Practice: 101 - CNMP Design and Implementation Activity

Scenario: #9 - CNMP Revision

Scenario Description:

A Comprehensive Nutrient Management Plan (CNMP) will be revised to address changes in manure management, volume or analysis, plants and crops, or plant and crop management or to adjust the nutrient balance on an Animal Feeding Operation (AFO). No modifications are required to engineered practices in the farmstead/production area. This scenario is where the services of a professional engineer are typically not required. The producer may export a portion of manure or organic products from the farm. The producer has an animal production area and land applies nutrients.

Before Situation:

The owner/operator of an AFO has an existing written Comprehensive Nutrient Management Plan (CNMP) that addresses the current required resource concerns and client objectives present on the facility production area and land application areas. The CNMP is

After Situation:

Utilize a certified Technical Service Provider (TSP) to update the nutrient management plan and design planned agronomic conservation practices that address the handling, storage, and application of animal waste in an environmentally safe manner. Design and implementation will meet the general and additional applicable criteria found in each conservation practice. Design all agronomic conservation practices found in Comprehensive Nutrient Management Plan (CPA 102) or Conservation Plan that addresses the planned practices for land application of manure and nutrients, and the handling, transfer, storage and treatment of animal wastes. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to reduce soil erosion on land application areas to sustainable levels; land apply waste material nutrients in a manner than meets NRCS 590 Nutrient Management standard technical criteria. Use CEMA 226 and CEMA 227 if site feasibility and evaluation of existing storages are needed.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,861.74

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $4,861.74

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 101 - CNMP Design and Implementation Activity

Scenario: #25 - All Livestock Operations, No Land Application

Scenario Description:

Animal Feeding Operation (AFO) without land application. Use only if CEMA 226 is needed. The producer exports (material transferred to another owner with written documentation of the transfer) manure or organic products from the farm. The operation has an animal production area. Select applicable CPA 102 component for a complete CNMP

Before Situation:

Currently the production area does not meet NRCS quality criteria for water quality and soil erosion. Manure not frequently tested. Various levels of management and conservation implementation have occurred on the farm. Little documentation of the systems

After Situation:

Utilize a certified Technical Service Provider (TSP) to design planned conservation practices that address the handling and storage of animal waste in an environmentally safe manner. Design and implementation will meet the general and additional applicable criteria found in each conservation practice. Use only if CEMA 226 is needed. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,115.38

Total Cost per Unit: $1,115.38

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 101 - CNMP Design and Implementation Activity

Scenario: #41 - All Livestock Operations, Less Than or Equal to 300 Animal Units

Scenario Description:

All Animal Feeding Operation (AFO) currently less than 300 animal units (AU). The producer may export (material transferred to another owner with written documentation of the transfer) a portion of the manure or organic products from the farm. The operation has an animal production area, cropland, and applies most nutrients (manure and commercial fertilizers). Select applicable CPA 102 component for a complete CNMP.

Before Situation:

Currently the production area and land application areas do not meet NRCS quality criteria for water quality and soil erosion. Soil tests are not current. Manure not frequently tested.

After Situation:

Utilize a certified Technical Service Provider (TSP) to complete a nutrient management plan and implementation specifications for conservation practices treating resource concerns and the application of animal waste in an environmentally safe manner on the production and land treatment areas. Design and implementation will meet the general and additional applicable criteria found in each conservation practice. Job sheets and implementation requirement documents found in State's eFOTG Section IV Conservation practices may be used. Complete Implementation Requirements or Job Sheets for all agronomic conservation practices found in Comprehensive Nutrient Management Plan (CPA 102) or Conservation Plan that address the planned practices for land application of manure and nutrients and treat identified resource concerns. Use CEMA 226 and CEMA 227 if site feasibility and evaluation of existing storages are needed.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,635.39

Total Cost per Unit: $6,635.39

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 101 - CNMP Design and Implementation Activity

Scenario: #73 - All Livestock Operations, 301 to 700 Animal Units

Scenario Description:

All Animal Feeding Operation (AFO) currently greater than 300 animal units (AU) and less than 700 AU with land application. The producer may export (material transferred to another owner with written documentation of the transfer) a portion of the manure or organic products from the farm. The operation has an animal production area, cropland, and applies most nutrients (manure and commercial fertilizers). Select applicable CPA 102 component for a complete CNMP.

Before Situation:

Currently the production area and land application areas do not meet NRCS quality criteria for water quality and soil erosion. Soil tests are not current. Manure not frequently tested.

After Situation:

Utilize a certified Technical Service Provider (TSP) to complete nutrient management plan and implementation specifications for conservation practices treating resource concerns and the application of animal waste in an environmentally safe manner on the production and land treatment areas. Design and implementation will meet the general and additional applicable criteria found in each conservation practice. Job sheets and implementation requirement documents found in State's eFOTG Section IV Conservation practices may be used. Complete Implementation Requirements or Job Sheets for all agronomic conservation practices found in Comprehensive Nutrient Management Plan (CPA 102) or Conservation Plan that address the planned practices for land application of manure and nutrients and treat identified resource concerns. Use CEMA 226 and CEMA 227 if site feasibility and evaluation of existing storages are needed.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,929.72

Total Cost per Unit: $5,929.72

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 101 - CNMP Design and Implementation Activity

Scenario: #105 - All Livestock Operations, Greater Than 700 Animal Units

Scenario Description:

All Animal Feeding Operation (AFO) currently greater than 700 animal units (AU) with land application. The producer may export (material transferred to another owner with written documentation of the transfer) a portion of the manure or organic products from the farm. The operation has an animal production area, cropland, and applies most nutrients (manure and commercial fertilizers). Select applicable CPA 102 component for a complete CNMP.

Before Situation:

Currently the production area and land application areas do not meet NRCS quality criteria for water quality and soil erosion. Soil tests are not current. Manure not frequently tested.

After Situation:

Utilize a certified Technical Service Provider (TSP) to complete a nutrient management plan and implementation specifications for conservation practices treating resource concerns and the application of animal waste in an environmentally safe manner on the production of land treatment areas. Design and implementation will meet the general and additional applicable criteria found in each conservation practice. Job sheets and implementation requirement documents found in State's eFOTG Section IV Conservation practices may be used. Complete Implementation Requirements or Job Sheets for all agronomic conservation practices found in Comprehensive Nutrient Management Plan (CPA 102) or Conservation Plan that address the planned practices for land application of manure and nutrients and treat identified resource concerns. Use CEMA 226 and CEMA 227 if site feasibility and evaluation of existing storages are needed.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $9,295.86

Total Cost per Unit: $9,295.86

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 102 - Comprehensive Nutrient Management Plan

Scenario: #355 - Dairy Operations, 301 to 700 Animal Units

Scenario Description:

Dairy Animal Feeding Operation (AFO) greater than 300 but less than 700 animal units (AU) animal units (AU). The producer utilizes manure or organic products from the farm and may export a portion. The operation has an animal production area, cropland, and applies most nutrients (manure and commercial fertilizers). Use CEMA 226/227 if site evaluation and evaluation of existing components are needed. Select applicable DIA 101 component for a complete CNMP.

Before Situation:

Currently the production area and land application areas do not meet NRCS quality criteria for water quality and soil erosion. Soil tests are not current or do not exist. Manure or Organic products are not frequently tested. The production area and land a

After Situation:

Utilize a CNMP Certified Technical Service Provider (TSP) to plan conservation practices that address the handling and storage of animal waste in an environmentally safe manner. CPA 102 - CNMP identifies the conservation practice solutions to all identified resource concerns on the AFO production area and land application areas. Production, collection, transfer, treatment, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,864.25

Total Cost per Unit: $6,864.25

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 102 - Comprehensive Nutrient Management Plan

Scenario: #371 - Dairy Operations, Less Than or Equal to 300 Animal Units

Scenario Description:

Dairy Animal Feeding Operation (AFO) currently is less than 300 animal units (AU). The producer utilizes manure or organic products from the farm and may export a portion. The operation has an animal production area, cropland, and applies most nutrients (manure and commercial fertilizers). Use CEMA 226/227 if site evaluation and evaluation of existing components are needed. Select applicable DIA 101 component for a complete CNMP.

Before Situation:

Currently the production area and land application areas do not meet NRCS quality criteria for water quality and soil erosion. Soil tests are not current or do not exist. Manure or Organic products are not frequently tested. The production area and land a

After Situation:

Utilize a CNMP Certified Technical Service Provider (TSP) to plan conservation practices that address the handling and storage of animal waste in an environmentally safe manner. CPA 102 - CNMP identifies the conservation practice solutions to all identified resource concerns on the AFO production area and land application areas. Production, collection, transfer, treatment, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,579.15

Total Cost per Unit: $5,579.15

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 102 - Comprehensive Nutrient Management Plan

Scenario: #387 - Dairy Operations, No Land Application

Scenario Description:

Dairy Feeding Operation (AFO). The producer exports (material transferred to another owner with written documentation of the transfer) all manure or organic products from the farm. The operation has an animal production area only. There is no land treatment section, this plan would cover production only. Use CEMA 226/227 if site evaluation and evaluation of existing components are needed. Export only Plan, DIA 101 should not be used unless a CEMA 226 is needed.

Before Situation:

Currently the production area does not meet NRCS quality criteria for water quality. Manure or Organic products are not frequently tested. The production area does not meet NRCS quality criteria for water quality and soil erosion. The owner/operator of a

After Situation:

Utilize a CNMP certified Technical Service Provider (TSP) to plan conservation practices that address the handling, storage, and transfer of animal waste in an environmentally safe manner. CPA 102 -CNMP describes the conservation practice solutions to all identified resource concerns on the AFO production area. Production, collection, transfer, treatment, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,837.06

Total Cost per Unit: $5,837.06

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 102 - Comprehensive Nutrient Management Plan

Scenario: #403 - Non-Dairy Livestock Operations, No Land Application

Scenario Description:

Animal Feeding Operation (AFO). The producer exports (material transferred to another owner with written documentation of the transfer) all manure or organic products from the farm. The operation has an animal production area only. There is no land treatment section, this plan would cover production only. Use CEMA 227 for evaluation of existing components, if needed. Export only Plan, DIA 101 should not be used unless CEMA 226 is needed.

Before Situation:

Currently the production area does not meet NRCS quality criteria for water quality. Manure or Organic products are not frequently tested. The production area does not meet NRCS quality criteria for water quality and soil erosion. The owner/operator of a

After Situation:

Utilize a CNMP certified Technical Service Provider (TSP) to plan conservation practices that address the handling, storage, and transfer of animal waste in an environmentally safe manner. CPA 102 -CNMP describes the conservation practice solutions to all identified resource concerns on the AFO production area. Production, collection, transfer, treatment, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,606.30

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $3,606.30

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 102 - Comprehensive Nutrient Management Plan

Scenario: #419 - Non-Dairy Operations, Greater Than 700 Animal Units

Scenario Description:

Animal Feeding Operation (AFO) currently is greater than 700 animal units (AU). The producer utilizes manure or organic products from the farm and may export a portion. The operation has an animal production area, cropland, and applies most nutrients (manure and commercial fertilizers). Use CEMA 226/227 if site evaluation and evaluation of existing components are needed. Select applicable DIA 101 component for a complete CNMP.

Before Situation:

Currently the production area and land application areas do not meet NRCS quality criteria for water quality and soil erosion. Soil tests are not current or do not exist. Manure or Organic products are not frequently tested. The production area and land a

After Situation:

Utilize a CNMP Certified Technical Service Provider (TSP) to plan conservation practices that address the handling and storage of animal waste in an environmentally safe manner. CPA 102 - CNMP identifies the conservation practice solutions to all identified resource concerns on the AFO production area and land application areas. Production, collection, transfer, treatment, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $7,726.18

Total Cost per Unit: $7,726.18

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 102 - Comprehensive Nutrient Management Plan

Scenario: #435 - Non-Dairy Livestock Operations, 301 to 700 Animal Units

Scenario Description:

Animal Feeding Operation (AFO) currently is greater than 300 but less than 700 animal units (AU). The producer utilizes manure or organic products from the farm and may export a portion. The operation has an animal production area, cropland, and applies most nutrients (manure and commercial fertilizers). Use CEMA 226/227 if site evaluation and evaluation of existing components are needed. Select applicable DIA 101 component for a complete CNMP.

Before Situation:

Currently the production area and land application areas do not meet NRCS quality criteria for water quality and soil erosion. Soil tests are not current or do not exist. Manure or Organic products are not frequently tested. The production area and land a

After Situation:

Utilize a CNMP Certified Technical Service Provider (TSP) to plan conservation practices that address the handling and storage of animal waste in an environmentally safe manner. CPA 102 - CNMP identifies the conservation practice solutions to all identified resource concerns on the AFO production area and land application areas. Production, collection, transfer, treatment, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,011.24

Total Cost per Unit: $6,011.24

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 102 - Comprehensive Nutrient Management Plan

Scenario: #451 - Non-Dairy Livestock Operations, Less Than or Equal to 300 Animal Units

Scenario Description:

Animal Feeding Operation (AFO) currently is less than 300 animal units (AU). The producer utilizes manure or organic products from the farm and may export a portion. The operation has an animal production area, cropland, and applies most nutrients (manure and commercial fertilizers). Use CEMA 226/227 if site evaluation and evaluation of existing components are needed. Select applicable DIA 101 component for a complete CNMP.

Before Situation:

Currently the production area and land application areas do not meet NRCS quality criteria for water quality and soil erosion. Soil tests are not current or do not exist. Manure or Organic products are not frequently tested. The production area and land a

After Situation:

Utilize a CNMP Certified Technical Service Provider (TSP) to plan conservation practices that address the handling and storage of animal waste in an environmentally safe manner. CPA 102 - CNMP identifies the conservation practice solutions to all identified resource concerns on the AFO production area and land application areas. Production, collection, transfer, treatment, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,551.97

Total Cost per Unit: $4,551.97

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 102 - Comprehensive Nutrient Management Plan

Scenario: #467 - Dairy Operations, Greater Than 700 Animal Units

Scenario Description:

Dairy Animal Feeding Operation (AFO) greater than 700 animal units (AU). The producer utilizes manure or organic products from the farm and may export a portion. The operation has an animal production area, cropland, and applies most nutrients (manure and commercial fertilizers). Use CEMA 226/227 if site evaluation and evaluation of existing components are needed. Select applicable DIA 101 component for a complete CNMP.

Before Situation:

Currently the production area and land application areas do not meet NRCS quality criteria for water quality and soil erosion. Soil tests are not current or do not exist. Manure or Organic products are not frequently tested. The production area and land a

After Situation:

Utilize a CNMP Certified Technical Service Provider (TSP) to plan conservation practices that address the handling and storage of animal waste in an environmentally safe manner. CPA 102 - CNMP identifies the conservation practice solutions to all identified resource concerns on the AFO production area and land application areas. Production, collection, transfer, treatment, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $8,579.20

Total Cost per Unit: $8,579.20

Based on North Dakota average costs. Individual county costs may vary.

Practice: 106 - Forest Management Plan

Scenario: #74 - Nonindustrial Private Forest, Less Than or Equal to 20 Acres

Scenario Description:

Nonindustrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 1 to 20 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concerns exist which are not addressed by a management plan. A Forest Management Plan or Conservation Plan Activities (CPA), as de

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Conservation Plan Activities (CPA). The CPA criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CPA is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CPA plan criteria is detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,610.05

Total Cost per Unit: $1,610.05

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 106 - Forest Management Plan

Scenario: #75 - Nonindustrial Private Forest, 21 to 100 Acres

Scenario Description:

Nonindustrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 21 to 100 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concerns exist which are not addressed by a management plan. A Forest Management Plan or Conservation Plan Activities (CPA), as de

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Conservation Plan Activities (CPA). The CPA criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CPA is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CPA plan criteria is detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,372.71

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $2,372.71

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 106 - Forest Management Plan

Scenario: #76 - Nonindustrial Private Forest, 101 to 250 Acres

Scenario Description:

Nonindustrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 101 to 250 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concerns exist which are not addressed by a management plan. A Forest Management Plan or Conservation Plan Activities (CPA), as de

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Conservation Plan Activities (CPA). The CPA criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CPA is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CPA plan criteria is detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,898.02

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $3,898.02

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 106 - Forest Management Plan

Scenario: #77 - Nonindustrial Private Forest, Greater Than 1,000 Acres

Scenario Description:

Nonindustrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 1001 acres or greater in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concerns exist which are not addressed by a management plan. A Forest Management Plan or Conservation Plan Activities (CPA), as de

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Conservation Plan Activities (CPA). The CPA criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CPA is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CPA plan criteria is detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $9,151.86

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $9,151.86

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 106 - Forest Management Plan

Scenario: #78 - Nonindustrial Private Forest, 501 to 1,000 Acres

Scenario Description:

Nonindustrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 501 to 1000 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concerns exist which are not addressed by a management plan. A Forest Management Plan or Conservation Plan Activities (CPA), as de

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Conservation Plan Activities (CPA). The CPA criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CPA is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CPA plan criteria is detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $7,033.38

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $7,033.38

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 106 - Forest Management Plan

Scenario: #79 - Nonindustrial Private Forest, 251 to 500 Acres

Scenario Description:

Nonindustrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 251 to 500 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concerns exist which are not addressed by a management plan. A Forest Management Plan or Conservation Plan Activities (CPA), as de

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Conservation Activity Plan (CPA). The CPA requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CPA is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CPA plan requirements are detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,762.28

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $5,762.28

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 110 - Grazing Management Plan

Scenario: #75 - Grazed Lands, 101 to 500 Acres

Scenario Description:

Site specific conservation plan for grazed lands for an agricultural operation with 101 to 500 acres grazed land. Natural Resource Concern: Soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without a plan to address identified natural resource concerns. Producer is interested in management of

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Conservation Planning Activity (CPA) plan for grazing lands. The CPA requires the plan to meet the General Requirements (steps 1-7) of the planning process. Step 1- Identify Problems and Opportunities, Step 2- Determine Objectives, Step 3-Inventory Resources, Step 4-Analyze Resource Data, Step 5-Formulate Alternatives, Step 6-Evaluate Alternatives, and Step 7-Make Decisions (Select Preferred Alternative).

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,141.79

Total Cost per Unit: $3,141.79

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 110 - Grazing Management Plan

Scenario: #91 - Grazed Lands, Less Than or Equal to 100 Acres

Scenario Description:

Site specific conservation plan for agricultural operation with less than 100 acres grazed land. The plan will address the following natural resource concerns: soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without a plan to address identified natural resource concerns. Producer is interested in management of

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Conservation Planning Activity (CPA) plan for grazing lands. The CPA requires the plan to meet the General Requirements (steps 1-7) of the planning process. Step 1- Identify Problems and Opportunities, Step 2- Determine Objectives, Step 3-Inventory Resources, Step 4-Analyze Resource Data, Step 5-Formulate Alternatives, Step 6-Evaluate Alternatives, and Step 7-Make Decisions (Select Preferred Alternative). The plan may include recommendations for associated conservation practices which address other related resource concerns. The CPA meets the basic quality criteria for the CPA 110 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,513.43

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $2,513.43

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 110 - Grazing Management Plan

Scenario: #107 - Grazed Lands, 501 to 1,500 Acres

Scenario Description:

Site specific conservation plan for grazed lands for an agricultural operation with 501 to 1,500 acres of grazed land. The plan will address the following natural resource concerns: soil erosion, water quality, fish and wildlife, plant condition and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without a plan to address identified natural resource concerns. Producer is interested in management of

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Conservation Planning Activity (CPA) plan for grazing lands. The CPA requires the plan to meet the General Requirements (steps 1-7) of the planning process. Step 1- Identify Problems and Opportunities, Step 2- Determine Objectives, Step 3-Inventory Resources, Step 4-Analyze Resource Data, Step 5-Formulate Alternatives, Step 6-Evaluate Alternatives, and Step 7-Make Decisions (Select Preferred Alternative). The plan may include recommendations for associated conservation practices which address other related resource concerns. The CPA meets the basic quality criteria for the CPA 110 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,770.14

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $3,770.14

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 110 - Grazing Management Plan

Scenario: #123 - Grazed Lands, 1,501 to 5,000 Acres

Scenario Description:

Site specific conservation plan for grazed lands for an agricultural operation with 1,501 to 5,000 acres grazed land. The following natural resource concerns will be addressed: soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without a plan to address identified natural resource concerns. Producer is interested in management of

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Conservation Planning Activity (CPA) plan for grazing lands. The CPA requires the plan to meet the General Requirements (steps 1-7) of the planning process. Step 1- Identify Problems and Opportunities, Step 2- Determine Objectives, Step 3-Inventory Resources, Step 4-Analyze Resource Data, Step 5-Formulate Alternatives, Step 6-Evaluate Alternatives, and Step 7-Make Decisions (Select Preferred Alternative). The plan may include recommendations for associated conservation practices which address other related resource concerns. The CPA meets the basic quality criteria for the CPA 110 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,398.50

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $4,398.50

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 110 - Grazing Management Plan

Scenario: #139 - Grazed Lands, 5,001 to 10,000 Acres

Scenario Description:

Site specific conservation plan for grazed lands for an agricultural operation with 5,001 to 10,000 acres grazed land. The following natural resource concerns will be addressed: soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without a plan to address identified natural resource concerns. Producer is interested in management of

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Conservation Planning Activity (CPA) plan for grazing lands. The CPA requires the plan to meet the General Requirements (steps 1-7) of the planning process. Step 1- Identify Problems and Opportunities, Step 2- Determine Objectives, Step 3-Inventory Resources, Step 4-Analyze Resource Data, Step 5-Formulate Alternatives, Step 6-Evaluate Alternatives, and Step 7-Make Decisions (Select Preferred Alternative). The plan may include recommendations for associated conservation practices which address other related resource concerns. The CPA meets the basic quality criteria for the CPA 110 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,026.86

Total Cost per Unit: $5,026.86

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 110 - Grazing Management Plan

Scenario: #155 - Grazed Lands, Greater Than 10,000 Acres

Scenario Description:

Site specific conservation plan for grazed lands for an agricultural operation with greater than 10,000 acres grazed land. The following natural resource concerns will be addressed: soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without a plan to address identified natural resource concerns. Producer is interested in management of

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Conservation Planning Activity (CPA) plan for grazing lands. The CPA requires the plan to meet the General Requirements (steps 1-7) of the planning process. Step 1- Identify Problems and Opportunities, Step 2- Determine Objectives, Step 3-Inventory Resources, Step 4-Analyze Resource Data, Step 5-Formulate Alternatives, Step 6-Evaluate Alternatives, and Step 7-Make Decisions (Select Preferred Alternative). The plan may include recommendations for associated conservation practices which address other related resource concerns. The CPA meets the basic quality criteria for the CPA 110 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,655.22

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $5,655.22

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 116 - Soil Health Management Plan

Scenario: #89 - Organic Crops and Livestock Soil Health Management, Less Than Five Units

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for fewer than 5 Soil Health Management Units (SHMU) for organic crops and livestock. A SHMU is 1 or more planning land units with similar soil type, land use, and management. A SHMU can vary in size or acreage depending on soil texture, topography, and cropping system.

Before Situation:

The producer currently manages without an existing soil health management plan, or with an outdated plan. Resource concerns exist which are not addressed by a management plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of a Soil Health Conservation Plan Activity (CPA). The CPA criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,922.99

Total Cost per Unit: $2,922.99

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 116 - Soil Health Management Plan

Scenario: #105 - Organic Crops Soil Health Management, Greater Than or Equal to Five Units

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for 5 or more Soil Health Management Units (SHMU) for organic crops. A SHMU is 1 or more planning land units with similar soil type, land use, and management. A SHMU can vary in size or acreage depending on soil texture, topography, and cropping system.

Before Situation:

The producer currently manages without an existing soil health management plan, or with an outdated plan. Resource concerns exist which are not addressed by a management plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of a Soil Health Conservation Plan Activity (CPA). The CPA criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,751.05

Total Cost per Unit: $2,751.05

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 116 - Soil Health Management Plan

Scenario: #121 - Small Farm, Less Than or Equal to 10 Acres

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for a small farm (<10 acres).

Before Situation:

The producer currently manages without an existing soil health management plan, or with an outdated plan. Resource concerns exist which are not addressed by a management plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of a Soil Health Conservation Plan Activity (CPA). The CPA criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,719.41

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $1,719.41

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 116 - Soil Health Management Plan

Scenario: #137 - Organic Crops and Livestock Soil Health Management, Greater Than or Equal to Five Units

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for 5 or more Soil Health Management Units (SHMU) for organic crops and livestock. A SHMU is 1 or more planning land units with similar soil type, land use, and management. A SHMU can vary in size or acreage depending on soil texture, topography, and cropping system.

Before Situation:

The producer currently manages without an existing soil health management plan, or with an outdated plan. Resource concerns exist which are not addressed by a management plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of a Soil Health Conservation Plan Activity (CPA). The CPA criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,094.93

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $3,094.93

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 116 - Soil Health Management Plan

Scenario: #153 - Crops and Livestock Soil Health Management, Greater Than or Equal to Five Units

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for 5 or more Soil Health Management Units (SHMU) for crops and livestock. A SHMU is 1 or more planning land units with similar soil type, land use, and management. A SHMU can vary in size or acreage depending on soil texture, topography, and cropping system.

Before Situation:

The producer currently manages without an existing soil health management plan, or with an outdated plan. Resource concerns exist which are not addressed by a management plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of a Soil Health Conservation Plan Activity (CPA). The CPA criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,579.11

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $2,579.11

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 116 - Soil Health Management Plan

Scenario: #169 - Crops and Livestock Soil Health Management, Less Than Five Units

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for fewer than 5 Soil Health Management Units (SHMU) for crops and livestock. A SHMU is 1 or more planning land units with similar soil type, land use, and management. A SHMU can vary in size or acreage depending on soil texture, topography, and cropping system.

Before Situation:

The producer currently manages without an existing soil health management plan, or with an outdated plan. Resource concerns exist which are not addressed by a management plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of a Soil Health Conservation Plan Activity (CPA). The CPA criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,063.29

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $2,063.29

Practice: 116 - Soil Health Management Plan

Scenario: #185 - Organic Crops Soil Health Management, Less Than Five Units

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for fewer than 5 Soil Health Management Units (SHMU) for organic crops. A SHMU is 1 or more planning land units with similar soil type, land use, and management. A SHMU can vary in size or acreage depending on soil texture, topography, and cropping system.

Before Situation:

The producer currently manages without an existing soil health management plan, or with an outdated plan. Resource concerns exist which are not addressed by a management plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of a Soil Health Conservation Plan Activity (CPA). The CPA criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,235.23

Total Cost per Unit: $2,235.23

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 116 - Soil Health Management Plan

Scenario: #201 - Crops Soil Health Management, Greater Than or Equal to Five Units

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for 5 or more Soil Health Management Units (SHMU) for crops. A SHMU is 1 or more planning land units with similar soil type, land use, and management. A SHMU can vary in size or acreage depending on soil texture, topography, and cropping system.

Before Situation:

The producer currently manages without an existing soil health management plan, or with an outdated plan. Resource concerns exist which are not addressed by a management plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of a Soil Health Conservation Plan Activity (CPA). The CPA criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,407.17

Total Cost per Unit: $2,407.17

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 116 - Soil Health Management Plan

Scenario: #217 - Crops Soil Health Management, Less Than Five Units

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for fewer than 5 Soil Health Management Units (SHMU) for crops. A SHMU is 1 or more planning land units with similar soil type, land use, and management. A SHMU can vary in size or acreage depending on soil texture, topography, and cropping system.

Before Situation:

The producer currently manages without an existing soil health management plan, or with an outdated plan. Resource concerns exist which are not addressed by a management plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of a Soil Health Conservation Plan Activity (CPA). The CPA criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,891.35

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $1,891.35

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 120 - Agricultural Energy Design

Scenario: #9 - High Complexity, Greater Than or Equal to Six Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for retrofits that impose several variables in the design process. The scenarios may involve a change in service levels that cannot be evaluated or designed through use of simple tools or manual calculations. Four factors typically indicate a “High Complexity” system, as follows. 1) Client objectives require a change of output (hp, Btu/hr., lux, etc.) that varies more than about 30% from old devices. 2) System constraints prevent new devices from being installed in the same location as the old devices. 3) The retrofit requires substantive changes to two or more of the electrical, mechanical, plumbing, or structural systems. 4) Complex analysis to evaluate alternatives is required to confirm level of service and appropriate device output, placement, etc. (For example, a detailed simulation is required to determine systems sizing and layout.) “High Complexity” practice scenarios include but are not limited to: comprehensive lighting system redesign; radiant heating systems; convert to tunnel ventilation; or convert to bench heating. Each “Design” indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than five practices are contracted, then, at a minimum, “6+ Designs” shall be contracted for the Ag Energy DIA. Use this scenario if at least one design is deemed high complexity. The Ag Energy DIA includes reviewing, and, when needed, revising alternatives to address energy concerns. The Ag Energy DIA documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop designs to implement one or more practice scenarios to address Energy Efficiency resource concerns using th

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Ag Energy DIA. The DIA 120 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The Ag Energy DIA meets the quality criteria for the DIA 120 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $11,068.11

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $11,068.11

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 120 - Agricultural Energy Design

Scenario: #25 - Medium Complexity, Greater Than or Equal to Six Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for retrofits that impose some variables in the design process. The scenarios may involve a change in service levels that can be evaluated or designed through use of simple tools or manual calculations. Four factors typically indicate a “Medium Complexity” system, as follows. 1) Client objectives require a change of output (hp, Btu/hr., lux, etc.) that varies more than about 10% from old devices. 2) System constraints prevent new devices from being installed in the same location as the old devices. 3) The retrofit requires substantive changes to either electrical, mechanical, plumbing, or structural systems. 4) Analysis beyond the scope of NRCS methodology to evaluate alternatives is required to confirm level of service and appropriate device output, placement, etc. (For example, a simplified heat transfer model to determine heating, ventilation, and cooling loads may be required if existing device capacity cannot be estimated.) “Medium Complexity” practice scenarios include but are not limited to: change of lighting fixture counts or layout; wall insulation; grain dryers; add reverse osmosis to syrup production; or add evaporative cooling systems (cooling cells). Each “Design” indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than five practices are contracted, then, at a minimum, “6+ Designs” shall be contracted for the Ag Energy DIA. If at least 1 scenario is more complex than indicated herein, use an alternate scenario for contracting. The Ag Energy DIA includes reviewing, and, when needed, revising alternatives to address energy concerns. The Ag Energy DIA documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop designs to implement one or more practice scenarios to address Energy Efficiency resource concerns using th

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Ag Energy DIA. The DIA 120 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The Ag Energy DIA meets the quality criteria for the DIA 120 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $9,553.51

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $9,553.51

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 120 - Agricultural Energy Design

Scenario: #41 - Low Complexity, Greater Than or Equal to Six Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for one-to-one device retrofits. The scenario(s) may provide for a new component to modify the operation of an existing device (e.g., timer to reduce run-time). Three factors typically indicate a “Low Complexity” system, as follows. 1) New devices maintain output (hp, Btu/hr., lux, etc.) of the old devices within a roughly 10% range. 2) New devices are installed in the same location as the old devices. 3) The retrofit does not require substantive changes to electrical, mechanical, plumbing, or structural systems. “Low Complexity” practice scenarios include but are not limited to: lamp or fixture upgrades; attic insulation; fans; or washer-extractors. Each “Design” indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than five practices are contracted, then, at a minimum, “6+ Designs” shall be contracted for the Ag Energy DIA. If at least 1 scenario is more complex than indicated herein, use an alternate scenario for contracting. The Ag Energy DIA includes reviewing, and, when needed, revising alternatives to address energy concerns. The Ag Energy DIA documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop designs to implement one or more practice scenarios to address Energy Efficiency resource concerns using th

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Ag Energy DIA. The DIA 120 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The Ag Energy DIA meets the quality criteria for the DIA 120 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $8,038.92

Total Cost per Unit: $8,038.92

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 120 - Agricultural Energy Design

Scenario: #57 - High Complexity, Four to Five Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for retrofits that impose several variables in the design process. The scenarios may involve a change in service levels that cannot be evaluated or designed through use of simple tools or manual calculations. Four factors typically indicate a “High Complexity” system, as follows. 1) Client objectives require a change of output (hp, Btu/hr., lux, etc.) that varies more than about 30% from old devices. 2) System constraints prevent new devices from being installed in the same location as the old devices. 3) The retrofit requires substantive changes to two or more of the electrical, mechanical, plumbing, or structural systems. 4) Complex analysis to evaluate alternatives is required to confirm level of service and appropriate device output, placement, etc. (For example, a detailed simulation is required to determine systems sizing and layout.) “High Complexity” practice scenarios include but are not limited to: comprehensive lighting system redesign; radiant heating systems; convert to tunnel ventilation; or convert to bench heating. Each “Design” indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than three practices are contracted, then, at a minimum, “4-5 Designs” shall be contracted for the Ag Energy DIA. Use this scenario if at least one design is deemed high complexity. The Ag Energy DIA includes reviewing, and, when needed, revising alternatives to address energy concerns. The Ag Energy DIA documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop designs to implement one or more practice scenarios to address Energy Efficiency resource concerns using th

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Ag Energy DIA. The DIA 120 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The Ag Energy DIA meets the quality criteria for the DIA 120 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $9,407.48

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $9,407.48

Practice: 120 - Agricultural Energy Design

Scenario: #73 - Medium Complexity, Four to Five Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for retrofits that impose some variables in the design process. The scenarios may involve a change in service levels that can be evaluated or designed through use of simple tools or manual calculations. Four factors typically indicate a “Medium Complexity” system, as follows. 1) Client objectives require a change of output (hp, Btu/hr., lux, etc.) that varies more than about 10% from old devices. 2) System constraints prevent new devices from being installed in the same location as the old devices. 3) The retrofit requires substantive changes to either electrical, mechanical, plumbing, or structural systems. 4) Analysis beyond the scope of NRCS methodology to evaluate alternatives is required to confirm level of service and appropriate device output, placement, etc. (For example, a simplified heat transfer model to determine heating, ventilation, and cooling loads may be required if existing device capacity cannot be estimated.) “Medium Complexity” practice scenarios include but are not limited to: change of lighting fixture counts or layout; wall insulation; grain dryers; add reverse osmosis to syrup production; or add evaporative cooling systems (cooling cells). Each “Design” indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than three practices are contracted, then, at a minimum, “4-5 Designs” shall be contracted for the Ag Energy DIA. If at least 1 scenario is more complex than indicated herein, use an alternate scenario for contracting. The Ag Energy DIA includes reviewing, and, when needed, revising alternatives to address energy concerns. The Ag Energy DIA documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop designs to implement one or more practice scenarios to address Energy Efficiency resource concerns using th

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Ag Energy DIA. The DIA 120 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The Ag Energy DIA meets the quality criteria for the DIA 120 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $7,892.89

Total Cost per Unit: $7,892.89

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 120 - Agricultural Energy Design

Scenario: #89 - Low Complexity, Four to Five Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for one-to-one device retrofits. The scenario(s) may provide for a new component to modify the operation of an existing device (e.g., timer to reduce run-time). Three factors typically indicate a “Low Complexity” system, as follows. 1) New devices maintain output (hp, Btu/hr., lux, etc.) of the old devices within a roughly 10% range. 2) New devices are installed in the same location as the old devices. 3) The retrofit does not require substantive changes to electrical, mechanical, plumbing, or structural systems. “Low Complexity” practice scenarios include but are not limited to: lamp or fixture upgrades; attic insulation; fans; or washer-extractors. Each “Design” indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than three practices are contracted, then, at a minimum, “4-5 Designs” shall be contracted for the Ag Energy DIA. If at least 1 scenario is more complex than indicated herein, use an alternate scenario for contracting. The Ag Energy DIA includes reviewing, and, when needed, revising alternatives to address energy concerns. The Ag Energy DIA documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop designs to implement one or more practice scenarios to address Energy Efficiency resource concerns using th

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Ag Energy DIA. The DIA 120 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The Ag Energy DIA meets the quality criteria for the DIA 120 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,378.29

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $6,378.29

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 120 - Agricultural Energy Design

Scenario: #105 - High Complexity, Two to Three Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for retrofits that impose several variables in the design process. The scenarios may involve a change in service levels that cannot be evaluated or designed through use of simple tools or manual calculations. Four factors typically indicate a “High Complexity” system, as follows. 1) Client objectives require a change of output (hp, Btu/hr., lux, etc.) that varies more than about 30% from old devices. 2) System constraints prevent new devices from being installed in the same location as the old devices. 3) The retrofit requires substantive changes to two or more of the electrical, mechanical, plumbing, or structural systems. 4) Complex analysis to evaluate alternatives is required to confirm level of service and appropriate device output, placement, etc. (For example, a detailed simulation is required to determine systems sizing and layout.) “High Complexity” practice scenarios include but are not limited to: comprehensive lighting system redesign; radiant heating systems; convert to tunnel ventilation; or convert to bench heating. Each “Design” indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than one practice is contracted, then, at a minimum, “2-3 Designs” shall be contracted for the Ag Energy DIA. Use this scenario if at least one design is deemed high complexity. The Ag Energy DIA includes reviewing, and, when needed, revising alternatives to address energy concerns. The Ag Energy DIA documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop designs to implement one or more practice scenarios to address Energy Efficiency resource concerns using th

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Ag Energy DIA. The DIA 120 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The Ag Energy DIA meets the quality criteria for the DIA 120 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $7,746.86

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $7,746.86

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 120 - Agricultural Energy Design

Scenario: #121 - Medium Complexity, Two to Three Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for retrofits that impose some variables in the design process. The scenarios may involve a change in service levels that can be evaluated or designed through use of simple tools or manual calculations. Four factors typically indicate a “Medium Complexity” system, as follows. 1) Client objectives require a change of output (hp, Btu/hr., lux, etc.) that varies more than about 10% from old devices. 2) System constraints prevent new devices from being installed in the same location as the old devices. 3) The retrofit requires substantive changes to either electrical, mechanical, plumbing, or structural systems. 4) Analysis beyond the scope of NRCS methodology to evaluate alternatives is required to confirm level of service and appropriate device output, placement, etc. (For example, a simplified heat transfer model to determine heating, ventilation, and cooling loads may be required if existing device capacity cannot be estimated.) “Medium Complexity” practice scenarios include but are not limited to: change of lighting fixture counts or layout; wall insulation; grain dryers; add reverse osmosis to syrup production; or add evaporative cooling systems (cooling cells). Each “Design” indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than one practice is contracted, then, at a minimum, “2-3 Designs” shall be contracted for Energy DIA. If at least 1 scenario is more complex than indicated herein, use an alternate scenario for contracting. The Ag Energy DIA includes reviewing, and, when needed, revising alternatives to address energy concerns. The Ag Energy DIA documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop designs to implement one or more practice scenarios to address Energy Efficiency resource concerns using th

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Ag Energy DIA. The DIA 120 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The Ag Energy DIA meets the quality criteria for the DIA 120 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,232.26

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $6,232.26

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 120 - Agricultural Energy Design

Scenario: #137 - Low Complexity, Two to Three Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for one-to-one device retrofits. The scenario(s) may provide for a new component to modify the operation of an existing device (e.g., timer to reduce run-time). Three factors typically indicate a “Low Complexity” system, as follows. 1) New devices maintain output (hp, Btu/hr., lux, etc.) of the old devices within a roughly 10% range. 2) New devices are installed in the same location as the old devices. 3) The retrofit does not require substantive changes to electrical, mechanical, plumbing, or structural systems. “Low Complexity” practice scenarios include but are not limited to: lamp or fixture upgrades; attic insulation; fans; or washer-extractors. Each “Design” indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than one practice is contracted, then, at a minimum, “2-3 Designs” shall be contracted for the Ag Energy DIA. If at least 1 scenario is more complex than indicated herein, use an alternate scenario for contracting. The Ag Energy DIA includes reviewing, and, when needed, revising alternatives to address energy concerns. The Ag Energy DIA documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop designs to implement one or more practice scenarios to address Energy Efficiency resource concerns using th

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Ag Energy DIA. The DIA 120 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The Ag Energy DIA meets the quality criteria for the DIA 120 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,717.66

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $4,717.66

Practice: 120 - Agricultural Energy Design

Scenario: #153 - High Complexity, One Design

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with at least one (1) energy practice scenario. Associated scenario(s) provide for retrofits that impose several variables in the design process. The scenarios may involve a change in service levels that cannot be evaluated or designed through use of simple tools or manual calculations. Four factors typically indicate a “High Complexity” system, as follows. 1) Client objectives require a change of output (hp, Btu/hr., lux, etc.) that varies more than about 30% from old devices. 2) System constraints prevent new devices from being installed in the same location as the old devices. 3) The retrofit requires substantive changes to two or more of the electrical, mechanical, plumbing, or structural systems. 4) Complex analysis to evaluate alternatives is required to confirm level of service and appropriate device output, placement, etc. (For example, a detailed simulation is required to determine systems sizing and layout.) “High Complexity” practice scenarios include but are not limited to: comprehensive lighting system redesign; radiant heating systems; convert to tunnel ventilation; or convert to bench heating. “One Design” indicates that each new device or component is closely related to other devices or components even if numerous scenarios are contracted. The Ag Energy DIA includes reviewing, and, when needed, revising alternatives to address energy concerns. The Ag Energy DIA documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop designs to implement one or more practice scenarios to address Energy Efficiency resource concerns using th

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Ag Energy DIA. The DIA 120 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The Ag Energy DIA meets the quality criteria for the DIA 120 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,086.23

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $6,086.23

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 120 - Agricultural Energy Design

Scenario: #169 - Medium Complexity, One Design

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with at least one (1) energy practice scenario. Associated scenario(s) provide for retrofits that impose some variables in the design process. The scenarios may involve a change in service levels that can be evaluated or designed through use of simple tools or manual calculations. Four factors typically indicate a “Medium Complexity” system, as follows. 1) Client objectives require a change of output (hp, Btu/hr., lux, etc.) that varies more than about 10% from old devices. 2) System constraints prevent new devices from being installed in the same location as the old devices. 3) The retrofit requires substantive changes to either electrical, mechanical, plumbing, or structural systems. 4) Analysis beyond the scope of NRCS methodology to evaluate alternatives is required to confirm level of service and appropriate device output, placement, etc. (For example, a simplified heat transfer model to determine heating, ventilation, and cooling loads may be required if existing device capacity cannot be estimated.) “Medium Complexity” practice scenarios include but are not limited to: change of lighting fixture counts or layout; wall insulation; grain dryers; add reverse osmosis to syrup production; or add evaporative cooling systems (cooling cells). “One Design” indicates that each new device or component is closely related to other devices or components even if numerous scenarios are contracted. The Ag Energy DIA includes reviewing, and, when needed, revising alternatives to address energy concerns. The Ag Energy DIA documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop designs to implement one or more practice scenarios to address Energy Efficiency resource concerns using th

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Ag Energy DIA. The DIA 120 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The Ag Energy DIA meets the quality criteria for the DIA 120 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,571.63

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $4,571.63

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 120 - Agricultural Energy Design

Scenario: #185 - Low Complexity, One Design

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with at least one (1) energy practice scenario. Associated scenario(s) provide for one-to-one device retrofits. The scenario(s) may provide for a new component to modify the operation of an existing device (e.g., timer to reduce run-time). Three factors typically indicate a “Low Complexity” system, as follows. 1) New devices maintain output (hp, Btu/hr., lux, etc.) of the old devices within a roughly 10% range. 2) New devices are installed in the same location as the old devices. 3) The retrofit does not require substantive changes to electrical, mechanical, plumbing, or structural systems. “Low Complexity” practice scenarios include but are not limited to: lamp or fixture upgrades; attic insulation; fans; or washer-extractors. “One Design” indicates that each new device or component is closely related to other devices or components even if numerous scenarios are contracted. The Ag Energy DIA includes reviewing, and, when needed, revising alternatives to address energy concerns. The Ag Energy DIA documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop designs to implement one or more practice scenarios to address Energy Efficiency resource concerns using th

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Ag Energy DIA. The DIA 120 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The Ag Energy DIA meets the quality criteria for the DIA 120 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,057.04

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $3,057.04

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 138 - Conservation Plan Supporting Organic Transition

Scenario: #24 - Supporting Organic Transition for Crops and Livestock

Scenario Description:

Agricultural operation where producer will transition from conventional to organic to meet USDA National Organic Program (NOP) requirements. Natural Resource Concern: Soil Erosion, Water Quality, Plant Condition, and other identified natural resource concerns.

Before Situation:

Agricultural operation currently managed using traditional and conventional methods for farming and/or ranching mixed operation of crops and livestock. The producer currently manages the operation based upon personal knowledge, or other local criteria. Th

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP to develop the Conservation Plan Supporting Organic Transition Conservation Activity Plan (CAP) The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to implement a system of conservation practices which assist the producer to transition from conventional farming or ranching to an organic production system with crops and livestock. The CAP plan will include conservation practices which address related resource concerns. The CAP meets the basic quality criteria for the 138 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,447.78

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $6,447.78

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 138 - Conservation Plan Supporting Organic Transition

Scenario: #41 - Transition to Organic for Crop, Low Complexity

Scenario Description:

A site specific conservation plan that contains planned conservation treatment activities for resource concerns resulting from the transition of conventional to organic production systems. At a minimum two alternatives will be developed. The first will be a no-action alternative in which current management activities are assumed to continue. The second will be an action alternative identifying a conservation practice or a system of conservation practices and management activities to address CPA identified resource concern(s). Additional action alternatives may be developed to identify different ways of achieving client objectives.

Before Situation:

Current crops and rotation, farming practices (tillage, nutrient application methods, timing, source, and rate), soils, and equipment and technology utilized are not considered as Organic. The producer objectives are to become organic. The effect of chang

After Situation:

When evaluating conservation practice effects, the short term and long term effect on natural resources and the applicability and effect on special environmental concerns identified in Step-3 (Resource Inventory) must be documented. Include recommendations that will avoid or mitigate any adverse effects on soil, water, air, plants, animals (including livestock, fish, and wildlife), energy, or human concerns; as well as on special environmental concerns. The Organic System Plan Template supplements are completed as part of NRCS Conservation Planning Activity (CPA) 138 that helps farmers who are interested in transitioning from conventional farming practices to organic production by addressing the natural resource concerns on their operation.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,588.07

Total Cost per Unit: $5,588.07

Based on North Dakota average costs. Individual county costs may vary.

Practice: 138 - Conservation Plan Supporting Organic Transition

Scenario: #57 - Transition to Organic for Crop, High Complexity

Scenario Description:

A site specific conservation plan that contains planned conservation treatment activities for resource concerns resulting from the transition of conventional to organic production systems. Crop production system is more complex based on site features, large acreage, specialty crops, irrigation, orchard and vineyards. At a minimum two alternatives will be developed. The first will be a no-action alternative in which current management activities are assumed to continue. The second will be an action alternative identifying a conservation practice or a system of conservation practices and management activities to address CPA identified resource concern(s). Additional action alternatives may be developed to identify different ways of achieving client objectives.

Before Situation:

Current crops and rotation, farming practices (tillage, nutrient application methods, timing, source, and rate), soils, and equipment and technology utilized are not considered as Organic. The producer objectives are to become organic. The effect of chang

After Situation:

When evaluating conservation practice effects, the short term and long term effect on natural resources and the applicability and effect on special environmental concerns identified in Step-3 (Resource Inventory) must be documented. Include recommendations that will avoid or mitigate any adverse effects on soil, water, air, plants, animals (including livestock, fish, and wildlife), energy, or human concerns; as well as on special environmental concerns. The Organic System Plan Template supplements are completed as part of NRCS Conservation Planning Activity (CPA) 138 that helps farmers who are interested in transitioning from conventional farming practices to organic production by addressing the natural resource concerns on their operation.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,447.78

Total Cost per Unit: $6,447.78

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 138 - Conservation Plan Supporting Organic Transition

Scenario: #73 - Transition to Organic for Livestock, Low Complexity

Scenario Description:

A site specific conservation plan that contains planned conservation treatment activities for resource concerns resulting from the transition of conventional to organic livestock systems. At a minimum two alternatives will be developed. The first will be a no-action alternative in which current management activities are assumed to continue. The second will be an action alternative identifying a conservation practice or a system of conservation practices and management activities to address CPA identified resource concern(s). Additional action alternatives may be developed to identify different ways of achieving client objectives.

Before Situation:

Current livestock production, housing, feed, equipment and technology utilized are not considered as Organic. The producer objectives are to become organic. The effect of changes to the current system are not known and new resource concerns may emerge.

After Situation:

When evaluating conservation practice effects, the short term and long term effect on natural resources and the applicability and effect on special environmental concerns identified in Step-3 (Resource Inventory) must be documented. Include recommendations that will avoid or mitigate any adverse effects on soil, water, air, plants, animals (including livestock, fish, and wildlife), energy, or human concerns; as well as on special environmental concerns. The Organic System Plan Template supplements are completed as part of NRCS Conservation Planning Activity (CPA) 138 that helps farmers who are interested in transitioning from conventional farming practices to organic production by addressing the natural resource concerns on their operation.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,017.92

Total Cost per Unit: $6,017.92

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 138 - Conservation Plan Supporting Organic Transition

Scenario: #89 - Transition to Organic for Livestock, High Complexity

Scenario Description:

A site specific conservation plan that contains planned conservation treatment activities for resource concerns resulting from the transition of conventional to organic livestock systems. System is high complexity based on conditions such as large Animal Units, multiple production locations, age segregation and similar management. At a minimum two alternatives will be developed. The first will be a no-action alternative in which current management activities are assumed to continue. The second will be an action alternative identifying a conservation practice or a system of conservation practices and management activities to address CPA identified resource concern(s). Additional action alternatives may be developed to identify different ways of achieving client objectives.

Before Situation:

Current livestock production, housing, feed, equipment and technology utilized are not considered as Organic. The producer objectives are to become organic. The effect of changes to the current system are not known and new resource concerns may emerge.

After Situation:

When evaluating conservation practice effects, the short term and long term effect on natural resources and the applicability and effect on special environmental concerns identified in Step-3 (Resource Inventory) must be documented. Include recommendations that will avoid or mitigate any adverse effects on soil, water, air, plants, animals (including livestock, fish, and wildlife), energy, or human concerns; as well as on special environmental concerns. The Organic System Plan Template supplements are completed as part of NRCS Conservation Planning Activity (CPA) 138 that helps farmers who are interested in transitioning from conventional farming practices to organic production by addressing the natural resource concerns on their operation.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $9,015.74

Total Cost per Unit: $9,015.74

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 138 - Conservation Plan Supporting Organic Transition

Scenario: #105 - Transition to Organic for Crop and Livestock, Low Complexity

Scenario Description:

A site specific conservation plan that contains planned conservation treatment activities for resource concerns resulting from the transition of conventional to organic crop and livestock production systems. At a minimum two alternatives will be developed. The first will be a no-action alternative in which current management activities are assumed to continue. The second will be an action alternative identifying a conservation practice or a system of conservation practices and management activities to address CPA identified resource concern(s). Additional action alternatives may be developed to identify different ways of achieving client objectives.

Before Situation:

Current crops and rotation, livestock management and feeding, farming practices (tillage, nutrient application methods, timing, source, and rate), soils, and equipment and technology utilized are not considered as Organic. The producer objectives are to b

After Situation:

When evaluating conservation practice effects, the short term and long term effect on natural resources and the applicability and effect on special environmental concerns identified in Step-3 (Resource Inventory) must be documented. Include recommendations that will avoid or mitigate any adverse effects on soil, water, air, plants, animals (including livestock, fish, and wildlife), energy, or human concerns; as well as on special environmental concerns. The Organic System Plan Template supplements are completed as part of NRCS Conservation Planning Activity (CPA) 138 that helps farmers who are interested in transitioning from conventional farming practices to organic production by addressing the natural resource concerns on their operation.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,447.78

Total Cost per Unit: $6,447.78

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 138 - Conservation Plan Supporting Organic Transition

Scenario: #121 - Transition to Organic for Crop and Livestock, High Complexity

Scenario Description:

A site specific conservation plan that contains planned conservation treatment activities for resource concerns resulting from the transition of conventional to organic crop and livestock production systems. Increased crop acreage, irrigation, specialty crops, orchards and vineyards, large AUs, age segregation management add complexity to the system. At a minimum two alternatives will be developed. The first will be a no-action alternative in which current management activities are assumed to continue. The second will be an action alternative identifying a conservation practice or a system of conservation practices and management activities to address CPA identified resource concern(s). Additional action alternatives may be developed to identify different ways of achieving client objectives.

Before Situation:

Current crops and rotation, livestock management and feeding, farming practices (tillage, nutrient application methods, timing, source, and rate), soils, and equipment and technology utilized are not considered as Organic. The producer objectives are to b

After Situation:

When evaluating conservation practice effects, the short term and long term effect on natural resources and the applicability and effect on special environmental concerns identified in Step-3 (Resource Inventory) must be documented. Include recommendations that will avoid or mitigate any adverse effects on soil, water, air, plants, animals (including livestock, fish, and wildlife), energy, or human concerns; as well as on special environmental concerns. The Organic System Plan Template supplements are completed as part of NRCS Conservation Planning Activity (CPA) 138 that helps farmers who are interested in transitioning from conventional farming practices to organic production by addressing the natural resource concerns on their operation.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $9,445.59

Total Cost per Unit: $9,445.59

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 140 - Transition to Organic Design

Scenario: #9 - Low Complexity Conservation Practices, One to Four

Scenario Description:

Agricultural operation where producer will transition from conventional production to organic production. They will meet the USDA National Organic Program (NOP) requirements. All Natural resources will be addressed: Soil, Water, Air, Plants and Animals. Will address resource concerns with 1 - 4, low complexity conservation practices.

Before Situation:

Agricultural operation currently managed using conventional agricultural production methods. Producer will transition all or part of the farm operation to meet national USDA NOP requirements for organic certification. The producer will collaborate with a

After Situation:

After NRCS program contract is approved, participant will obtain services from a certified TSP to develop the required implementation requirements and/or designs and specifications for all conservation practices required to meet organic certification requirements. All practices installed according to field office technical guide requirements. Implementation requirements, designs and specifications all complete.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,962.45

Total Cost per Unit: $4,962.45

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 140 - Transition to Organic Design

Scenario: #25 - Low Complexity Conservation Practices, Greater Than or Equal to Five

Scenario Description:

Agricultural operation where producer will transition from conventional production to organic production. They will meet the USDA National Organic Program (NOP) requirements. All Natural resources will be addressed: Soil, Water, Air, Plants and Animals. Will address resources concerns with 5 or more conservation practices with low complexity.

Before Situation:

Agricultural operation currently managed using conventional agricultural production methods. Producer will transition all or part of the farm operation to meet national USDA NOP requirements for organic certification. The producer will collaborate with a

After Situation:

After NRCS program contract is approved, participant will obtain services from a certified TSP to develop the required implementation requirements and/or designs and specifications for all conservation practices required to meet organic certification requirements. All practices installed according to field office technical guide requirements. Implementation requirements, designs and specifications all complete.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $9,856.38

Total Cost per Unit: $9,856.38

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 140 - Transition to Organic Design

Scenario: #41 - High Complexity Conservation Practices, One to Four

Scenario Description:

Agricultural operation where producer will transition from conventional production to organic production. They will meet the USDA National Organic Program (NOP) requirements. All Natural resources will be addressed: Soil, Water, Air, Plants, and Animals. Will address resource concerns with 1 - 4, high complexity conservation practices.

Before Situation:

Agricultural operation currently managed using conventional agricultural production methods. Producer will transition all or part of the farm operation to meet national USDA NOP requirements for organic certification. The producer will collaborate with a

After Situation:

After NRCS program contract is approved, participant will obtain services from a certified TSP to develop the required implementation requirements and/or designs and specifications for all conservation practices required to meet organic certification requirements. All practices installed according to field office technical guide requirements. Implementation requirements, designs and specifications all complete.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $12,752.61

Total Cost per Unit: $12,752.61

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 140 - Transition to Organic Design

Scenario: #57 - High Complexity Conservation Practices, Greater Than or Equal to Five

Scenario Description:

Agricultural operation where producer will transition from conventional production to organic production. They will meet the USDA National Organic Program (NOP) requirements. All Natural resources will be addressed: Soil, Water, Air, Plants and Animals. Will address resource concerns with 5 or more, high complexity conservation practices.

Before Situation:

Agricultural operation currently managed using conventional agricultural production methods. Producer will transition all or part of the farm operation to meet national USDA NOP requirements for organic certification. The producer will collaborate with a

After Situation:

After NRCS program contract is approved, participant will obtain services from a certified TSP to develop the required implementation requirements and/or designs and specifications for all conservation practices required to meet organic certification requirements. All practices installed according to field office technical guide requirements. Implementation requirements, designs and specifications all complete.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $16,436.72

Total Cost per Unit: $16,436.72

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 144 - Fish and Wildlife Habitat Design

Scenario: #9 - Habitat Design, One Land Use

Scenario Description:

Various on-farm land uses. Natural Resource Concerns: Terrestrial Habitat and/or Aquatic Habitat on an agricultural operation. The Fish and Wildlife Habitat Design and Implementation Activity (DIA) addresses fish and wildlife habitat management relative to only one land use on the agricultural operation.

Before Situation:

Producer has no plan or knowledge of development or management of fish and/or wildlife habitat. The producer does not currently manage or enhance habitat to promote opportunities for fish and/or wildlife habitat. Within existing land uses, the producer is

After Situation:

After EQIP contract approval, the participant has obtained services from a certified TSP for development of the Fish and Wildlife Habitat DIA. The DIA criteria require the plan to meet quality criteria for the primary fish/wildlife habitat resource concern and provides for opportunities to improve, restore, or enhance habitat that supports native and/or managed species. The DIA may include recommendations for associated conservation practices which address other related resource concerns. The DIA meets the basic quality criteria for the 144 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Design & Implementation Pl

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,277.99

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $3,277.99

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 144 - Fish and Wildlife Habitat Design

Scenario: #25 - Habitat Design, Two Land Uses

Scenario Description:

Various on-farm land uses. Natural Resource Concerns: Terrestrial Habitat and/or Aquatic Habitat on an agricultural operation. The Fish and Wildlife Habitat Design and Implementation Activity (DIA) addresses fish and wildlife habitat management relative to two land uses on the agricultural operation of which each land use is at least 20 acres in size.

Before Situation:

Producer has no plan or knowledge of development or management of fish and/or wildlife habitat. The producer does not currently manage or enhance habitat to promote opportunities for fish and/or wildlife habitat. Within existing land uses, the producer is

After Situation:

After EQIP contract approval, the participant has obtained services from a certified TSP for development of the Fish and Wildlife Habitat DIA. The DIA criteria require the plan to meet quality criteria for the primary fish/wildlife habitat resource concern and provides for opportunities to improve, restore, or enhance habitat that supports native and/or managed species. The DIA may include recommendations for associated conservation practices which address other related resource concerns. The DIA meets the basic quality criteria for the 144 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Fish and Wildlife Habitat DI

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,006.43

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $4,006.43

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 144 - Fish and Wildlife Habitat Design

Scenario: #41 - Habitat Design, Three or More Land Uses

Scenario Description:

Various on-farm land uses. Natural Resource Concerns: Terrestrial Habitat and/or Aquatic Habitat on an agricultural operation. The Fish and Wildlife Habitat Design and Implementation Activity (DIA) addresses fish and wildlife habitat management relative to three or more land uses on the agricultural operation of which at least three of the land uses are at least 20 acres in size.

Before Situation:

Producer has no plan or knowledge of development or management of fish and/or wildlife habitat. The producer does not currently manage or enhance habitat to promote opportunities for fish and/or wildlife habitat. Within existing land uses, the producer is

After Situation:

After EQIP contract approval, the participant has obtained services from a certified TSP for development of the Fish and Wildlife Habitat DIA. The DIA criteria require the plan to meet quality criteria for the primary fish/wildlife habitat resource concern and provides for opportunities to improve, restore, or enhance habitat that supports native and/or managed species. The DIA may include recommendations for associated conservation practices which address other related resource concerns. The DIA meets the basic quality criteria for the 144 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Fish and Wildlife Habitat DI

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,734.88

Total Cost per Unit: $4,734.88

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 148 - Pollinator Habitat Design

Scenario: #9 - Pollinator Habitat, No Local TSP

Scenario Description:

Various on-farm land uses, No qualified TSP within 300 miles. Natural Resource Concern: Fish and Wildlife, Plant Condition, Soil Erosion, Water Quality on an agricultural operation.

Before Situation:

Agricultural producer currently has no plan or knowledge of development or management of pollinator habitat. The producer does not currently manage or enhance habitat to promote opportunities for pollinator habitat. Within existing land uses, the producer

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Pollinator Habitat Enhancement Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to improve, restore, or enhance flower-rich habitat that supports native and/or managed pollinator species. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 146 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,554.37

Total Cost per Unit: $5,554.37

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 148 - Pollinator Habitat Design

Scenario: #25 - Pollinator Habitat

Scenario Description:

Various on-farm land uses. Natural Resource Concern: Fish and Wildlife, Plant Condition, Soil Erosion, Water Quality on an agricultural operation.

Before Situation:

Agricultural producer currently has no plan or knowledge of development or management of pollinator habitat. The producer does not currently manage or enhance habitat to promote opportunities for pollinator habitat. Within existing land uses, the producer

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Pollinator Habitat Enhancement Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to improve, restore, or enhance flower-rich habitat that supports native and/or managed pollinator species. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 146 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,824.32

Total Cost per Unit: $3,824.32

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 157 - Nutrient Management Design and Implementation Activity

Scenario: #9 - Nutrient Management, 101 to 300 Acres Fertilizer and Manure

Scenario Description:

Various on-farm land uses where natural or artificial amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns. Manure may be imported.

Before Situation:

Agricultural producer has no plan or minimal knowledge for the application and management of nutrients. The producer currently manages nutrient application based upon personal knowledge, or other local criteria. Producer is interested in management of nut

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Nutrient Management conservation activity plan consistent with the criteria in DIA 157 and 590 Nutrient Management. The DIA criteria requires the plan to meet quality criteria for Soils, Water Quality and Air Quality resource concerns and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The design may include recommendations for associated conservation practices which address other related resource concerns. Meets the basic quality criteria for the DIA 157 as cited in the NRCS Field Office Technical Guide and CPS 590 Nutrient Management.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $7,759.71

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $7,759.71

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 157 - Nutrient Management Design and Implementation Activity

Scenario: #25 - Nutrient Management, 101 to 300 Acres and No Manure

Scenario Description:

Various on-farm land uses where natural or artificial amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns.

Before Situation:

Agricultural producer has no plan or minimal knowledge for the application and management of nutrients. The producer currently manages nutrient application based upon personal knowledge, or other local criteria. Producer is interested in management of nut

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Nutrient Management conservation activity plan consistent with the criteria in DIA 157 and 590 Nutrient Management. The DIA criteria requires the plan to meet quality criteria for Soils, Water Quality and Air Quality resource concerns and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The design may include recommendations for associated conservation practices which address other related resource concerns. Meets the basic quality criteria for the DIA 157 as cited in the NRCS Field Office Technical Guide and CPS 590 Nutrient Management.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,434.12

Total Cost per Unit: $4,434.12

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 157 - Nutrient Management Design and Implementation Activity

Scenario: #41 - Nutrient Management, Greater Than 300 Acres and No Manure

Scenario Description:

Various on-farm land uses where natural or artificial amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns.

Before Situation:

Agricultural producer has no plan or minimal knowledge for the application and management of nutrients. The producer currently manages nutrient application based upon personal knowledge, or other local criteria. Producer is interested in management of nut

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Nutrient Management conservation activity plan consistent with the criteria in DIA 157 and 590 Nutrient Management. The DIA criteria requires the plan to meet quality criteria for Soils, Water Quality and Air Quality resource concerns and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The design may include recommendations for associated conservation practices which address other related resource concerns. Meets the basic quality criteria for the DIA 157 as cited in the NRCS Field Office Technical Guide and CPS 590 Nutrient Management.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,542.65

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $5,542.65

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 157 - Nutrient Management Design and Implementation Activity

Scenario: #57 - Nutrient Management, Less Than or Equal to 100 Acres Fertilizer and Manure

Scenario Description:

Various on-farm land uses where natural or artificial amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns. Manure may be imported.

Before Situation:

Agricultural producer has no plan or minimal knowledge for the application and management of nutrients. The producer currently manages nutrient application based upon personal knowledge, or other local criteria. Producer is interested in management of nut

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Nutrient Management conservation activity plan consistent with the criteria in DIA 157 and 590 Nutrient Management. The DIA criteria requires the plan to meet quality criteria for Soils, Water Quality and Air Quality resource concerns and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The design may include recommendations for associated conservation practices which address other related resource concerns. Meets the basic quality criteria for the DIA 157 as cited in the NRCS Field Office Technical Guide and CPS 590 Nutrient Management.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,542.65

Total Cost per Unit: $5,542.65

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 157 - Nutrient Management Design and Implementation Activity

Scenario: #73 - Nutrient Management, Less Than or Equal to 100 Acres and No Manure

Scenario Description:

Various on-farm land uses where natural or artificial amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns.

Before Situation:

Agricultural producer has no plan or minimal knowledge for the application and management of nutrients. The producer currently manages nutrient application based upon personal knowledge, or other local criteria. Producer is interested in management of nut

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Nutrient Management conservation activity plan consistent with the criteria in DIA 157 and 590 Nutrient Management. The DIA criteria requires the plan to meet quality criteria for Soils, Water Quality and Air Quality resource concerns and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The design may include recommendations for associated conservation practices which address other related resource concerns. Meets the basic quality criteria for the DIA 157 as cited in the NRCS Field Office Technical Guide and CPS 590 Nutrient Management.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,325.59

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $3,325.59

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 157 - Nutrient Management Design and Implementation Activity

Scenario: #89 - Nutrient Management, Greater Than 300 Acres Fertilizer and Manure

Scenario Description:

Various on-farm land uses where natural or artificial amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns. Manure may be imported.

Before Situation:

Agricultural producer has no plan or minimal knowledge for the application and management of nutrients. The producer currently manages nutrient application based upon personal knowledge, or other local criteria. Producer is interested in management of nut

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Nutrient Management conservation activity plan consistent with the criteria in DIA 157 and 590 Nutrient Management. The DIA criteria requires the plan to meet quality criteria for Soils, Water Quality and Air Quality resource concerns and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The design may include recommendations for associated conservation practices which address other related resource concerns. Meets the basic quality criteria for the DIA 157 as cited in the NRCS Field Office Technical Guide and CPS 590 Nutrient Management.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $9,422.51

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $9,422.51

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 158 - Feed Management Design

Scenario: #9 - Feed Management Plan

Scenario Description:

The owner/operator of an Animal Feeding Operation (AFO) has not received a written Feed Management Plan that addresses all resource concerns present on the facility. Various levels of management and conservation implementation has occurred in the operation. Little documentation of the methods of feed management used and practices installed exists, and the producer is not likely to developed a complete forage inventory or nutrient analysis. The producer may or may not have a conservation plan or a nutrient management plan. Nutrient management related resource concerns on the operation remain to be addressed through the development of a complete activity plan including management and conservation practices for proper quantity and quality of available nutrients, feedstuffs, and/or additives fed to livestock or poultry that may be present on the operation. Present operation and feed methodology poses risk of feeding excessive amounts of nutrients in animal manure which result in negative impacts to water quality and odor resource concerns. Negative water and air quality impacts as well as farmstead safety and security issues may remain on the AFO, and inadequate record-keeping nutrient, inspection and monitoring of the existing operation may need further improvement.

Before Situation:

Producer does not have a plan or has limited knowledge of management of feed, nutrients, feedstuffs, or nutritional additives provided to domestic livestock and poultry. The producer currently manages feed without a plan which would address livestock prod

After Situation:

Participant has obtained services from a certified TSP for development of the Feed Management plan (CAP). The criteria requires the plan to meet quality criteria for applicable natural resource concerns and provides for opportunities to identify and implement conservation practices related to management of feed, forages, or delivery of supplements to maximize efficient feeding operations and livestock growth. The plan may serve as the basis for implementation of the primary conservation practice 592 - Feed Management. If applicable, the plan may also be developed to complement Comprehensive Nutrient Management Plans (CNMP) or to help meet requirements of NRCS practice standard 590 - Nutrient Management. The plan may include recommendations for addressing associated natural resource concerns with other conservation practices.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,434.12

Total Cost per Unit: $4,434.12

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 159 - Grazing Management Design

Scenario: #105 - Grazed Lands, Less Than or Equal to 100 Acres

Scenario Description:

Design and implementation activities for agricultural operation with less than 100 acres grazed land. The following natural resource concerns will be addressed: Soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of conservation practices to effectively manage livestock or other animals on grazed land resources. The producer currently manages animals without a plan or implemented conservation practices to address identifie

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Grazing Management DIA. The DIA criteria requires the design and implementation of grazing activities as a component of the CPA to address resource concerns and to meet criteria for applicable conservation practices including practices such as: Prescribed Grazing Management (528), Brush Management (314), Fencing (382), Forage Harvest Management (511), Grazing Land Mechanical Treatment (548), Herbaceous Weed Treatment (315), Pasture and Hay Planting (512), Range Planting (550), and any additional conservation practices which address other related resource concerns. The DIA meets the basic quality criteria for the 159 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,675.62

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $1,675.62

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 159 - Grazing Management Design

Scenario: #121 - Grazed Lands, 101 to 500 Acres

Scenario Description:

Design and implementation activities for an agricultural operation with 101 to 500 acres grazed land. The following natural resource concerns will be addressed: soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of conservation practices to effectively manage livestock or other animals on grazed land resources. The producer currently manages animals without a plan or implemented conservation practices to address identifie

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Grazing Management DIA. The DIA criteria requires the design and implementation of grazing activities as a component of the CPA to address resource concerns and to meet criteria for applicable conservation practices including practices such as: Prescribed Grazing Management (528), Brush Management (314), Fencing (382), Forage Harvest Management (511), Grazing Land Mechanical Treatment (548), Herbaceous Weed Treatment (315), Pasture and Hay Planting (512), Range Planting (550), and any additional conservation practices which address other related resource concerns. The DIA meets the basic quality criteria for the 159 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,094.52

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $2,094.52

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 159 - Grazing Management Design

Scenario: #137 - Grazed Lands, 501 to 1,500 Acres

Scenario Description:

Design and implementation activities for agricultural operation with 501 to 1,500 acres grazed land. The following natural resource concerns will be addressed: soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of conservation practices to effectively manage livestock or other animals on grazed land resources. The producer currently manages animals without a plan or implemented conservation practices to address identifie

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Grazing Management DIA. The DIA criteria requires the design and implementation of grazing activities as a component of the CPA to address resource concerns and to meet criteria for applicable conservation practices including practices such as: Prescribed Grazing Management (528), Brush Management (314), Fencing (382), Forage Harvest Management (511), Grazing Land Mechanical Treatment (548), Herbaceous Weed Treatment (315), Pasture and Hay Planting (512), Range Planting (550), and any additional conservation practices which address other related resource concerns. The DIA meets the basic quality criteria for the 159 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,513.43

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $2,513.43

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 159 - Grazing Management Design

Scenario: #153 - Grazed Lands, 1,501 to 5,000 Acres

Scenario Description:

Design and implementation activity for an agricultural operation with 1,501 to 5,000 acres grazed land. The following natural resource concerns will be addressed: Soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of conservation practices to effectively manage livestock or other animals on grazed land resources. The producer currently manages animals without a plan or implemented conservation practices to address identifie

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Grazing Management DIA. The DIA criteria requires the design and implementation of grazing activities as a component of the CPA to address resource concerns and to meet criteria for applicable conservation practices including practices such as: Prescribed Grazing Management (528), Brush Management (314), Fencing (382), Forage Harvest Management (511), Grazing Land Mechanical Treatment (548), Herbaceous Weed Treatment (315), Pasture and Hay Planting (512), Range Planting (550), and any additional conservation practices which address other related resource concerns. The DIA meets the basic quality criteria for the 159 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,932.33

Total Cost per Unit: $2,932.33

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 159 - Grazing Management Design

Scenario: #169 - Grazed Lands, 5,001 to 10,000 Acres

Scenario Description:

Design and implementation activities for an agricultural operation with 5,001 to 10,000 acres grazed land. The following natural resource concerns will be addressed: soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of conservation practices to effectively manage livestock or other animals on grazed land resources. The producer currently manages animals without a plan or implemented conservation practices to address identifie

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Grazing Management DIA. The DIA criteria requires the design and implementation of grazing activities as a component of the CPA to address resource concerns and to meet criteria for applicable conservation practices including practices such as: Prescribed Grazing Management (528), Brush Management (314), Fencing (382), Forage Harvest Management (511), Grazing Land Mechanical Treatment (548), Herbaceous Weed Treatment (315), Pasture and Hay Planting (512), Range Planting (550), and any additional conservation practices which address other related resource concerns. The DIA meets the basic quality criteria for the 159 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,351.24

Total Cost per Unit: $3,351.24

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 159 - Grazing Management Design

Scenario: #185 - Grazed Lands, Greater Than 10,000 Acres

Scenario Description:

Design and implementation activities for an agricultural operation with greater than 10,000 acres grazed land. The following natural resource concerns will be addressed: soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of conservation practices to effectively manage livestock or other animals on grazed land resources. The producer currently manages animals without a plan or implemented conservation practices to address identifie

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Grazing Management DIA. The DIA criteria requires the design and implementation of grazing activities as a component of the CPA to address resource concerns and to meet criteria for applicable conservation practices including practices such as: Prescribed Grazing Management (528), Brush Management (314), Fencing (382), Forage Harvest Management (511), Grazing Land Mechanical Treatment (548), Herbaceous Weed Treatment (315), Pasture and Hay Planting (512), Range Planting (550), and any additional conservation practices which address other related resource concerns. The DIA meets the basic quality criteria for the 159 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,770.14

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $3,770.14

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 160 - Prescribed Burning Design

Scenario: #9 - Burn Implementation, Less Than or Equal to 20 Acres

Scenario Description:

Non Industrial Private Forest Land, Pasture or Range Land typically less than or equal to 20 acres in size and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

Before Situation:

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. A Prescribed Burning Plan or DIA is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in

After Situation:

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the Prescribed Burning DIA. The DIA criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan DIA is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The DIA plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e., site preparation, wildlife habitat, etc.), site conditions (i.e., fuel load, fuel type, etc.), implementation strategies (i.e., method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e., wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional DIA plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,271.09

Total Cost per Unit: $1,271.09

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 160 - Prescribed Burning Design

Scenario: #25 - Burn Implementation, Greater Than 1,000 Acres

Scenario Description:

Non Industrial Private Forest Land, Pasture or Range Land typically greater than 1,000 acres in size and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

Before Situation:

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. A Prescribed Burning Plan or DIA is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in

After Situation:

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the Prescribed Burning Plan (DIA). The DIA criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan DIA is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The DIA plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e., site preparation, wildlife habitat, etc.), site conditions (i.e., fuel load, fuel type, etc.), implementation strategies (i.e., method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e., wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional DIA plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,084.37

Total Cost per Unit: $5,084.37

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 160 - Prescribed Burning Design

Scenario: #41 - Burn Implementation, 501 to 1,000 Acres

Scenario Description:

Non Industrial Private Forest Land, Pasture or Range Land typically greater than 501 acres and less than 1,000 acres in size and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

Before Situation:

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. A Prescribed Burning Plan or DIA is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in

After Situation:

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the Prescribed Burning Plan DIA. The DIA criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan DIA is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The DIA plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e., site preparation, wildlife habitat, etc.), site conditions (i.e., fuel load, fuel type, etc.), implementation strategies (i.e., method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e., wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional DIA plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,389.58

Total Cost per Unit: $3,389.58

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 160 - Prescribed Burning Design

Scenario: #57 - Burn Implementation, 251 to 500 Acres

Scenario Description:

Non Industrial Private Forest Land, Pasture or Range Land typically greater than 251 acres and less than 500 acres in size and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

Before Situation:

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. A Prescribed Burning Plan or DIA is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in

After Situation:

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the Prescribed Burning Plan or DIA. The DIA criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan DIA is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The DIA plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e., site preparation, wildlife habitat, etc.), site conditions (i.e., fuel load, fuel type, etc.), implementation strategies (i.e., method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e., wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional DIA plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,542.18

Total Cost per Unit: $2,542.18

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 160 - Prescribed Burning Design

Scenario: #73 - Burn Implementation, 101 to 250 Acres

Scenario Description:

Non Industrial Private Forest Land, Pasture or Range Land typically greater that 101 acres in size and less than 250 acres and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

Before Situation:

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. A Prescribed Burning Plan or DIA is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in

After Situation:

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the Prescribed Burning Plan DIA. The DIA criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan DIA is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The DIA plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e., site preparation, wildlife habitat, etc.), site conditions (i.e., fuel load, fuel type, etc.), implementation strategies (i.e., method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e., wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional DIA plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,118.49

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $2,118.49

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 160 - Prescribed Burning Design

Scenario: #89 - Burn Implementation, 21 to 100 Acres

Scenario Description:

Non Industrial Private Forest Land, Pasture or Range Land typically greater than 21 acres and less than 100 acres in size and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

Before Situation:

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. A Prescribed Burning Plan or DIA is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in

After Situation:

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the Prescribed Burning Plan or DIA. The DIA criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan DIA is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The DIA plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e., site preparation, wildlife habitat, etc.), site conditions (i.e., fuel load, fuel type, etc.), implementation strategies (i.e., method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e., wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional DIA plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

Feature Measure: 1

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,694.79

Total Cost per Unit: $1,694.79

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 161 - Pest Management Conservation System Design

Scenario: #9 - High Complexity Conservation Practices, Greater Than or Equal to Five

Scenario Description:

Agricultural operation where producer will implement high complexity conservation practices and PAMS activities as part of an overall Pest Management Conservation System. Natural resources relating to CPS 595 Pest Management Conservation System will be addressed. Will address resource concerns with 5 or more, high complexity conservation practices and/or PAMS activities.

Before Situation:

Agricultural operation currently managed using few pest management strategies. The producer will collaborate with a certified TSP to develop implementation requirements and/or designs and specifications for all conservation practices and PAMS activities t

After Situation:

After NRCS program contract is approved, participant will obtain services from a certified TSP to develop the required implementation requirements and/or designs and specifications for all conservation practices required to address resource concerns. All practices installed according to field office technical guide requirements. PAMS activities according to IPM plan and Land Grant University guidelines. Implementation requirements, designs and specifications all complete.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $8,510.65

Total Cost per Unit: $8,510.65

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 161 - Pest Management Conservation System Design

Scenario: #25 - High Complexity Conservation Practices, One to Four

Scenario Description:

Agricultural operation where producer will implement high complexity conservation practices and PAMS activities as part of an overall Pest Management Conservation System. Natural resources relating to CPS 595 Pest Management Conservation System will be addressed. Will address resource concerns with 1 - 4, high complexity conservation practices and/or PAMS activities.

Before Situation:

Agricultural operation currently managed using few pest management strategies. The producer will collaborate with a certified TSP to develop implementation requirements and/or designs and specifications for all conservation practices and PAMS activities t

After Situation:

After NRCS program contract is approved, participant will obtain services from a certified TSP to develop the required implementation requirements and/or designs and specifications for all conservation practices required to address resource concerns. All practices installed according to field office technical guide requirements. PAMS activities according to IPM plan and Land Grant University guidelines. Implementation requirements, designs and specifications all complete.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,901.80

Total Cost per Unit: $6,901.80

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 161 - Pest Management Conservation System Design

Scenario: #41 - Low Complexity Conservation Practices, Greater Than or Equal to Five

Scenario Description:

Agricultural operation where producer will implement low complexity conservation practices and PAMS activities as part of an overall Pest Management Conservation System. Natural resources relating to CPS 595 Pest Management Conservation System will be addressed. Will address resource concerns with 5 or more, low complexity conservation practices.

Before Situation:

Agricultural operation currently managed using few pest management strategies. The producer will collaborate with a certified TSP to develop implementation requirements and/or designs and specifications for all conservation practices and PAMS activities t

After Situation:

After NRCS program contract is approved, participant will obtain services from a certified TSP to develop the required implementation requirements and/or designs and specifications for all conservation practices required to address resource concerns. All practices installed according to field office technical guide requirements. PAMS activities according to IPM plan and Land Grant University guidelines. Implementation requirements, designs and specifications all complete.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,860.81

Total Cost per Unit: $4,860.81

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 161 - Pest Management Conservation System Design

Scenario: #57 - Low Complexity Conservation Practices, One to Four

Scenario Description:

Agricultural operation where producer will implement low complexity conservation practices and PAMS activities as part of an overall Pest Management Conservation System. Natural resources relating to CPS 595 Pest Management Conservation System will be addressed. Will address resource concerns with 1 - 4, low complexity conservation practices.

Before Situation:

Agricultural operation currently managed using few pest management strategies. The producer will collaborate with a certified TSP to develop implementation requirements and/or designs and specifications for all conservation practices and PAMS activities t

After Situation:

After NRCS program contract is approved, participant will obtain services from a certified TSP to develop the required implementation requirements and/or designs and specifications for all conservation practices required to address resource concerns. All practices installed according to field office technical guide requirements. PAMS activities according to IPM plan and Land Grant University guidelines. Implementation requirements, designs and specifications all complete.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,251.96

Total Cost per Unit: $3,251.96

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 162 - Soil Health Management System Design

Scenario: #9 - Organic Crops and Livestock Soil Health Management, Less Than Five Units

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for up to 5 Soil Health Management Units (SHMU) for organic crops and livestock. A SHMU is 1 or more planning land units with similar soil type, land use, and management. A SHMU and can vary in size or acreage depending on soil texture, topography, and cropping system.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management. Producer has collabor

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Soil Health Management Plan consistent with the criteria in DIA 162. The DIA criteria requires the plan address all 4 soil health principles. Meets the planning criteria for DIA 162 and facilitating soil health practices as referenced in FOTG.

Feature Measure: each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $7,094.59

Total Cost per Unit: $7,094.59

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 162 - Soil Health Management System Design

Scenario: #25 - Crops Soil Health Management, Greater Than or Equal to Five Units

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for more than 5 Soil Health Management Units (SHMU) for crops. A SHMU is 1 or more planning land units with similar soil type, land use, and management. A SHMU can vary in size or acreage depending on soil texture, topography, and cropping system.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management. Producer has a writte

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Soil Health Management Plan consistent with the criteria in DIA 162. The DIA criteria requires the plan address all 4 soil health principles. Meets the planning criteria for DIA 162 and facilitating soil health practices as referenced in FOTG.

Feature Measure: each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,099.24

Total Cost per Unit: $5,099.24

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 162 - Soil Health Management System Design

Scenario: #41 - Crops and Livestock Soil Health Management, Greater Than or Equal to Five Units

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for 5 or more Soil Health Management Units (SHMU) for crops and livestock. A SHMU is 1 or more planning land units with similar soil type, land use, and management. A SHMU can vary in size or acreage depending on soil texture, topography, and cropping system.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management. Producer has a writte

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Soil Health Management Plan consistent with the criteria in DIA 162. The DIA criteria requires the plan address all 4 soil health principles. Meets the planning criteria for DIA 162 and facilitating soil health practices as referenced in FOTG.

Feature Measure: each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,542.65

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $5,542.65

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 162 - Soil Health Management System Design

Scenario: #57 - Small Farm, Less Than or Equal to 10 Acres

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for a small farm operation of less than 10 acres.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management. Producer has collabor

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Soil Health Management Plan consistent with the criteria in DIA 162. The DIA criteria requires the plan address all 4 soil health principles. Meets the planning criteria for DIA 162 and facilitating soil health practices as referenced in FOTG.

Feature Measure: each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,325.59

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $3,325.59

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 162 - Soil Health Management System Design

Scenario: #73 - Crops Soil Health Management, Less Than Five Units

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for fewer than 5 Soil Health Management Units (SHMU) for crops. A SHMU is 1 or more planning land units with similar soil type, land use, and management. A SHMU and can vary in size or acreage depending on soil texture, topography, and cropping system.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management. Producer has collabor

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Soil Health Management Plan consistent with the criteria in DIA 162. The DIA criteria requires the plan address all 4 soil health principles. Meets the planning criteria for DIA 162 and facilitating soil health practices as referenced in FOTG.

Feature Measure: each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,212.41

Total Cost per Unit: $4,212.41

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 162 - Soil Health Management System Design

Scenario: #89 - Organic Crops Soil Health Management, Less Than Five Units

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for fewer than 5 Soil Health Management Units (SHMU) for organic crops. A SHMU is 1 or more planning land units with similar soil type, land use, and management. A SHMU and can vary in size or acreage depending on soil texture, topography, and cropping system.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management. Producer has collabor

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Soil Health Management Plan consistent with the criteria in DIA 162. The DIA criteria requires the plan address all 4 soil health principles. Meets the planning criteria for DIA 162 and facilitating soil health practices as referenced in FOTG.

Feature Measure: each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,877.53

Total Cost per Unit: $4,877.53

Based on North Dakota average costs. Individual county costs may vary.

Practice: 162 - Soil Health Management System Design

Scenario: #105 - Crops and Livestock Soil Health Management, Less Than Five Units

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for fewer than 5 Soil Health Management Units (SHMU) for crops and livestock. A SHMU is 1 or more planning land units with similar soil type, land use, and management. A SHMU can vary in size or acreage depending on soil texture, topography, and cropping system.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management. Producer has a writte

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Soil Health Management Plan consistent with the criteria in DIA 162. The DIA criteria requires the plan address all 4 soil health principles. Meets the planning criteria for DIA 162 and facilitating soil health practices as referenced in FOTG.

Feature Measure: each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,434.12

Total Cost per Unit: $4,434.12

Based on North Dakota average costs. Individual county costs may vary.

Practice: 162 - Soil Health Management System Design

Scenario: #121 - Organic Crops Soil Health Management, Greater Than or Equal to Five Units

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for 5 or more Soil Health Management Units (SHMU) for organic crops. A SHMU is 1 or more planning land units with similar soil type, land use, and management. A SHMU can vary in size or acreage depending on soil texture, topography, and cropping system.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management. Producer has a writte

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Soil Health Management Plan consistent with the criteria in DIA 162. The DIA criteria requires the plan address all 4 soil health principles. Meets the planning criteria for DIA 162 and facilitating soil health practices as referenced in FOTG.

Feature Measure: each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,651.18

Total Cost per Unit: $6,651.18

Based on North Dakota average costs. Individual county costs may vary.

Practice: 162 - Soil Health Management System Design

Scenario: #137 - Organic Crops and Livestock Soil Health Management, Greater Than or Equal to Five Units

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible. May simultaneously implement 216 Soil Health Testing CEMA to evaluate baseline soil health and inventory basic or additional soil health indicators. The plan is developed for 5 or more Soil Health Management Units (SHMU) for organic crops and livestock. A SHMU is 1 or more planning land units with similar soil type, land use, and management. A SHMU can vary in size or acreage depending on soil texture, topography, and cropping system.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management. Producer has a writte

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Soil Health Management Plan consistent with the criteria in DIA 162. The DIA criteria requires the plan address all 4 soil health principles. Meets the planning criteria for DIA 162 and facilitating soil health practices as referenced in FOTG.

Feature Measure: each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $8,868.24

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $8,868.24

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 163 - Irrigation Water Management Design

Scenario: #9 - Designs without Pump Test, One to Two

Scenario Description:

An agricultural producer wishes to address irrigation water use inefficiency and all other appropriate resource concerns through an EQIP contract with at least one (1) irrigation practice scenario. The pump for the irrigation system is of known performance and less then 3 years old. Each "Design" indicates that new devices or components is closely related to other devices or components of the irrigation water management system even if numerous practices are contracted. The Irrigation Water Management DIA includes reviewing, and when needed, revising alternatives to address the identified concern(s). The Irrigation Water Management DIA documents: a) the client’s final decisions related to the associated irrigation practice scenarios; and b) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern(s): Insufficient Water - Inefficient Irrigation Water Use; Water Quality Degradation - Excessive sediment in surface waters, Nutrients transported to surface and groundwater, pesticides transported to surface and groundwater, pathogens and chemicals from manure, and biosolids or compost applications transported to surface and groundwater, excess salts in surface and groundwater; Degraded Plant Condition - Undesirable plant productivity and health; Inefficient Energy Use - Equipment and facilities.

Before Situation:

Producer wants to improve irrigation water management on their agricultural operation to address insufficient water, water quality degradation, degraded plant condition, or inefficient energy use concerns. Producer intends to work with a certified TSP to

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Irrigation Water Management DIA. The DIA 163 criteria include tasks needed to document the client’s decisions and design of conservation practices which address insufficient water, water quality degradation, degraded plant condition, or inefficient energy use. The Irrigation Water Management DIA meets the quality criteria for the DIA 164 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $7,018.72

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $7,018.72

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 163 - Irrigation Water Management Design

Scenario: #25 - Designs without Pump Test, Greater Than or Equal to Three

Scenario Description:

An agricultural producer wishes to address irrigation water use inefficiency and all other appropriate resource concerns through an EQIP contract with multiple irrigation practice scenario. The pump for the irrigation system is of known performance and less then 3 years old. Each "Design" indicates that new devices or components is closely related to other devices or components of the irrigation water management system even if numerous practices are contracted. The Irrigation Water Management DIA includes reviewing, and, when needed, revising alternatives to address the identified concern(s). The Irrigation Water Management DIA documents: a) the client’s final decisions related to the associated irrigation practice scenarios; and b) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern(s): Insufficient Water - Inefficient Irrigation Water Use; Water Quality Degradation - Excessive sediment in surface waters, Nutrients transported to surface and groundwater, pesticides transported to surface and groundwater, pathogens and chemicals from manure, and biosolids or compost applications transported to surface and groundwater, excess salts in surface and groundwater; Degraded Plant Condition - Undesirable plant productivity and health; Inefficient Energy Use - Equipment and facilities.

Before Situation:

Producer wants to improve irrigation water management on their agricultural operation to address insufficient water, water quality degradation, degraded plant condition, or inefficient energy use concerns. Producer intends to work with a certified TSP to

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Drainage Water Management DIA. The DIA 164 criteria include tasks needed to document the client’s decisions and design of conservation practices which address water quality, plant condition, or soil health. The Drainage Water Management DIA meets the quality criteria for the DIA 164 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $11,437.44

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $11,437.44

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 163 - Irrigation Water Management Design

Scenario: #41 - Designs with Pump Test, One to Two

Scenario Description:

An agricultural producer wishes to address irrigation water use inefficiency and all other appropriate resource concerns through an EQIP contract with multiple irrigation practice scenario through an EQIP contract with at least one (1) irrigation practice scenario. The pump for the irrigation system is of unknown performance and older than 3 years. Each "Design" indicates that new devices or components is closely related to other devices or components of the irrigation water management system even if numerous practices are contracted. The Irrigation Water Management DIA includes reviewing, and, when needed, revising alternatives to address the identified concern(s). The Irrigation Water Management DIA documents: a) the client’s final decisions related to the associated irrigation practice scenarios; and b) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern(s): Insufficient Water - Inefficient Irrigation Water Use; Water Quality Degradation - Excessive sediment in surface waters, Nutrients transported to surface and groundwater, pesticides transported to surface and groundwater, pathogens and chemicals from manure, and biosolids or compost applications transported to surface and groundwater, excess salts in surface and groundwater; Degraded Plant Condition - Undesirable plant productivity and health; Inefficient Energy Use - Equipment and facilities.

Before Situation:

Producer wants to improve irrigation water management on their agricultural operation to address insufficient water, water quality degradation, degraded plant condition, or inefficient energy use concerns. The pump for the irrigation system is of unknown

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Irrigation Water Management DIA. The DIA 163 criteria include tasks needed to document the client’s decisions and design of conservation practices which address insufficient water, water quality degradation, degraded plant condition, or inefficient energy use. The Irrigation Water Management DIA meets the quality criteria for the DIA 163 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $8,354.49

Total Cost per Unit: $8,354.49

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 163 - Irrigation Water Management Design

Scenario: #57 - Designs with Pump Test, Greater Than or Equal to Three

Scenario Description:

An agricultural producer wishes to address irrigation water use inefficiency and all other appropriate resource concerns through an EQIP contract with multiple irrigation practice scenario through an EQIP contract with at least one (1) irrigation practice scenario. The pump for the irrigation system is of unknown performance and older than 3 years. Each "Design" indicates that new devices or components is closely related to other devices or components of the irrigation water management system even if numerous practices are contracted. The Irrigation Water Management DIA includes reviewing, and, when needed, revising alternatives to address the identified concern(s). The Irrigation Water Management DIA documents: a) the client's final decisions related to the associated irrigation practice scenarios; and b) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern(s): Insufficient Water - Inefficient Irrigation Water Use; Water Quality Degradation - Excessive sediment in surface waters, Nutrients transported to surface and groundwater, pesticides transported to surface and groundwater, pathogens and chemicals from manure, and biosolids or compost applications transported to surface and groundwater, excess salts in surface and groundwater; Degraded Plant Condition - Undesirable plant productivity and health; Inefficient Energy Use - Equipment and facilities.

Before Situation:

Producer wants to improve irrigation water management on their agricultural operation to address insufficient water, water quality degradation, degraded plant condition, or inefficient energy use concerns. The pump for the irrigation system is of unknown

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Irrigation Water Management DIA. The DIA 163 criteria include tasks needed to document the client's decisions and design of conservation practices which address insufficient water, water quality degradation, degraded plant condition, or inefficient energy use. The Irrigation Water Management DIA meets the quality criteria for the DIA 163 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $13,253.74

Total Cost per Unit: $13,253.74

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 164 - Improved Management of Drainage Water Design

Scenario: #9 - Designs with Tile Map, One to Two

Scenario Description:

An agricultural producer wishes to address water quality degradation, poor plant productivity and health, and/or oxidation of organic matter in soils on a relatively flat crop field with a patterned drainage system through an EQIP contract with at least one (1) drainage practice scenario. A map of the tile system is available. Each "Design" indicates that each new device or component is closely related to other devices or components of the drainage water management system even if numerous practices are contracted. The Drainage Water Management DIA includes reviewing, and when needed, revising alternatives to address the identified concern(s). The Drainage Water Management DIA documents: a) the client's final decisions related to the associated drainage practice scenarios; and b) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern(s): Water Quality - Excess nutrients in surface and groundwaters, Plant Condition - Plant Productivity and Health, and Soil Health - Subsidence.

Before Situation:

Producer wants to improve drainage water management on their agricultural operation to address water quality, plant condition, or soil health concerns. Producer intends to work with a certified TSP to develop designs to implement one or more practice scen

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Drainage Water Management DIA. The DIA 164 criteria include tasks needed to document the client's decisions and design of conservation practices which address water quality, plant condition, or soil health. The Drainage Water Management DIA meets the quality criteria for the DIA 164 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,851.23

Total Cost per Unit: $6,851.23

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 164 - Improved Management of Drainage Water Design

Scenario: #25 - Designs with Tile Map, Greater Than or Equal to Three

Scenario Description:

An agricultural producer wishes to address water quality degradation, poor plant productivity and health, and/or oxidation of organic matter in soils on a relatively flat crop field with a patterned drainage system through an EQIP contract with multiple drainage practice scenario. A map of the tile system is available. Each "Design" indicates that each new device or component is closely related to other devices or components of the drainage water management system even if numerous practices are contracted. The Drainage Water Management DIA includes reviewing, and when needed, revising alternatives to address the identified concern(s). The Drainage Water Management DIA documents: a) the client's final decisions related to the associated drainage practice scenarios; and b) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern(s): Water Quality - Excess nutrients in surface and groundwaters, Plant Condition - Plant Productivity and Health, and Soil Health - Subsidence.

Before Situation:

Producer wants to improve drainage water management on their agricultural operation to address water quality, plant condition, or soil health concerns. Producer intends to work with a certified TSP to develop designs to implement one or more practice scen

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Drainage Water Management DIA. The DIA 164 criteria include tasks needed to document the client's decisions and design of conservation practices which address water quality, plant condition, or soil health. The Drainage Water Management DIA meets the quality criteria for the DIA 164 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $10,769.29

Total Cost per Unit: $10,769.29

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 164 - Improved Management of Drainage Water Design

Scenario: #41 - Designs with No Tile Map, One to Two

Scenario Description:

An agricultural producer wishes to address water quality degradation, poor plant productivity and health, and/or oxidation of organic matter in soils on a relatively flat crop field with a patterned drainage system through an EQIP contract with at least one (1) drainage practice scenario. A map of the tile system is not available. Each "Design" indicates that each new device or component is closely related to other devices or components of the drainage water management system even if numerous practices are contracted. The Drainage Water Management DIA includes reviewing, and when needed, revising alternatives to address the identified concern(s). The Drainage Water Management DIA documents: a) the client's final decisions related to the associated drainage practice scenarios; and b) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern(s): Water Quality - Excess nutrients in surface and groundwaters, Plant Condition - Plant Productivity and Health, and Soil Health - Subsidence.

Before Situation:

Producer wants to improve drainage water management on their agricultural operation to address water quality, plant condition, or soil health concerns. Producer intends to work with a certified TSP to develop designs to implement one or more practice scen

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Drainage Water Management DIA. The DIA 164 criteria include tasks needed to document the client's decisions and design of conservation practices which address water quality, plant condition, or soil health. The Drainage Water Management DIA meets the quality criteria for the DIA 164 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $9,332.06

Total Cost per Unit: $9,332.06

Based on North Dakota average costs. Individual county costs may vary.

Practice: 164 - Improved Management of Drainage Water Design

Scenario: #57 - Designs with No Tile Map, Greater Than or Equal to Three

Scenario Description:

An agricultural producer wishes to address water quality degradation, poor plant productivity and health, and/or oxidation of organic matter in soils on a relatively flat crop field with a patterned drainage system through an EQIP contract with multiple drainage practice scenario. A map of the tile system is not available. Each "Design" indicates that new devices or components are closely related to other devices or components of the drainage water management system even if numerous designs are contracted. If more than one practice is contracted, then "2-5 Designs" shall be contracted for the Drainage Water Management DIA. The Drainage Water Management DIA includes reviewing, and, when needed, revising alternatives to address the identified concern(s). The Drainage Water Management DIA documents: a) the client’s final decisions related to the associated drainage practice scenarios; and b) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern(s): Water Quality - Excess nutrients in surface and groundwaters, Plant Condition - Plant Productivity and Health, and Soil Health - Subsidence.

Before Situation:

Producer wants to improve drainage water management on their agricultural operation to address water quality, plant condition, or soil health concerns. Producer intends to work with a certified TSP to develop designs to implement one or more practice scen

After Situation:

The producer has obtained services from a certified TSP to develop practice scenario designs using the Drainage Water Management DIA. The DIA 164 criteria include tasks needed to document the client’s decisions and design of conservation practices which address water quality, plant condition, or soil health. The Drainage Water Management DIA meets the quality criteria for the DIA 164 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $11,730.35

Total Cost per Unit: $11,730.35

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 165 - Forest Management Practice Design

Scenario: #9 - Nonindustrial Private Forest, Less Than or Equal to 20 Acres

Scenario Description:

Nonindustrial Private Forest Land with a forest management plan. Typical site is approximately 1 to 20 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands with an existing forest management plan. Resource concerns exist which are not addressed by a management plan. A Design and Implementation Activities is needed to allow the producer to apply for financial assi

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Design and Implementation Activities (DIA). The DIA criteria requires the design of site-specific forestry activities as a component of a forest management plan to address identified resource concerns. Additional DIA criteria are detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $423.70

Total Cost per Unit: $423.70

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 165 - Forest Management Practice Design

Scenario: #25 - Nonindustrial Private Forest, 501 to 1,000 Acres

Scenario Description:

Nonindustrial Private Forest Land with a forest management plan. Typical site is approximately 501 to 1000 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands with an existing forest management plan. Resource concerns exist which are not addressed by a management plan. A Design and Implementation Activities is needed to allow the producer to apply for financial assi

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Design and Implementation Activities (DIA). The DIA criteria requires the design of site-specific forestry activities as a component of a forest management plan to address identified resource concerns. Additional DIA criteria are detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,610.05

Total Cost per Unit: $1,610.05

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 165 - Forest Management Practice Design

Scenario: #41 - Nonindustrial Private Forest, 101 to 250 Acres

Scenario Description:

Nonindustrial Private Forest Land with a forest management plan. Typical site is approximately 101 to 250 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands with an existing forest management plan. Resource concerns exist which are not addressed by a management plan. A Design and Implementation Activities is needed to allow the producer to apply for financial assi

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Design and Implementation Activities (DIA). The DIA criteria requires the design of site-specific forestry activities as a component of a forest management plan to address identified resource concerns. Additional DIA criteria are detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,016.87

Total Cost per Unit: $1,016.87

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 165 - Forest Management Practice Design

Scenario: #57 - Nonindustrial Private Forest, Greater Than 1,000 Acres

Scenario Description:

Nonindustrial Private Forest Land with a forest management plan. Typical site is approximately 1001 acres or greater in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands with an existing forest management plan. Resource concerns exist which are not addressed by a management plan. A Design and Implementation Activities is needed to allow the producer to apply for financial assi

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Design and Implementation Activities (DIA). The DIA criteria requires the design of site-specific forestry activities as a component of a forest management plan to address identified resource concerns. Additional DIA criteria are detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,949.01

Total Cost per Unit: $1,949.01

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 165 - Forest Management Practice Design

Scenario: #73 - Nonindustrial Private Forest, 251 to 500 Acres

Scenario Description:

Nonindustrial Private Forest Land with a forest management plan. Typical site is approximately 251 to 500 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands with an existing forest management plan. Resource concerns exist which are not addressed by a management plan. A Design and Implementation Activities is needed to allow the producer to apply for financial assi

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Design and Implementation Activities (DIA). The DIA criteria requires the design of site-specific forestry activities as a component of a forest management plan to address identified resource concerns. Additional DIA criteria are detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,355.83

Total Cost per Unit: $1,355.83

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 165 - Forest Management Practice Design

Scenario: #89 - Nonindustrial Private Forest, 21 to 100 Acres

Scenario Description:

Nonindustrial Private Forest Land with a forest management plan. Typical site is approximately 21 to 100 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands with an existing forest management plan. Resource concerns exist which are not addressed by a management plan. A Design and Implementation Activities is needed to allow the producer to apply for financial assi

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Design and Implementation Activities (DIA). The DIA criteria requires the design of site-specific forestry activities as a component of a forest management plan to address identified resource concerns. Additional DIA criteria are detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $677.92

Total Cost per Unit: $677.92

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 199 - Conservation Plan

Scenario: #25 - Small Farm

Scenario Description:

Conservation plan developed by a Technical Service Provider (TSP) for a participant enrolled in a Farm Bill program contract. The TSP completes NRCS conservation planning process, steps 1 through 7 as described in NRCS National Planning Procedures Handbook. The steps identify problems and opportunities (step 1), determine objectives (step 2), include inventory and analyze resources (steps 3 and 4), formulate and evaluate alternatives (steps 5 and 6) and document client’s preferred alternative(s) (step 7). The small farm planning scenario involves combinations of various specialty crops, small fruits, tree and vine crops, and small livestock enterprises on less than or equal to 10 acres.

Before Situation:

Client and NRCS have identified a need to develop a conservation plan to address resource concern(s) using a Technical Service Provider.

After Situation:

TSP has met with client and visited the planning area, in order to develop at least one conservation system alternative for each planning land unit that meet the producer's objectives; and obtain the client's decision for a schedule of practices to implement. TSP provides deliverables that meet the requirements of the CPA 199, or (if applicable to the enterprise) the requirements of conservation activities CPA 102 CNMP or CPA 106 Forestry Plan.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,339.30

Total Cost per Unit: $3,339.30

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 199 - Conservation Plan

Scenario: #41 - One Land Use, 10 to 199 Acres

Scenario Description:

Conservation plan developed by a Technical Service Provider (TSP) for a participant enrolled in a Farm Bill program contract. The TSP completes NRCS conservation planning process, steps 1 through 7 as described in NRCS National Planning Procedures Handbook. The steps identify problems and opportunities (step 1), determine objectives (step 2), include inventory and analyze resources (steps 3 and 4), formulate and evaluate alternatives (steps 5 and 6) and document client's preferred alternative(s) (step 7). The Planning Land Unit involves one land use and one agricultural enterprise covering up to less than 200 acres.

Before Situation:

Client and NRCS have identified a need to develop a conservation plan to address resource concern(s) using a Technical Service Provider.

After Situation:

TSP has met with client and visited the planning area, in order to develop at least one conservation system alternative for each planning land unit that meet the producer's objectives; and obtain the client's decision for a schedule of practices to implement. TSP provides deliverables that meet the requirements of the CPA 199, or (if applicable to the enterprise) the requirements of conservation activities CPA 102 CNMP or CPA 106 Forestry Plan.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,232.98

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $4,232.98

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 199 - Conservation Plan

Scenario: #57 - One Land Use, 200 to 1,000 Acres

Scenario Description:

Conservation plan developed by a Technical Service Provider (TSP) for a participant enrolled in a Farm Bill program contract. The TSP completes NRCS conservation planning process, steps 1 through 7 as described in NRCS National Planning Procedures Handbook. The steps identify problems and opportunities (step 1), determine objectives (step 2), include inventory and analyze resources (steps 3 and 4), formulate and evaluate alternatives (steps 5 and 6) and document client's preferred alternative(s) (step 7). The Planning Land Unit involves one land use and one agricultural enterprise covering 200-1,000 acres.

Before Situation:

Client and NRCS have identified a need to develop a conservation plan to address resource concern(s) using a Technical Service Provider.

After Situation:

TSP has met with client and visited the planning area, in order to develop at least one conservation system alternative for each planning land unit that meet the producer's objectives; and obtain the client's decision for a schedule of practices to implement. TSP provides deliverables that meet the requirements of the CPA 199, or (if applicable to the enterprise) the requirements of conservation activities CPA 102 CNMP or CPA 106 Forestry Plan.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,235.19

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $6,235.19

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 199 - Conservation Plan

Scenario: #73 - One Land Use, Greater Than 1,000 Acres

Scenario Description:

Conservation plan developed by a Technical Service Provider (TSP) for a participant enrolled in a Farm Bill program contract. The TSP completes NRCS conservation planning process, steps 1 through 7 as described in NRCS National Planning Procedures Handbook. The steps identify problems and opportunities (step 1), determine objectives (step 2), include inventory and analyze resources (steps 3 and 4), formulate and evaluate alternatives (steps 5 and 6) and document client's preferred alternative(s) (step 7). The Planning Land Unit involves one land use and one agricultural enterprise covering more than 1,000 acres.

Before Situation:

Client and NRCS have identified a need to develop a conservation plan to address resource concern(s) using a Technical Service Provider.

After Situation:

TSP has met with client and visited the planning area, in order to develop at least one conservation system alternative for each planning land unit that meet the producer's objectives; and obtain the client's decision for a schedule of practices to implement. TSP provides deliverables that meet the requirements of the CPA 199, or (if applicable to the enterprise) the requirements of conservation activities CPA 102 CNMP or CPA 106 Forestry Plan.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $8,298.48

Total Cost per Unit: $8,298.48

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 199 - Conservation Plan

Scenario: #89 - Two Land Uses, 10 to 199 Acres

Scenario Description:

Conservation plan developed by a Technical Service Provider (TSP) for a participant enrolled in a Farm Bill program contract. The TSP completes NRCS conservation planning process, steps 1 through 7 as described in NRCS National Planning Procedures Handbook. The steps identify problems and opportunities (step 1), determine objectives (step 2), include inventory and analyze resources (steps 3 and 4), formulate and evaluate alternatives (steps 5 and 6) and document client’s preferred alternative(s) (step 7). The Planning Land Unit involves one land use with two agricultural enterprises, or two land uses with one agricultural enterprise (ex. farmstead and cropland used for a dairy enterprise) covering less than 200 acres.

Before Situation:

Client and NRCS have identified a need to develop a conservation plan to address resource concern(s) using a Technical Service Provider.

After Situation:

TSP has met with client and visited the planning area, in order to develop at least one conservation system alternative for each planning land unit that meet the producer's objectives; and obtain the client's decision for a schedule of practices to implement. TSP provides deliverables that meet the requirements of the CPA 199, and/or (if applicable to the enterprises) the requirements of conservation activities CPA 102 CNMP or CPA 106 Forestry Plan.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,235.19

Total Cost per Unit: $6,235.19

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 199 - Conservation Plan

Scenario: #105 - Two Land Uses, 200 to 1,000 Acres

Scenario Description:

Conservation plan developed by a Technical Service Provider (TSP) for a participant enrolled in a Farm Bill program contract. The TSP completes NRCS conservation planning process, steps 1 through 7 as described in NRCS National Planning Procedures Handbook. The steps identify problems and opportunities (step 1), determine objectives (step 2), include inventory and analyze resources (steps 3 and 4), formulate and evaluate alternatives (steps 5 and 6) and document client’s preferred alternative(s) (step 7). The Planning Land Unit involves one land use with two agricultural enterprises, or two land uses with one agricultural enterprise (ex. farmstead and cropland used for a dairy enterprise) covering 200-1000 acres.

Before Situation:

Client and NRCS have identified a need to develop a conservation plan to address resource concern(s) using a Technical Service Provider.

After Situation:

TSP has met with client and visited the planning area, in order to develop at least one conservation system alternative for each planning land unit that meet the producer's objectives; and obtain the client's decision for a schedule of practices to implement. TSP provides deliverables that meet the requirements of the CPA 199, and/or (if applicable to the enterprises) the requirements of conservation activities CPA 102 CNMP or CPA 106 Forestry Plan.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $8,298.48

Total Cost per Unit: $8,298.48

Based on North Dakota average costs. Individual county costs may vary.

Practice: 199 - Conservation Plan

Scenario: #121 - Two Land Uses, Greater Than 1,000 Acres

Scenario Description:

Conservation plan developed by a Technical Service Provider (TSP) for a participant enrolled in a Farm Bill program contract. The TSP completes NRCS conservation planning process, steps 1 through 7 as described in NRCS National Planning Procedures Handbook. The steps identify problems and opportunities (step 1), determine objectives (step 2), include inventory and analyze resources (steps 3 and 4), formulate and evaluate alternatives (steps 5 and 6) and document client's preferred alternative(s) (step 7). The Planning Land Unit involves one land use with two agricultural enterprises, or two land uses with one agricultural enterprise (ex. farmstead and cropland used for a dairy enterprise) covering more than 1,000 acres.

Before Situation:

Client and NRCS have identified a need to develop a conservation plan to address resource concern(s) using a Technical Service Provider.

After Situation:

TSP has met with client and visited the planning area, in order to develop at least one conservation system alternative for each planning land unit that meet the producer's objectives; and obtain the client's decision for a schedule of practices to implement. TSP provides deliverables that meet the requirements of the CPA 199, and/or (if applicable to the enterprises) the requirements of conservation activities CPA 102 CNMP or CPA 106 Forestry Plan.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $10,109.52

Total Cost per Unit: $10,109.52

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 199 - Conservation Plan

Scenario: #137 - Three or More Land Uses, 10 to 199 Acres

Scenario Description:

Conservation plan developed by a Technical Service Provider (TSP) for a participant enrolled in a Farm Bill program contract. The TSP completes NRCS conservation planning process, steps 1 through 7 as described in NRCS National Planning Procedures Handbook. The steps identify problems and opportunities (step 1), determine objectives (step 2), include inventory and analyze resources (steps 3 and 4), formulate and evaluate alternatives (steps 5 and 6) and document client's preferred alternative(s) (step 7). The Planning Land Unit involves one land use supporting three or more agricultural enterprises, two land uses supporting two or more agricultural enterprises, or three or more land uses and any number of enterprises on up to less than 200 acres.

Before Situation:

Client and NRCS have identified a need to develop a conservation plan to address resource concern(s) using a Technical Service Provider.

After Situation:

TSP has met with client and visited the planning area, in order to develop at least one conservation system alternative for each planning land unit that meet the producer's objectives; and obtain the client's decision for a schedule of practices to implement. TSP provides deliverables that meet the requirements of the CPA 199, and/or (if applicable to the enterprises) the requirements of conservation activities CPA 102 CNMP or CPA 106 Forestry Plan.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $8,298.48

Total Cost per Unit: $8,298.48

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 199 - Conservation Plan

Scenario: #153 - Three or More Land Uses, 200 to 1,000 Acres

Scenario Description:

Conservation plan developed by a Technical Service Provider (TSP) for a participant enrolled in a Farm Bill program contract. The TSP completes NRCS conservation planning process, steps 1 through 7 as described in NRCS National Planning Procedures Handbook. The steps identify problems and opportunities (step 1), determine objectives (step 2), include inventory and analyze resources (steps 3 and 4), formulate and evaluate alternatives (steps 5 and 6) and document client's preferred alternative(s) (step 7). The Planning Land Unit involves three or more agricultural enterprises, two land uses supporting two or more agricultural enterprises, or three or more land uses and any number of enterprises on 200-1000 acres.

Before Situation:

Client and NRCS have identified a need to develop a conservation plan to address resource concern(s) using a Technical Service Provider.

After Situation:

TSP has met with client and visited the planning area, in order to develop at least one conservation system alternative for each planning land unit that meet the producer's objectives; and obtain the client's decision for a schedule of practices to implement. TSP provides deliverables that meet the requirements of the CPA 199, and/or (if applicable to the enterprises) the requirements of conservation activities CPA 102 CNMP or CPA 106 Forestry Plan.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $10,109.52

Total Cost per Unit: $10,109.52

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 199 - Conservation Plan

Scenario: #169 - Three or More Land Uses, Greater Than 1,000 Acres

Scenario Description:

Conservation plan developed by a Technical Service Provider (TSP) for a participant enrolled in a Farm Bill program contract. The TSP completes NRCS conservation planning process, steps 1 through 7 as described in NRCS National Planning Procedures Handbook. The steps identify problems and opportunities (step 1), determine objectives (step 2), include inventory and analyze resources (steps 3 and 4), formulate and evaluate alternatives (steps 5 and 6) and document client's preferred alternative(s) (step 7). The Planning Land Unit involves one land use supporting three or more agricultural enterprises, two land uses supporting two or more agricultural enterprises, or three or more land uses and any number of enterprises on more than 1,000 acres.

Before Situation:

Client and NRCS have identified a need to develop a conservation plan to address resource concern(s) using a Technical Service Provider.

After Situation:

TSP has met with client and visited the planning area, in order to develop at least one conservation system alternative for each planning land unit that meet the producer's objectives; and obtain the client's decision for a schedule of practices to implement. TSP provides deliverables that meet the requirements of the CPA 199, and/or (if applicable to the enterprises) the requirements of conservation activities CPA 102 CNMP or CPA 106 Forestry Plan.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $11,668.32

Total Cost per Unit: $11,668.32

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

Scenario: #1 - Surface Year One Plus, No Quality Assurance Project Plan

Scenario Description:

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and one treatment site. The scenario requires the collection and analysis of edge-of-field water quality data with an average sample collection of 20 per year per station, with each sample analyzed for 6 separate parameters (2 sites x 20 samples x 6 parameters = 240 total water quality tests). The data will be transferred through semi-annual submittal and annual report which include some preliminary annual analysis. This scenario will normally be used in year 1 to next to the last year of monitoring of the contract when a monitoring plan and QAPP will be not prepared as this is for an existing monitoring system that has been accepted as meeting both Activity 201 and 202. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

Before Situation:

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

After Situation:

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and one treatment site. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared as part of an existing monitoring system installation where the QAPP and monitoring plan meets Activity 201 requirements and no major changes are needed to meet Activity 202 requirements. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

Feature Measure: Measuring Site

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $24,734.32

Total Cost per Unit: $24,734.32

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

Scenario: #142 - Tile Year One, Quality Assurance Project Plan

Scenario Description:

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and one treatment site with an average of 40 samples per year per station, with each sample analyzed for 6 separate parameters (2 sites x 40 samples x 6 parameters = 480 total water quality tests). A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year, with each sample analyzed for 6 separate parameters (2 sites x 20 samples x 6 parameters = 240 total water quality tests). Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The scenario requires the creation of a survey to site a monitoring station, preparation of monitoring plan and a quality assurance project plan to detail how data will be collected, handled and analyzed, provides for the data collection, analysis, semiannual report, and annual report. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP need to be prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

Before Situation:

The agricultural operation prior to installing this practice will not have a plan or quality assurance project plan prepared for installing equipment nor collecting data for sediment and nutrients leaving the edge of field.

After Situation:

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual report, and annual report for one control and one treatment site. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

Feature Measure: Measuring Site

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $69,278.03

Total Cost per Unit: $69,278.03

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

Scenario: #149 - Tile Year One and Less Quality Assurance Project Plan, Two Treatment Sites

Scenario Description:

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and two treatment sites with an average of 40 samples per year per station, with each sample analyzed for 6 separate parameters (3 sites x 40 samples x 6 parameters = 720 total water quality tests). A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year, with each sample analyzed for 6 separate parameters (3 sites x 20 samples x 6 parameters = 360 total water quality tests). Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The data will be transferred through semi-annual submittal and annual reports, which include some preliminary annual analysis. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP will not be prepared as this is for an existing monitoring system be accepted as meeting both Activity 201 and 202. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

Before Situation:

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

After Situation:

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and two treatment sites. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared as part of an existing monitoring system installation where the QAPP and monitoring plan meets Activity 201 requirements and no major changes are needed to meet Activity 202 requirements. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

Feature Measure: Measuring site

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $85,372.69

Total Cost per Unit: $85,372.69

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

Scenario: #156 - Tile Year One Plus, No Quality Assurance Project Plan

Scenario Description:

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and one treatment site with an average of 40 samples per year per station, with each sample analyzed for 6 separate parameters (2 sites x 40 samples x 6 parameters = 480 total water quality tests). A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year, with each sample analyzed for 6 separate parameters (2 sites x 20 samples x 6 parameters = 240 total water quality tests). Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The data will be transferred through semi-annual submittal and annual reports, which include some preliminary annual analysis. This scenario will normally be used in year 1 to next to the last year of monitoring of the contract when a monitoring plan and QAPP will be not prepared as this is for an existing monitoring system be accepted as meeting both Activity 201 and 202. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

Before Situation:

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

After Situation:

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and one treatment site. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared as part of an existing monitoring system installation where the QAPP and monitoring plan meets Activity 201 requirements and no major changes are needed to meet Activity 202 requirements. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

Feature Measure: Measuring Site

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $59,729.30

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $59,729.30

Practice: 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

Scenario: #163 - Tile Last Year, Two Treatment Sites

Scenario Description:

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and two treatment sites with an average of 40 samples per year per station with each sample analyzed for 6 separate parameters (3 sites x 40 samples x 6 parameters = 720 total water quality tests). A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year with each sample analyzed for 6 separate parameters (3 sites x 20 samples x 6 parameters = 360 total water quality tests). Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The scenario requires the collection and analysis of edge-of-field water quality data along with a comprehensive report to statistically prove relationship between select conservation practices and water quality. The data will be transferred through semi-annual submittal and annual report and a comprehensive report of practice effectiveness. This scenario will be used in the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

Before Situation:

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

After Situation:

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and two treatment sites. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201 to provide a comprehensive report of statistical testing of data collected during to complete monitoring period.

Feature Measure: Measuring site

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $92,911.17

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $92,911.17

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

Scenario: #170 - Tile Last Year

Scenario Description:

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and one treatment site with an average of 40 samples per year per station, with each sample analyzed for 6 separate parameters (2 sites x 40 samples x 6 parameters = 480 total water quality tests). A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year, with each sample analyzed for 6 separate parameters (2 sites x 20 samples x 6 parameters = 240 total water quality tests). Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The scenario requires the collection and analysis of edge-of-field water quality data along with a comprehensive report to statistically prove relationship between select conservation practices and water quality. The data will be transferred through semi-annual submittal and annual report and a comprehensive report of practice effectiveness. This scenario will be used in the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

Before Situation:

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

After Situation:

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and one treatment site. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201 to provide a comprehensive report of statistical testing of data collected during to complete monitoring period.

Feature Measure: Measuring site

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $64,754.95

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $64,754.95

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

Scenario: #177 - Surface Year One Quality Assurance Project Plan, Two Treatment Sites

Scenario Description:

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and two treatment sites with an average of 20 samples per year per station, with each sample analyzed for 6 separate parameters (3 sites x 20 samples x 6 parameters = 360 total water quality tests). The scenario requires the creation of a survey to site a monitoring station, preparation of monitoring plan and a quality assurance project plan to detail how data will be collected, handled and analyzed, provides for the data collection, analysis, semiannual report, and annual report. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP need to be prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

Before Situation:

The agricultural operation prior to installing this practice will not have a plan or quality assurance project plan prepared for installing equipment nor collecting data for sediment and nutrients leaving the edge of field.

After Situation:

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual report, and annual report for one control and one treatment site. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

Feature Measure: Measuring Sites

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $47,328.78

Total Cost per Unit: $47,328.78

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

Scenario: #184 - Surface Year One Quality Assurance Project Plan

Scenario Description:

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and one treatment site with an average of 20 samples per year per station, with each sample analyzed for 6 separate parameters (2 sites x 20 samples x 6 parameters = 240 total water quality tests). The scenario requires the creation of a survey to site a monitoring station, preparation of monitoring plan and a quality assurance project plan to detail how data will be collected, handled and analyzed, provides for the data collection, analysis, semiannual report, and annual report. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP need to be prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

Before Situation:

The agricultural operation prior to installing this practice will not have a plan or quality assurance project plan prepared for installing equipment nor collecting data for sediment and nutrients leaving the edge of field.

After Situation:

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual report, and annual report for one control and one treatment site. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

Feature Measure: Measuring Sites

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $34,283.05

Total Cost per Unit: $34,283.05

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

Scenario: #193 - Surface Year One and Less Quality Assurance Project Plan, Two Treatment Sites

Scenario Description:

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and two treatment sites. The scenario requires the collection and analysis of edge-of-field water quality data with an average sample collection of 20 per year for each surface system, with each sample analyzed for 6 separate parameters (3 sites x 20 samples x 6 parameters = 360 total water quality tests). The data will be transferred through semi-annual submittal and annual report, which include some preliminary annual analysis. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP will not be prepared as this is for an existing monitoring system be accepted as meeting both Activity 201 and 202. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

Before Situation:

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

After Situation:

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semi-annual submittal, and annual report for one control and two treatment sites. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared as part of an existing monitoring system installation where the QAPP and monitoring plan meets Activity 201 requirements and no major changes are needed to meet Activity 202 requirements. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

Feature Measure: Measuring site

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $35,518.50

Total Cost per Unit: $35,518.50

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

Scenario: #200 - Surface Last Year

Scenario Description:

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and one treatment site with an average of 20 samples per year per station, with each sample analyzed for 6 separate parameters (2 sites x 20 samples x 6 parameters = 240 total water quality tests). The scenario requires the collection and analysis of edge-of-field water quality data along with a comprehensive report to statistically prove relationship between select conservation practices and water quality. The data will be transferred through semi-annual submittal and annual report and a comprehensive report of practice effectiveness. This scenario will be used in the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

Before Situation:

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

After Situation:

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and one treatment site. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201 to provide a comprehensive report of statistical testing of data collected to complete monitoring period.

Feature Measure: Measuring Site

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $29,759.96

Total Cost per Unit: $29,759.96

Based on North Dakota average costs. Individual county costs may vary.

Practice: 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

Scenario: #207 - Surface Last Year, Two Treatment Sites

Scenario Description:

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and two treatment sites with an average of 20 samples per year per station, with each sample analyzed for 6 separate parameters (3 sites x 20 samples x 6 parameters = 360 total water quality tests). The scenario requires the collection and analysis of edge-of-field water quality data along with a comprehensive report to statistically prove relationship between select conservation practices and water quality. The data will be transferred through semi-annual submittal and annual report and a comprehensive report of practice effectiveness. This scenario will be used in the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

Before Situation:

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

After Situation:

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and two treatment sites. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201 to provide a comprehensive report of statistical testing of data collected during to complete monitoring period.

Feature Measure: Measuring site

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $43,056.98

Total Cost per Unit: $43,056.98

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

Scenario: #219 - Discrete Sampling, Single Parameter, Year One

Scenario Description:

This scenario is to be used for targeted, periodic WQ grab sampling design and implementation for evaluating and assessing conservation practice performance. This scenario provides for collection and analysis of one of the following water quality constituents: Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration, or Total Suspended Solids. A monitoring plan is created by a qualified individual to achieve monitoring goals. Event-based or regularly re-occurring grab samples are acquired from the concentrated flow streams at 2 locations, typically in a before-and-after or a side-by-side sampling design and then analyzed at a laboratory.

Before Situation:

The agricultural operation prior to implementing this activity will not have a monitoring plan prepared for evaluating and assessing the performance of a conservation practice.

After Situation:

The agricultural operation after implementing this activity will have produced and implemented a water quality monitoring plan for a single water quality constituent to evaluate and assess the performance of a conservation practice with respect to that constituent.

Feature Measure: Measuring sites

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $7,668.24

Total Cost per Unit: $7,668.24

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

Scenario: #235 - Discrete Sampling, Single Parameter, Additional Year

Scenario Description:

This scenario extends, by an additional year, discreet WQ grab sampling design and implementation for evaluating and assessing conservation practice performance. This scenario provides for analysis of one of the following water quality constituents: Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration, or Total Suspended Solids. A monitoring plan is created by a qualified individual to achieve monitoring goals. Event-based or regularly re-occurring synoptic grab samples are acquired from the concentrated flow streams at 2 locations, typically in a before-and-after or a side-by-side sampling design and then analyzed at a laboratory.

Before Situation:

The agricultural operation prior to implementing this activity will not have a monitoring plan prepared for evaluating and assessing the performance of a conservation practice.

After Situation:

The agricultural operation after implementing this activity will have produced and implemented a water quality monitoring plan for a single water quality constituent to evaluate and assess the performance of a conservation practice with respect to that constituent.

Feature Measure: Measuring Sites

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $6,160.54

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $6,160.54

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 202 - Edge-of-Field Water Quality Monitoring-System Installation

Scenario: #103 - Tile, Cold Climate

Scenario Description:

This edge-of-field water quality monitoring system is applicable to a single control or treatment site that has a field defined with tile or other subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for northern latitudes where winter time heating is required for sampling. It will allow for installation of automated sampling data collection system for a subsurface collection and separate surface automated sample collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, an area velocity sensor for pipe flow and estimation of submerged flow, a calf hut or other structure with heat is required over the flume to allow sampling under northern latitude winter conditions and a berm or other directional flow structure to guide the runoff to a sampling flume.

Before Situation:

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients. Nothing is known about the

After Situation:

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

Feature Measure: System installed

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $41,765.93

Total Cost per Unit: $41,765.93

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 202 - Edge-of-Field Water Quality Monitoring-System Installation

Scenario: #112 - Tile

Scenario Description:

This edge-of-field water quality monitoring system is applicable to a single control or treatment site that has a field defined with tile or other subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for southern latitudes where winter time heating is not required for sampling. It will allow for installation of automated sampling data collection system for a subsurface collection and separate surface automated sample collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, an area velocity sensor for pipe flow and estimation of submerged flow, and a berm or other directional flow structure to guide the runoff to a sampling flume.

Before Situation:

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients. Nothing is known about the

After Situation:

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

Feature Measure: System installed

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $41,765.93

Total Cost per Unit: $41,765.93

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 202 - Edge-of-Field Water Quality Monitoring-System Installation

Scenario: #119 - Surface, Cold Climate

Scenario Description:

This edge-of-field water quality monitoring system is applicable to a single control or treatment site that has a field defined with surface runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for northern latitudes where winter time heating is required for sampling. It will allow for installation of automated sampling data collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, a calf hut or other structure with heat is required over the flume to allow sampling under northern latitude winter conditions, and a berm or other directional flow structure to guide the runoff to a sampling flume.

Before Situation:

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients. Nothing is known about the

After Situation:

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

Feature Measure: System installed

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $30,541.19

Total Cost per Unit: $30,541.19

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 202 - Edge-of-Field Water Quality Monitoring-System Installation

Scenario: #126 - Surface

Scenario Description:

This edge-of-field water quality monitoring system is applicable to a single control or treatment site that has a field defined with surface runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for southern latitudes where winter time heating is not required for sampling. It will allow for installation of automated sampling data collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, and a berm or other directional flow structure to guide the runoff to a sampling flume.

Before Situation:

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients.

After Situation:

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

Feature Measure: System installed

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $29,801.59

Total Cost per Unit: $29,801.59

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 202 - Edge-of-Field Water Quality Monitoring-System Installation

Scenario: #134 - Retrofit, Surface or Subsurface, One

Scenario Description:

This edge-of-field water quality monitoring system is to retrofit an existing above and below monitoring designed system that is being used in associated with the 799 interim practice or comparable system. The retrofit is applicable to an above and below system that has a field defined with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The data represents the installation of an automated and manual backup rain gauge and two back-up/solar power supply be added to existing paired system.

Before Situation:

The agricultural operation prior to retrofit has an edge-of-field data collection system but it does not meet the present standards for accuracy or reliability as detailed in either or both of Activity 201 and Activity 202.

After Situation:

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

Feature Measure: System installed

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $4,433.54

Total Cost per Unit: $4,433.54

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 202 - Edge-of-Field Water Quality Monitoring-System Installation

Scenario: #143 - Retrofit, Above Three

Scenario Description:

This edge-of-field water quality monitoring system is to retrofit an existing above and below monitoring designed system that is being used in associated with the 799 interim practice or comparable system. The retrofit is applicable to an above and below system that has a field defined with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The data represents the installation of an automated and manual backup rain gauge, two back-up/solar power supplies, two communications devices, two pre-calibrated flumes, and two depth (stage) sensors to be added to existing paired system.

Before Situation:

The agricultural operation prior to retrofit has an edge-of-field data collection system but it does not meet the present standards for accuracy or reliability as detailed in either or both of Activity 201 and Activity 202.

After Situation:

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

Feature Measure: System installed

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $24,929.73

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $24,929.73

Practice: 202 - Edge-of-Field Water Quality Monitoring-System Installation

Scenario: #151 - Retrofit, Three

Scenario Description:

This edge-of-field water quality monitoring system is to retrofit an existing system that is being used in associated with the 799 interim practice or comparable system. The retrofit is applicable to a single control or treatment site that has a field defined with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The data represents the installation of an automated and manual backup rain gauge, back-up/solar power supply, communications device, pre-calibrated flow control structure, and depth (stage) sensor to be added to existing system.

Before Situation:

The agricultural operation prior to retrofit has an edge-of-field data collection system but it does not meet the present standards for accuracy or reliability as detailed in either or both of Activity 201 and Activity 202.

After Situation:

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

Feature Measure: System installed

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $14,166.43

Total Cost per Unit: $14,166.43

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 202 - Edge-of-Field Water Quality Monitoring-System Installation

Scenario: #159 - Retrofit, Two

Scenario Description:

This edge-of-field water quality monitoring system is to retrofit an existing system that is being used in associated with the 799 interim practice or comparable system. The retrofit is applicable to a single control or treatment site that has a field defined with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The data represents the installation of an automated and manual backup rain gauge, back-up/solar power supply, communications device, and depth (stage) sensor to be added to existing system.

Before Situation:

The agricultural operation prior to retrofit has an edge-of-field data collection system but it does not meet the present standards for accuracy or reliability as detailed in either or both of Activity 201 and Activity 202.

After Situation:

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

Feature Measure: System installed

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $10,286.45

Total Cost per Unit: $10,286.45

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 202 - Edge-of-Field Water Quality Monitoring-System Installation

Scenario: #167 - Retrofit, One

Scenario Description:

This edge-of-field water quality monitoring system is to retrofit an existing system that is being used in associated with the 799 interim practice or comparable system. The retrofit is applicable to a single control or treatment site that has a field defined with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The data represents the installation of an automated and manual backup rain gauge and back-up/solar power supply be added to existing system.

Before Situation:

The agricultural operation prior to retrofit has an edge-of-field data collection system but it does not meet the present standards for accuracy or reliability as detailed in either or both of Activity 201 and Activity 202.

After Situation:

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

Feature Measure: System installed

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $3,494.09

Total Cost per Unit: $3,494.09

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 202 - Edge-of-Field Water Quality Monitoring-System Installation

Scenario: #175 - Above and Below System, Cold Climate

Scenario Description:

This edge-of-field water quality monitoring system is applicable where a conservation practice has a pre- and post treatment area in the same field drainage with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for northern latitudes where winter time heating is required for sampling. It will allow for installation of automated sampling data collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, a calf hut or other structure with heat is required over the flume to allow sampling under northern latitude winter conditions, and a berm or other directional flow structure to guide the runoff to a sampling flume. The actual installation will different on the subsurface flow by allowing a smaller pre-calibrated flume with the addition of a velocity sensor meter as in the tile alternative.

Before Situation:

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients. Nothing is known about the

After Situation:

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

Feature Measure: System installed

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $45,766.34

Total Cost per Unit: $45,766.34

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 202 - Edge-of-Field Water Quality Monitoring-System Installation

Scenario: #183 - Above and Below System, Warm Climate

Scenario Description:

This edge-of-field water quality monitoring system is applicable where a conservation practice has a pre- and post treatment area in the same field drainage with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for southern latitudes where winter time heating is not required for sampling. It will allow for installation of automated sampling data collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, and a berm or other directional flow structure to guide the runoff to a sampling flume. The actual installation will different on the subsurface flow by allowing a smaller precalibrated flume with the addition of a velocity sensor meter as in the tile alternative.

Before Situation:

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients.

After Situation:

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

Feature Measure: System installed

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $41,696.13

Total Cost per Unit: $41,696.13

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 204 - Adaptive Management for Soil Health

Scenario: #9 - Basic

Scenario Description:

Field study with replicated plots for implementation of any of the conservation practices outlined in CEMA 204 Adaptive Management for Soil Health. Allows comparison of management and treatments on crop, grassland, forest, or rangeland small plots. Replicated treatment plots allow the producer to learn how to manage conservation practice on their operation and evaluate the management strategy effectiveness on soil health indicators particularly soil organic carbon, aggregate stability, pH, respiration. Scenario includes following the guidelines of the Conservation Practice in CEMA 204 Adaptive Management for Soil Health and CEMA 216 Soil Health Testing in small, replicated plots. Follow NRCS Technical Note 10- Adaptive Management. Study plot typical sizes range from 2-10 acres. Typical acre for scenario is 5.

Before Situation:

A producer is adopting the practice for the first time and desires to learn how to best to apply the practice within their unique landscape and management style or the producer is interested in improving the effectiveness of an existing practice or evalua

After Situation:

The study plots were installed with at least 4 replicated plots (control + treatment) designed, laid out, managed and evaluated with the assistance of a consultant knowledgeable in the selected practice. Data has been collected. Results are summarized in a report showing effectiveness of the treatments and any determined statistical analysis of collected data. Results are used to make management decisions to address soil health principles, erosion and water quality issues. Soil Health indicators and yields will be measured and statistically summarized following the procedures in Agronomy Technical Note 10 - Adaptive Management. This would be repeated yearly for 3 years.

Feature Measure: Number of Study Plots

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,735.45

Total Cost per Unit: $2,735.45

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 204 - Adaptive Management for Soil Health

Scenario: #25 - Basic with Soil Health Test

Scenario Description:

Field study with replicated plots for implementation of any of the conservation practices outlined in CEMA 204 Adaptive Management for Soil Health. Allows comparison of management and treatments on crop, grassland, forest, or rangeland small plots. Replicated treatment plots allow the producer to learn how to manage conservation practice on their operation and evaluate the management strategy effectiveness on soil health indicators particularly soil organic carbon, aggregate stability, active carbon, pH, texture and respiration. Scenario includes following the guidelines of the Conservation Practice in CEMA 204 Adaptive Management for Soil Health in small replicated plots. Follow NRCS Technical Note 10- Adaptive Management. Study plot typical sizes range from 2-10 acres. Typical acre for scenario is 5.

Before Situation:

A producer is adopting the practice for the first time and desires to learn how to best to apply the practice within their unique landscape and management style or the producer is interested in improving the effectiveness of an existing practice or evalua

After Situation:

Study plots were installed with treatments applied per the study design. Plot field data is collected. Soil health soil samples were collected in the fall and analyzed for include at least SOC by dry combustion, Active Carbon, pH, texture (soil texture in year 1 only to calculate AWC), aggregate stability, and 24-hr respiration. Soil Health indicators and yields will be measured and statistically summarized following the procedures in Agronomy Technical Note 10 - Adaptive Management. A final report summarizes the effect of the treatment on soil health using interpretation of lab analysis and any statical analysis of collected field data. Results will inform future management decisions for the conservation practice to improve or maintain soil health.

Feature Measure: Number of field study plots

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,829.28

Total Cost per Unit: $3,829.28

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 206 - Feed and Forage Analysis

Scenario: #9 - Nutrient Composition Analysis

Scenario Description:

Testing of feed or forage for nutrient composition. Each lot (forage lot or lot of feed) should be sampled and tested separately. Testing of bale or stack forage for nutrient composition. Factors to consider when determining lot size include forage species, stage of maturity, cutting schedule, soil type, soil fertility, presence of weeds, harvest conditions, storage effects. Each lot should be sampled and tested separately. Testing of standing forage for nutrient composition. Forage can be tested to determine if it is worth cutting for hay or to determine if grazing animals require supplemental feed. Select at lease eight representative locations and clip the forage at grazing or harvest height from a one square foot area at each location. In grazing situations try and select the species being selectively grazed. Cut the samples into 2- to 3-inch pieces, combine in a bucket and mix well. Spread the sample on paper and allow it to air-dry for two days or place in a pan and dry overnight in an oven at 150°F before mailing it to the laboratory. Analysis of silage (fresh or silo) for nutrient composition. Remove two to three gallons of silage from different sections of a load and save about a quart using the quartering method. Freeze the samples until all loads are sampled. Combine samples, mix thoroughly, and reduce to about one quart by quartering. The final sample should be placed in the cloth forage sample bag, and the full forage bag inserted into a plastic bag to prevent moisture loss during mailing. Remove excess air from the plastic bag before sealing. Do not insert the plastic bag inside the cloth forage bag since damage may result when it is processed by the laboratory. Freeze the sample prior to mailing and mail samples early in the week to avoid weekend delays and reduce chances of molding. Upright silos- 12 handfuls of silage as it is discharged from the silo. Horizontal silos-hand grab same as upright but access the entire surface of the open face. Analysis of dietary ration, feed, or diet for nutrient composition.

Before Situation:

Producer wishes to reduce nutrient excretion or emission from livestock or poultry to air, soil, or water. To accomplish a reduction in nutrient excretion and emissions, knowledge of nutrient input from silage is required to optimally balance the diet for

After Situation:

Animal diet is optimally balanced for nutrient composition and nutrients excreted or emitted by the animal are reduced.

Feature Measure: Each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,355.54

Total Cost per Unit: $2,355.54

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 207 - Site Assessment and Soil Testing for Contaminants Activity

Scenario: #9 - Site Evaluation

Scenario Description:

This practice applies to urban sites where the desired land use is cropland. Sites may have been residential, industrial or commercial land use in the past and the risk for soil contaminants is unknown.

Before Situation:

Soil suitability for agricultural production is unknown with potential risk of contamination from prior land use activities.

After Situation:

Site history has been researched and findings indicate a potential for the presence of contaminants. Final report provides the landowner with the level of risk and recommendation for further testing. Reports may be used in the conservation planning process to explore non-remedial conservation practices to reduce risk of contaminants entering the food products.

Feature Measure: Each Site

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,276.22

Total Cost per Unit: $4,276.22

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 207 - Site Assessment and Soil Testing for Contaminants Activity

Scenario: #25 - Site Evaluation and Testing for Soil Contaminants

Scenario Description:

This practice applies to urban sites where the desired land use is cropland. Sites may have been residential, industrial or commercial land use in the past and the risk for soil contaminants is unknown.

Before Situation:

Soil suitability for agricultural production is unknown with potential risk of contamination from prior land use activities.

After Situation:

Site history has been researched and findings indicate a potential for the presence of contaminants. The soil has been collected and tested for heavy metals, VOCs and PAHs. Final reports provide the landowner with the level of risk. Reports may be used in the conservation planning process to explore non-remedial conservation practices to reduce risk of contaminants entering the food products.

Feature Measure: Each Site

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $12,828.66

Total Cost per Unit: $12,828.66

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 207 - Site Assessment and Soil Testing for Contaminants Activity

Scenario: #41 - Soil Testing, Subsurface Investigation

Scenario Description:

This practice applies to urban sites where the desired land use is cropland. Sites may have been residential, industrial or commercial land use in the past and the risk for soil contaminants is unknown. The landowner has a prior Environmental Site Assessment completed by an Environmental Professional. The ESA report recommends further subsurface investigation. OR Landowner has NRCS report from portable Xray Fluorescence screening that detected soil contaminants.

Before Situation:

Soil suitability for agricultural production is unknown with potential risk of contamination from prior land use activities.

After Situation:

Site history has been researched and findings indicate a potential for the presence of contaminants. The soil has been collected and tested for heavy metals, VOCs and PAHs. Final reports provide the landowner with the level of risk. Reports may be used in the conservation planning process to explore non-remedial conservation practices to reduce risk of contaminants entering the food products.

Feature Measure: Each Site

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $8,552.44

Total Cost per Unit: $8,552.44

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 207 - Site Assessment and Soil Testing for Contaminants Activity

Scenario: #57 - Low Risk Sites

Scenario Description:

This practice applies to urban sites where the desired land use is cropland. Sites may have been residential, industrial or commercial land use in the past and the risk for soil contaminants is unknown. The landowner has a prior Environmental Site Assessment completed by an Environmental Professional. The ESA report does not require further investigation. OR Landowner has NRCS report from portable Xray Fluorescence screening that detected soil contaminants. Screening detection levels are below the State Environmental Protection Agency or equivalent agency published safety thresholds for bare soil residential use.

Before Situation:

Soil suitability for agricultural production is unknown with potential risk of contamination from prior land use activities.

After Situation:

Site history has been researched and findings indicate a potential for the presence of contaminants. The soil has been collected and tested for heavy metals only. Soil test reports provide the landowner with the level of risk. Reports may be used in the conservation planning process to explore non-remedial conservation practices to reduce risk of contaminants entering the food products.

Feature Measure: Area of Soil Tested

Scenario Unit: 1,000 Square Feet

Scenario Typical Size: 4.0

Scenario Total Cost: $918.30

Total Cost per Unit: $229.57

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 209 - PFAS Testing in Water or Soil

Scenario: #9 - Low Complexity, Single Sample

Scenario Description:

A single sample of water or soil is required to provide prescreening information to the landowner to determine if PFAS may be present in water or soils at their operation. In this scenario, the environmental media being sampled by the qualified individual is of low complexity: there is little temporal or spatial variation to account for in sampling, therefore no pre-sampling planning needed. This could include a single well used for stockwater or irrigation systems. The typical number of tests is 1, assuming that a landowner has a single well or a single field that can be represented by a single composite sample.

Before Situation:

Water or soil on an agricultural operation are of unknown PFAS status. PFAS laboratory analysis has not been conducted on the water or soil of interest.

After Situation:

A laboratory PFAS analysis was completed, and the results were interpreted and explained to the landowner. The landowner now has pre-screening information that suggests if PFAS may be present in water (or soil) on their operation. If testing detects PFAS in water or soil at levels that exceed State or Federal screening levels, the landowner can decide to pursue non-NRCS sources for follow-up detailed PFAS assessment.

Feature Measure: Each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,293.51

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $1,293.51

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 209 - PFAS Testing in Water or Soil

Scenario: #25 - Low Complexity, Multiple Samples

Scenario Description:

Multiple samples of water or soil are needed to provide prescreening information to the landowner to determine if PFAS may be present in water or soils at their operation. In this scenario, the environmental media being sampled by the qualified individual is of low complexity. There is little temporal or spatial variation to account for in sampling, therefore no pre-sampling planning needed. This scenario could apply to small ponds or wells used for stockwater or irrigation systems, a small field, or a small number of fields of uniform soil composition. This scenario assumes that additional time is needed for each collection of multiple samples. The typical number of tests is 5, assuming that a landowner has four fields and a well and each field can be represented by a single composite sample.

Before Situation:

Water or soil on an agricultural operation are of unknown PFAS status. PFAS laboratory analysis has not been conducted on the water or soil of interest.

After Situation:

A laboratory PFAS analysis was completed, and the results were interpreted and explained to the landowner. The landowner now has pre-screening information that suggests if PFAS may be present in water (or soil) on their operation. If testing detects PFAS in water or soil at levels that exceed State or Federal screening levels, the landowner can decide to pursue non-NRCS sources for follow-up detailed PFAS assessment.

Feature Measure: Each

Scenario Unit: Number

Scenario Typical Size: 5.0

Scenario Total Cost: $4,457.31

Total Cost per Unit: $891.46

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 209 - PFAS Testing in Water or Soil

Scenario: #41 - High Complexity, Multiple Samples

Scenario Description:

Multiple samples of water or soil are needed to provide prescreening information to the landowner to determine if PFAS may be present in water or soils at their operation. In this scenario, the environmental media being sampled is of high complexity. There is a need to account for this temporal or spatial variation in sampling. Therefore, additional time is needed to prepare and discuss a comprehensive sampling strategy to detect PFAS and the final comprehensive report with the landowner. This scenario could apply to the agricultural use of multiple sources of water (ponds, wells, and reclaimed water) for stockwater or irrigation systems or to assess multiple fields with variable soil composition. This scenario assumes that additional time is needed for each collection of multiple samples. The typical number of tests is 5, assuming that a farmer has many fields, and the producer doesn't want to test all or has large fields with highly variable soil composition.

Before Situation:

Water or soil on an agricultural operation are of unknown PFAS status. PFAS laboratory analysis has not been conducted on the water or soil of interest.

After Situation:

A laboratory PFAS analysis was completed, and the results were interpreted and explained to the landowner. The landowner now has pre-screening information that suggests if PFAS may be present in water (or soil) on their operation. If testing detects PFAS in water or soil at levels that exceed State or Federal screening levels, the landowner can decide to pursue non-NRCS sources for follow-up detailed PFAS assessment.

Feature Measure: Each

Scenario Unit: Number

Scenario Typical Size: 5.0

Scenario Total Cost: $5,462.44

Total Cost per Unit: $1,092.49

Based on North Dakota average costs. Individual county costs may vary.

Practice: 216 - Soil Health Testing

Scenario: #172 - Basic

Scenario Description:

A laboratory soil health assessment for a suite of indicators is conducted using recommended methods to evaluate and/or monitor conservation practices. Laboratory tests for five (~6 2 pH methods) indicators: soil organic carbon concentration, active carbon, soil texture, pH CaCl, pH H2O and aggregate stability. Sample collection is completed by a qualified individual and includes time for soil sampling and submission. Lab method for organic carbon concentration is dry combustion. For calcareous soil: Total C - Inorganic C. Lab method for carbon mineralization potential is 24-hr CO2 burst resulting from rewetting air dried, sieved soil. Lab method for aggregate stability is slaking.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management.

After Situation:

A laboratory soil health test of was completed for the suite of three soil health indicators and results explained to the producer and used to establish benchmark conditions for soil health management practices or evaluate the effectiveness of a conservation practice.

Feature Measure: Test

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $650.45

Total Cost per Unit: $650.45

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 216 - Soil Health Testing

Scenario: #188 - Single Indicator

Scenario Description:

A laboratory soil health assessment for a single indicator is conducted using recommended methods to evaluate and/or monitor conservation practices. Laboratory tests available: soil organic carbon concentration, carbon mineralization potential, pH, PoxC, soil texture, ACE Protein, PLFA, Enzymes, Respiration 1,2,3, or 4-day, and aggregate stability. Sample collection is completed by a qualified individual and includes time for soil sampling and submission. Lab method for organic carbon concentration is dry combustion. For calcareous soil: Total C - Inorganic C. Lab method for carbon mineralization potential is 24-hr CO2 burst resulting from rewetting air dried, sieved soil.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management.

After Situation:

A laboratory soil health test of was completed for a single indicator and results explained to the producer and used to establish benchmark conditions for soil health management practices or evaluate the effectiveness of a conservation practice.

Feature Measure: polygon

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $422.83

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $422.83

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 216 - Soil Health Testing

Scenario: #277 - Minimal Suite

Scenario Description:

A laboratory soil health assessment for a suite of indicators is conducted using recommended methods to evaluate and/or monitor conservation practices. Laboratory tests for three indicators: soil organic carbon concentration, carbon mineralization potential, and aggregate stability. Sample collection is completed by a qualified individual and includes time for soil sampling and submission. Lab method for organic carbon concentration is dry combustion. For calcareous soil: Total C - Inorganic C.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management.

After Situation:

A laboratory soil health test of was completed for the suite of six soil health indicators and results explained to the producer and used to establish benchmark conditions for soil health management practices or evaluate the effectiveness of a conservation practice.

Feature Measure: Test

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $787.97

Total Cost per Unit: $787.97

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 216 - Soil Health Testing

Scenario: #293 - Basic and Single Indicator

Scenario Description:

A laboratory soil health assessment for a suite of indicators is conducted using recommended methods to evaluate and/or monitor conservation practices. Laboratory tests for five (~6 2 pH methods) indicators: soil organic carbon concentration, active carbon, soil texture, pH CaCl, pH H2O and aggregate stability. Sample collection is completed by a qualified individual and includes time for soil sampling and submission. Lab method for organic carbon concentration is dry combustion. For calcareous soil: Total C - Inorganic C. Lab method for carbon mineralization potential is 24-hr CO2 burst resulting from rewetting air dried, sieved soil. Lab method for aggregate stability is slaking. Producer also selects 1 additional indicator from the Single Indicator List.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management.

After Situation:

A laboratory soil health test was completed for the suite of three soil health indicators and results explained to the producer and used to establish benchmark conditions for soil health management practices or evaluate the effectiveness of a conservation practice.

Feature Measure: Test

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $833.02

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $833.02

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 216 - Soil Health Testing

Scenario: #309 - Minimal Suite and Single Indicator

Scenario Description:
A laboratory soil health assessment for a suite of indicators is conducted using recommended methods to evaluate and/or monitor conservation practices. Laboratory tests for three indicators: soil organic carbon concentration, carbon mineralization potential, and aggregate stability. Sample collection is completed by a qualified individual and includes time for soil sampling and submission. Lab method for organic carbon concentration is dry combustion. For calcareous soil: Total C - Inorganic C.

Before Situation:
Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management.

After Situation:
A laboratory soil health test of was completed for the suite of six soil health indicators and results explained to the producer and used to establish benchmark conditions for soil health management practices or evaluate the effectiveness of a conservation practice.

Feature Measure: Test

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $970.54

Total Cost per Unit: $970.54

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 217 - Soil and Source Testing for Nutrient Management

Scenario: #9 - Soil Testing

Scenario Description:

A qualified individual will develop a nutrient testing strategy, collect soil samples and prepare for laboratory analysis; and interpret soil nutrient needs. Typical management unit is 100 acres. Includes Comprehensive Soil Testing to provide both Macro and micro soil nutrient levels.

Before Situation:

Producer does not have soil test laboratory analysis documenting the level of nitrogen, phosphorus, potassium or pH for each field or management unit in crop production. Nutrients are applied without knowledge of soil test levels.

After Situation:

Soil samples have been collected and analyzed. The strategy for sampling is described and a map if sampling points is provided. Qualified individual concludes nutrients are needed or not based on soil test results. Follow up by developing a nutrient management plan with DIA 157 Nutrient Management Design and Implementation Activity or implement Nutrient Management 590.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $953.27

Total Cost per Unit: $953.27

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 217 - Soil and Source Testing for Nutrient Management

Scenario: #41 - Zone or Grid Soil Testing

Scenario Description:
A qualified individual will develop a nutrient testing strategy, collect soil samples based on a 2.5 acre grid or zone, and prepare for laboratory analysis; and interpret soil nutrient needs. Typical management unit is 100 acres.

Before Situation:
Producer does not have soil test laboratory analysis documenting the level of nitrogen, phosphorus, potassium or pH for each field or management unit in crop production. Nutrients are applied without knowledge of soil test levels.

After Situation:
Soil samples have been collected and analyzed. The strategy for sampling is described and a map if sampling points is provided. Qualified individual concludes nutrients are needed or not based on soil test results. Follow up by developing a nutrient management plan with DIA 157 Nutrient Management Design and Implementation Activity or implement Nutrient Management 590.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,230.98

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $2,230.98

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 217 - Soil and Source Testing for Nutrient Management

Scenario: #57 - Manure or Compost

Scenario Description:

A qualified individual will develop a nutrient testing strategy, collect manure or compost samples and prepare for laboratory analysis; and interpret crop nutrient needs. Sampling protocol for liquid manure includes agitation per LGU guidelines. Dry manure and compost sampling protocol are performed per LGU guidelines.

Before Situation:

Producer does not have manure or compost laboratory analysis documenting the level of nitrogen, phosphorus, potassium or pH of the organic source. Nutrients are applied without knowledge of manure or compost nutrient levels.

After Situation:

Manure or Compost samples have been collected and analyzed. The strategy for sampling is described. Qualified individual concludes the amount of nutrients needed for the crop based on manure or compost test results. Follow up by developing a nutrient management plan with DIA 157 Nutrient Management Design and Implementation Activity or implement Nutrient Management 590.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,088.67

Total Cost per Unit: $1,088.67

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 217 - Soil and Source Testing for Nutrient Management

Scenario: #73 - Water Sampling

Scenario Description:

A qualified individual will develop a nutrient testing strategy, collect source water samples and prepare for laboratory analysis; and interpret crop nutrient needs. Typical irrigation water sampling for nutrients, may include drainage water sampling for monitoring nutrient loss or if drainage water is being reused.

Before Situation:

Producer does not have Source Water Nutrient laboratory analysis documenting the level of nitrogen, phosphorus, potassium or pH of the water source. Nutrients are applied without knowledge of source water nutrient levels.

After Situation:

Water samples have been collected and analyzed. The strategy for sampling is described. Qualified individual concludes the amount of nutrients needed for the crop based on Source Water test results. Follow up by developing a nutrient management plan with DIA 157 Nutrient Management Design and Implementation Activity or implement Nutrient Management 590.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $699.46

Total Cost per Unit: $699.46

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 217 - Soil and Source Testing for Nutrient Management

Scenario: #89 - Acidic or Alkaline Soil Testing

Scenario Description:

Soil analysis is used as a diagnostic tool to identify fields with soil acidification problems in no-till cropping systems. One soil sample is collected every 40 acres from only the top 3 inches of soil and analyzed for both pH and buffer pH. A recommended three cores should be taken from a 4 sq ft sampling area every 40 acres and composited to provide at least 100 grams of soil for the laboratory test. Test results are georeferenced on a map and can be used to build a lime application budget for the field.

Before Situation:

Field shows crop yield decline and areas of lower pH are suspected but not tested. No-till application of nitrogen fertilizers is causing acidification. Soil is sampled to 6-inch depth, multiple sub-samples are collected from random locations in the field

After Situation:

One composited soil sample is collected in a 4 sq ft area from the top 3 inches of soil every 40 acres,. The sample is analyzed for pH and buffer pH. Sample results are georeferenced on a map and used to identify and diagnose soil acidification problems. Follow up by developing or updating a nutrient management plan with DIA 157 Nutrient Management Design and Implementation Activity or implement Nutrient Management 590. Producers can then use this diagnostic information to apply lime to raise the soil pH. Topsoil pH and plant productivity and health are both maintained at desirable levels.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $247.30

Total Cost per Unit: $247.30

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 217 - Soil and Source Testing for Nutrient Management

Scenario: #105 - Soil Test with Organic Nutrients, Less Than or Equal to One Acre

Scenario Description:

A qualified individual will develop a nutrient testing strategy, collect soil and nutrient source samples, prepare for laboratory analysis and interpret soil and crop nutrient needs. Typical field size is less than or equal to 0.5 acres (22000 sq ft). Includes Comprehensive Soil Testing to provide both Macro and micro soil nutrient levels.

Before Situation:

Producer does not have soil and nutrient source laboratory analysis documenting the level of nitrogen, phosphorus, potassium or pH for the soil and nutrient source. Nutrients are applied without knowledge of soil and nutrient source test levels.

After Situation:

Soil and nutrient source samples have been collected and analyzed. The strategy for sampling is described. Qualified individual concludes nutrients are needed or not based on soil test results. The amount of nutrients needed is based on Nutrient Source results. Follow up by developing a nutrient management plan with DIA 157 Nutrient Management Design and Implementation Activity or implement Nutrient Management 590.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $473.02

Total Cost per Unit: $473.02

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 217 - Soil and Source Testing for Nutrient Management

Scenario: #121 - Soil Testing, Small Production Beds

Scenario Description:

A qualified individual will develop a nutrient testing strategy, collect 5 soil subsamples and combine to one representative sample, prepare for laboratory analysis, and interpret soil nutrient needs. This scenario considers costs for 5 or less raised beds. Cost includes comprehensive soil test based on expected specialty crop production.

Before Situation:

Producer does not have soil test laboratory analysis documenting the level of nitrogen, phosphorus, potassium or pH for each field or management unit in crop production. Nutrients are applied without knowledge of soil test levels.

After Situation:

Soil samples have been collected and analyzed. The strategy for sampling is described and a map if sampling points is provided. Qualified individual concludes nutrients are needed or not based on soil test results. A Nutrient Management Plan CPS 590 or DIA 157 may be developed after the report is complete.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $612.18

Total Cost per Unit: $612.18

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 218 - Carbon Sequestration and Greenhouse Gas Mitigation Assessment

Scenario: #9 - Low Complexity

Scenario Description:

An evaluation of the quantifiable carbon sequestration and greenhouse gas mitigation effects using the COMET-Farm tool. The information on the type of operation, land use, and management history is collected initially as part of the planning process for a conservation plan focused on carbon sequestration and greenhouse gas mitigation. The carbon sequestration and greenhouse gas mitigation CEMA includes a complete COMET-Farm project designed to evaluate the current conservation plan and the baseline and historic management impacts on carbon sequestration and greenhouse gas mitigation. The COMET-Farm evaluation can occur concurrently or following a conservation plan. Low complexity would include simple systems of a single enterprise, low number of management units, detailed available history.

Before Situation:

The producer's objectives are to improve soil carbon sequestration and greenhouse gas mitigation and to quantify the effects of a conservation plan. The quantifiable effects on soil carbon sequestration and greenhouse gas mitigation of the current and his

After Situation:

Producer receives a detailed report from COMET-Farm that quantifies the soil carbon sequestration and greenhouse gas mitigation effects of historic, baseline, and (scenario management) proposed conservation plan.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,005.13

Total Cost per Unit: $1,005.13

Based on North Dakota average costs. Individual county costs may vary.

Practice: 218 - Carbon Sequestration and Greenhouse Gas Mitigation Assessment

Scenario: #25 - Medium Complexity

Scenario Description:

An evaluation of the quantifiable carbon sequestration and greenhouse gas mitigation effects using the COMET-Farm tool. The information on the type of operation, land use, and management history is collected initially as part of the planning process for a conservation plan focused on carbon sequestration and greenhouse gas mitigation. The carbon sequestration and greenhouse gas mitigation CEMA includes a complete COMET-Farm project designed to evaluate the current conservation plan and the baseline and historic management impacts on carbon sequestration and greenhouse gas mitigation. The COMET-Farm evaluation can occur concurrently or following a conservation plan. Medium complexity would include systems with more than one enterprises, a moderate number of management units, complex or difficult to define history.

Before Situation:

The producer objectives are to improve soil carbon sequestration and greenhouse gas mitigation and quantify the effects of a conservation plan. The quantifiable effects on soil carbon sequestration and greenhouse gas mitigation of the current and historic

After Situation:

Producer receives a detailed COMET-Farm report that quantifies the soil carbon sequestration and greenhouse gas mitigation effects of historic, baseline, and (scenario management) proposed conservation plan.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,507.69

Total Cost per Unit: $1,507.69

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 218 - Carbon Sequestration and Greenhouse Gas Mitigation Assessment

Scenario: #41 - High Complexity

Scenario Description:

An evaluation of the quantifiable carbon sequestration and greenhouse gas mitigation effects using the COMET-Farm tool. The information on the type of operation, land use, and management history is collected initially as part of the planning process for a conservation plan focused on carbon sequestration and greenhouse gas mitigation. The carbon sequestration and greenhouse gas mitigation CEMA includes a complete COMET-Farm project designed to evaluate the current conservation plan and the baseline and historic management impacts on carbon sequestration and greenhouse gas mitigation. The COMET-Farm evaluation can occur concurrently or following a conservation plan. High complexity would include systems with multiple enterprises, high number of management units, and complex or incomplete management history.

Before Situation:

The producer objectives are to improve soil carbon sequestration and greenhouse gas mitigation and quantify the effects of a conservation plan. The quantifiable effects on soil carbon sequestration and greenhouse gas mitigation of the current and historic

After Situation:

Producer receives a detailed report from COMET-Farm that quantifies the soil carbon sequestration and greenhouse gas mitigation effects of historic, baseline, and (scenario management) proposed conservation plan .

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,010.26

Total Cost per Unit: $2,010.26

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 219 - Prescribed Grazing Conservation Evaluation and Monitoring Activity

Scenario: #9 - Grazed Lands, Less Than or Equal to 100 Acres

Scenario Description:

Small agricultural operation with less than 100 acres grazed land. Natural Resource Concern: soil erosion, water quality, fish and wildlife, plant condition, or appropriate resource concerns.

Before Situation:

Producer is not utilizing a certified Technical Service Provider (TSP) to evaluate and monitor all practices planned in a Conservation Plan, CPA 110, Implementation Requirement (IR), and/or DIA 159. Information is not being gathered to evaluate the effect

After Situation:

Producer will utilize a certified Technical Service Provider (TSP) to evaluate and monitor all grazing management practices planned in a Conservation Plan, CPA 110, Implementation Requirement (IR) and/or DIA 159. Evaluation and monitoring activities will provide all needed information to evaluate the effectiveness of the grazing management plan (CPS 528) and any associated practices. A monitoring plan will be implemented with appropriate protocols and data records that evaluate whether the grazing strategy identified in the grazing plan is resulting in a movement toward meeting goals and objectives. Specific evaluation activities will be chosen based on stated objectives and pertinent resource concerns assessments identified in the Conservation Plan, CPA, Implementation Requirement (IR) and/or DIA. Evaluation and monitoring will meet the applicable "plans and specifications" and "operation and maintenance" sections found in CPS 528. Other supporting and facilitating conservation practices will also be monitored and evaluated. The CEMA narrative will describe the overall methodology, decision support tools and recommended management actions to meet purposes and criteria within practice standards. Job sheets and implementation requirement documents found in State's FOTG Section IV Conservation practices may be used.

Feature Measure: number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,047.26

Total Cost per Unit: $1,047.26

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 219 - Prescribed Grazing Conservation Evaluation and Monitoring Activity

Scenario: #25 - Grazed Lands, 101 to 500 Acres

Scenario Description:

Agricultural operation between 101 and 500 acres grazed land. Natural Resource Concern: soil erosion, water quality, fish and wildlife, plant condition, or appropriate resource concerns.

Before Situation:

Producer is not utilizing a certified Technical Service Provider (TSP) to evaluate and monitor all practices planned in a Conservation Plan, CPA 110, Implementation Requirement (IR), and/or DIA 159. Information is not being gathered to evaluate the effect

After Situation:

Producer will utilize a certified Technical Service Provider (TSP) to evaluate and monitor all grazing management practices planned in a Conservation Plan, CPA 110, Implementation Requirement (IR) and/or DIA 159. Evaluation and monitoring activities will provide all needed information to evaluate the effectiveness of the grazing management plan (CPS 528) and any associated practices. A monitoring plan will be implemented with appropriate protocols and data records that evaluate whether the grazing strategy identified in the grazing plan is resulting in a movement toward meeting goals and objectives. Specific evaluation activities will be chosen based on stated objectives and pertinent resource concerns assessments identified in the Conservation Plan, CPA, Implementation Requirement (IR) and/or DIA. Evaluation and monitoring will meet the applicable "plans and specifications" and "operation and maintenance" sections found in CPS 528. Other supporting and facilitating conservation practices will also be monitored and evaluated. The CEMA narrative will describe the overall methodology, decision support tools and recommended management actions to meet purposes and criteria within practice standards. Job sheets and implementation requirement documents found in State's FOTG Section IV Conservation practices may be used.

Feature Measure: number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,570.89

Total Cost per Unit: $1,570.89

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 219 - Prescribed Grazing Conservation Evaluation and Monitoring Activity

Scenario: #41 - Grazed Lands, 501 to 1,500 Acres

Scenario Description:

Small agricultural operation with 501 to 1,500 acres grazed land. Natural Resource Concern: Soil erosion, water quality, fish and wildlife, plant condition, or appropriate resource concerns.

Before Situation:

Producer is not utilizing a certified Technical Service Provider (TSP) to evaluate and monitor all practices planned in a Conservation Plan, CPA 110, Implementation Requirement (IR), and/or DIA 159. Information is not being gathered to evaluate the effect

After Situation:

Producer will utilize a certified Technical Service Provider (TSP) to evaluate and monitor all grazing management practices planned in a Conservation Plan, CPA 110, Implementation Requirement (IR) and/or DIA 159. Evaluation and monitoring activities will provide all needed information to evaluate the effectiveness of the grazing management plan (CPS 528) and any associated practices. A monitoring plan will be implemented with appropriate protocols and data records that evaluate whether the grazing strategy identified in the grazing plan is resulting in a movement toward meeting goals and objectives. Specific evaluation activities will be chosen based on stated objectives and pertinent resource concerns assessments identified in the Conservation Plan, CPA, Implementation Requirement (IR) and/or DIA. Evaluation and monitoring will meet the applicable "plans and specifications" and "operation and maintenance" sections found in CPS 528. Other supporting and facilitating conservation practices will also be monitored and evaluated. The CEMA narrative will describe the overall methodology, decision support tools and recommended management actions to meet purposes and criteria within practice standards. Job sheets and implementation requirement documents found in State's FOTG Section IV Conservation practices may be used.

Feature Measure: number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,618.16

Total Cost per Unit: $2,618.16

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 219 - Prescribed Grazing Conservation Evaluation and Monitoring Activity

Scenario: #57 - Grazed Lands, 1,501 to 5,000 Acres

Scenario Description:

Agricultural operation with 1,501 to 5,000 acres grazed land. Natural Resource Concern: Soil erosion, water quality, fish and wildlife, plant condition, or appropriate resource concerns.

Before Situation:

Producer is not utilizing a certified Technical Service Provider (TSP) to evaluate and monitor all practices planned in a Conservation Plan, CPA 110, Implementation Requirement (IR), and/or DIA 159. Information is not being gathered to evaluate the effect

After Situation:

Producer will utilize a certified Technical Service Provider (TSP) to evaluate and monitor all grazing management practices planned in a Conservation Plan, CPA 110, Implementation Requirement (IR) and/or DIA 159. Evaluation and monitoring activities will provide all needed information to evaluate the effectiveness of the grazing management plan (CPS 528) and any associated practices. A monitoring plan will be implemented with appropriate protocols and data records that evaluate whether the grazing strategy identified in the grazing plan is resulting in a movement toward meeting goals and objectives. Specific evaluation activities will be chosen based on stated objectives and pertinent resource concerns assessments identified in the Conservation Plan, CPA, Implementation Requirement (IR) and/or DIA. Evaluation and monitoring will meet the applicable "plans and specifications" and "operation and maintenance" sections found in CPS 528. Other supporting and facilitating conservation practices will also be monitored and evaluated. The CEMA narrative will describe the overall methodology, decision support tools and recommended management actions to meet purposes and criteria within practice standards. Job sheets and implementation requirement documents found in State's FOTG Section IV Conservation practices may be used.

Feature Measure: number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,665.42

Total Cost per Unit: $3,665.42

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 219 - Prescribed Grazing Conservation Evaluation and Monitoring Activity

Scenario: #73 - Grazed Lands, 5,001 to 10,000 Acres

Scenario Description:

Agricultural operation with 5,001 to 10,000 acres grazed land. Natural Resource Concern: Soil erosion, water quality, fish and wildlife, plant condition, or appropriate resource concerns.

Before Situation:

Producer is not utilizing a certified Technical Service Provider (TSP) to evaluate and monitor all practices planned in a Conservation Plan, CPA 110, Implementation Requirement (IR), and/or DIA 159. Information is not being gathered to evaluate the effect

After Situation:

Producer will utilize a certified Technical Service Provider (TSP) to evaluate and monitor all grazing management practices planned in a Conservation Plan, CPA 110, Implementation Requirement (IR) and/or DIA 159. Evaluation and monitoring activities will provide all needed information to evaluate the effectiveness of the grazing management plan (CPS 528) and any associated practices. A monitoring plan will be implemented with appropriate protocols and data records that evaluate whether the grazing strategy identified in the grazing plan is resulting in a movement toward meeting goals and objectives. Specific evaluation activities will be chosen based on stated objectives and pertinent resource concerns assessments identified in the Conservation Plan, CPA, Implementation Requirement (IR) and/or DIA. Evaluation and monitoring will meet the applicable "plans and specifications" and "operation and maintenance" sections found in CPS 528. Other supporting and facilitating conservation practices will also be monitored and evaluated. The CEMA narrative will describe the overall methodology, decision support tools and recommended management actions to meet purposes and criteria within practice standards. Job sheets and implementation requirement documents found in State's FOTG Section IV Conservation practices may be used.

Feature Measure: number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,712.68

Total Cost per Unit: $4,712.68

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 219 - Prescribed Grazing Conservation Evaluation and Monitoring Activity

Scenario: #89 - Grazed Lands, Greater Than 10,000 Acres

Scenario Description:

Agricultural operation with greater than 10,000 acres grazed land. Natural Resource Concern: Soil erosion, water quality, fish and wildlife, plant condition, or appropriate resource concerns.

Before Situation:

Producer is not utilizing a certified Technical Service Provider (TSP) to evaluate and monitor all practices planned in a Conservation Plan, CPA 110, Implementation Requirement (IR), and/or DIA 159. Information is not being gathered to evaluate the effect

After Situation:

Producer will utilize a certified Technical Service Provider (TSP) to evaluate and monitor all grazing management practices planned in a Conservation Plan, CPA 110, Implementation Requirement (IR) and/or DIA 159. Evaluation and monitoring activities will provide all needed information to evaluate the effectiveness of the grazing management plan (CPS 528) and any associated practices. A monitoring plan will be implemented with appropriate protocols and data records that evaluate whether the grazing strategy identified in the grazing plan is resulting in a movement toward meeting goals and objectives. Specific evaluation activities will be chosen based on stated objectives and pertinent resource concerns assessments identified in the Conservation Plan, CPA, Implementation Requirement (IR) and/or DIA. Evaluation and monitoring will meet the applicable "plans and specifications" and "operation and maintenance" sections found in CPS 528. Other supporting and facilitating conservation practices will also be monitored and evaluated. The CEMA narrative will describe the overall methodology, decision support tools and recommended management actions to meet purposes and criteria within practice standards. Job sheets and implementation requirement documents found in State's FOTG Section IV Conservation practices may be used.

Feature Measure: number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,283.57

Total Cost per Unit: $6,283.57

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 221 - Soil Organic Carbon Stock Monitoring

Scenario: #9 - Soil Carbon Stock Sampling

Scenario Description:

Soil is collected for organic carbon testing following the measurement, monitoring, reporting and verification (MMRV) protocol. PODS land use and management information is collected and documents. Soil sample collection strategy is planned in an area of interest (AOI) of <10 acres. Soil samples are collected by a Qualified Individual (QI) at 6 different locations within the AOI (3 locations in 3 different strata). Soil bulk density is measured before being analyzed for organic carbon by dry combustion. Payment includes time for collecting management information, developing sampling strategy, soil sampling and sample preparation, submission to the laboratory, and interpretation/delivery of results.

Before Situation:

No recent measurements of soil organic carbon stocks have been made in the AOI. Conservation practices are planned or installed for the purpose of improving soil health and sequestering carbon.

After Situation:

Land use and management information is collected. Soil bulk density was measured before being analyzed for organic carbon by dry combustion. The results were interpreted and explained to the producer. Initial measurements are used to establish benchmark conditions for soil organic carbon stocks. Subsequent measurements are used to evaluate the effectiveness of a conservation practice on carbon sequestration and report the change over time.

Feature Measure: Area of Interest Polygon

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,864.16

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $4,864.16

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 221 - Soil Organic Carbon Stock Monitoring

Scenario: #89 - Citizen Science

Scenario Description:

Soil is collected for organic carbon testing following the measurement, monitoring, reporting and verification (MMRV) protocol. PODS land use and management information is collected and documents. Soil sample collection strategy is planned in an area of interest (AOI) of <10 acres. Soil samples are collected by a Qualified Individual (QI) at 9 different locations within the AOI (3 locations in 3 different strata). Soil bulk density is measured before being analyzed for organic carbon by dry combustion. Payment includes time for collecting management information, developing sampling strategy, soil sampling and sample preparation, submission to the laboratory, and interpretation/delivery of results.

Before Situation:

No recent measurements of soil organic carbon stocks have been made in the AOI. Conservation practices are planned or installed for the purpose of improving soil health and sequestering carbon.

After Situation:

Land use and management information is collected. Soil bulk density was measured before being analyzed for organic carbon by dry combustion. The results were interpreted and explained to the producer. Initial measurements are used to establish benchmark conditions for soil organic carbon stocks. Subsequent measurements are used to evaluate the effectiveness of a conservation practice on carbon sequestration and report the change over time.

Feature Measure: Area of Interest Polygon

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $7,150.49

Total Cost per Unit: $7,150.49

Based on North Dakota average costs. Individual county costs may vary.

Practice: 222 - Indigenous Stewardship Methods Evaluation

Scenario: #9 - Indigenous Knowledge, 301 to 1,000 Acres

Scenario Description:

The scenario involves obtaining assistance from a Qualified Individual, designated by the governing body of a Tribe or Indigenous culture, to evaluate the designated planning area, then gather knowledge about indigenous knowledge, and deliver results to the client and NRCS. The resulting information can be used to inform the conservation planning and implementation processes, meet the client's objectives by addressing one or more NRCS-recognized resource concerns using techniques that align with Tribal or Indigenous knowledge.

Before Situation:

Through the NRCS conservation planning process, a conservation planner has identified client objectives for addressing natural resource concerns (Soil, Water, Animals, Plants, Air + Energy) and socio-economic considerations such as increasing capacity for

After Situation:

The client hired a QI to provide the CEMA assistance. The QI has met with client and visited the planning area, in order to develop an understanding of its capabilities, limitations, and needs within a culturally appropriate context. Indigenous knowledge about the planning area has been gathered from sources approved by a Tribe or Indigenous culture. The QI verifies with the Tribe's or Indigenous culture's governing body, that the information gathered is accurate- then provides a report, map and other supporting documentation of their ISM evaluation of the planning area to the client; and a copy is shared with NRCS. In the future, the information this CEMA provides can assists the participant and the planner refine conservation objectives; and realize opportunities to incorporate Indigenous knowledge into a conservation plan and/or conservation practice implementations.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $17,303.84

Total Cost per Unit: $17,303.84

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 222 - Indigenous Stewardship Methods Evaluation

Scenario: #25 - Indigenous Knowledge, 1,001 to 3,000 Acres

Scenario Description:

The scenario involves obtaining assistance from a Qualified Individual, designated by the governing body of a Tribe or Indigenous culture, to evaluate the designated planning area, then gather knowledge about indigenous knowledge, and deliver results to the client and NRCS. The resulting information can be used to inform the conservation planning and implementation processes, meet the client's objectives by addressing one or more NRCS-recognized resource concerns using techniques that align with Tribal or Indigenous knowledge.

Before Situation:

Through the NRCS conservation planning process, a conservation planner has identified client objectives for addressing natural resource concerns (Soil, Water, Animals, Plants, Air + Energy) and socio-economic considerations such as increasing capacity for

After Situation:

The client hired a QI to provide the CEMA assistance. The QI has met with client and visited the planning area, in order to develop an understanding of its capabilities, limitations, and needs within a culturally appropriate context. Indigenous knowledge about the planning area has been gathered from sources approved by a Tribe or Indigenous culture. The QI verifies with the Tribe's or Indigenous culture's governing body, that the information gathered is accurate- then provides a report, map and other supporting documentation of their ISM evaluation of the planning area to the client; and a copy is shared with NRCS. In the future, the information this CEMA provides can assists the participant and the planner refine conservation objectives; and realize opportunities to incorporate Indigenous knowledge into a conservation plan and/or conservation practice implementations.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $22,961.52

Total Cost per Unit: $22,961.52

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 222 - Indigenous Stewardship Methods Evaluation

Scenario: #41 - Indigenous Knowledge, Less Than or Equal to 10 Acres

Scenario Description:

The scenario involves obtaining assistance from a Qualified Individual, designated by the governing body of a Tribe or Indigenous culture, to evaluate the designated planning area, then gather knowledge about indigenous knowledge, and deliver results to the client and NRCS. The resulting information can be used to inform the conservation planning and implementation processes, meet the client's objectives by addressing one or more NRCS-recognized resource concerns using techniques that align with Tribal or Indigenous knowledge.

Before Situation:

Through the NRCS conservation planning process, a conservation planner has identified client objectives for addressing natural resource concerns (Soil, Water, Animals, Plants, Air + Energy) and socio-economic considerations such as increasing capacity for

After Situation:

The client hired a QI to provide the CEMA assistance. The QI has met with client and visited the planning area, in order to develop an understanding of its capabilities, limitations, and needs within a culturally appropriate context. Indigenous knowledge about the planning area has been gathered from sources approved by a Tribe or Indigenous culture. The QI verifies with the Tribe's or Indigenous culture's governing body, that the information gathered is accurate- then provides a report, map and other supporting documentation of their ISM evaluation of the planning area to the client; and a copy is shared with NRCS. In the future, the information this CEMA provides can assists the participant and the planner refine conservation objectives; and realize opportunities to incorporate Indigenous knowledge into a conservation plan and/or conservation practice implementations.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $7,106.10

Total Cost per Unit: $7,106.10

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 222 - Indigenous Stewardship Methods Evaluation

Scenario: #57 - Indigenous Knowledge, 11 to 300 Acres

Scenario Description:

The scenario involves obtaining assistance from a Qualified Individual, designated by the governing body of a Tribe or Indigenous culture, to evaluate the designated planning area, then gather knowledge about indigenous knowledge, and deliver results to the client and NRCS. The resulting information can be used to inform the conservation planning and implementation processes, meet the client's objectives by addressing one or more NRCS-recognized resource concerns using techniques that align with Tribal or Indigenous knowledge.

Before Situation:

Through the NRCS conservation planning process, a conservation planner has identified client objectives for addressing natural resource concerns (Soil, Water, Animals, Plants, Air + Energy) and socio-economic considerations such as increasing capacity for

After Situation:

The client hired a QI to provide the CEMA assistance. The QI has met with client and visited the planning area, in order to develop an understanding of its capabilities, limitations, and needs within a culturally appropriate context. Indigenous knowledge about the planning area has been gathered from sources approved by a Tribe or Indigenous culture. The QI verifies with the Tribe's or Indigenous culture's governing body, that the information gathered is accurate- then provides a report, map and other supporting documentation of their ISM evaluation of the planning area to the client; and a copy is shared with NRCS. In the future, the information this CEMA provides can assists the participant and the planner refine conservation objectives; and realize opportunities to incorporate Indigenous knowledge into a conservation plan and/or conservation practice implementations.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $9,417.48

Total Cost per Unit: $9,417.48

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 223 - Forest Management Assessment

Scenario: #9 - Nonindustrial Private Forest, Less Than or Equal to 20 Acres

Scenario Description:

Nonindustrial Private Forest Land with a forest management plan. Typical site is approximately 1 to 20 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands with an existing forest management plan. Resource concerns exist which are not addressed by a management plan. A Conservation Evaluation and Monitoring Activity is needed to provide a forest inventory to allow

After Situation:

After EQIP contract approval, participant has obtained services from a qualified individual for development of the Conservation Evaluation and Monitoring Activities (CEMA) - Forest Inventory. The CEMA criteria requires a forest inventory as a component of a forest management plan to determine current site condition and identify resource concerns. Additional CEMA criteria are detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $847.39

Total Cost per Unit: $847.39

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 223 - Forest Management Assessment

Scenario: #25 - Nonindustrial Private Forest, 21 to 100 Acres

Scenario Description:

Nonindustrial Private Forest Land with a forest management plan. Typical site is approximately 21 to 100 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands with an existing forest management plan. Resource concerns exist which are not addressed by a management plan. A Conservation Evaluation and Monitoring Activity is needed to provide a forest inventory to allow

After Situation:

After EQIP contract approval, participant has obtained services from a qualified individual for development of the Conservation Evaluation and Monitoring Activities (CEMA) - Forest Inventory. The CEMA criteria requires a forest inventory as a component of a forest management plan to determine current site condition and identify resource concerns. Additional CEMA criteria are detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,610.05

Total Cost per Unit: $1,610.05

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 223 - Forest Management Assessment

Scenario: #41 - Nonindustrial Private Forest, 101 to 250 Acres

Scenario Description:

Nonindustrial Private Forest Land with a forest management plan. Typical site is approximately 101 to 250 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands with an existing forest management plan. Resource concerns exist which are not addressed by a management plan. A Conservation Evaluation and Monitoring Activity is needed to provide a forest inventory to allow

After Situation:

After EQIP contract approval, participant has obtained services from a qualified individual for development of the Conservation Evaluation and Monitoring Activities (CEMA) - Forest Inventory. The CEMA criteria requires a forest inventory as a component of a forest management plan to determine current site condition and identify resource concerns. Additional CEMA criteria are detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,050.62

Total Cost per Unit: $3,050.62

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 223 - Forest Management Assessment

Scenario: #57 - Nonindustrial Private Forest, 251 to 500 Acres

Scenario Description:

Nonindustrial Private Forest Land with a forest management plan. Typical site is approximately 251 to 500 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands with an existing forest management plan. Resource concerns exist which are not addressed by a management plan. A Conservation Evaluation and Monitoring Activity is needed to provide a forest inventory to allow

After Situation:

After EQIP contract approval, participant has obtained services from a qualified individual for development of the Conservation Evaluation and Monitoring Activities (CEMA) - Forest Inventory. The CEMA criteria requires a forest inventory as a component of a forest management plan to determine current site condition and identify resource concerns. Additional CEMA criteria are detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,575.93

Total Cost per Unit: $4,575.93

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 223 - Forest Management Assessment

Scenario: #73 - Nonindustrial Private Forest, 501 to 1,000 Acres

Scenario Description:

Nonindustrial Private Forest Land with a forest management plan. Typical site is approximately 501 to 1000 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands with an existing forest management plan. Resource concerns exist which are not addressed by a management plan. A Conservation Evaluation and Monitoring Activity is needed to provide a forest inventory to allow

After Situation:

After EQIP contract approval, participant has obtained services from a qualified individual for development of the Conservation Evaluation and Monitoring Activities (CEMA) - Forest Inventory. The CEMA criteria requires a forest inventory as a component of a forest management plan to determine current site condition and identify resource concerns. Additional CEMA criteria are detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,762.28

Total Cost per Unit: $5,762.28

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 223 - Forest Management Assessment

Scenario: #89 - Nonindustrial Private Forest, Greater Than 1,000 Acres

Scenario Description:

Nonindustrial Private Forest Land with a forest management plan. Typical site is approximately 1001 acres or greater in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands with an existing forest management plan. Resource concerns exist which are not addressed by a management plan. A Conservation Evaluation and Monitoring Activity is needed to provide a forest inventory to allow

After Situation:

After EQIP contract approval, participant has obtained services from a qualified individual for development of the Conservation Evaluation and Monitoring Activities (CEMA) - Forest Inventory. The CEMA criteria requires a forest inventory as a component of a forest management plan to determine current site condition and identify resource concerns. Additional CEMA criteria are detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $7,711.29

Total Cost per Unit: $7,711.29

Based on North Dakota average costs. Individual county costs may vary.

Practice: 224 - Aquifer Flow Test

Scenario: #10 - Aquifer Testing

Scenario Description:

The typical scenario supports the utilization of an existing or planned vertical turbine or submersible pump in an existing or planned water well for pressurizing an irrigation or stockwater system where water well flow rate is unknown. An aquifer flow test (e.g., step drawdown or constant rate) will be done to determine the flow rate from the well and select a pumping plant to match the pumping requirements of the irrigation or livestock system. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water for livestock - Inefficient use of irrigation water; inefficient energy use. Associated Practices: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Micro-irrigation; 449 - Irrigation Water Management, 642 - Water Well, 516 - Livestock Pipeline

Before Situation:

Livestock or irrigation system is delivering insufficient water due to unknown volume and flow rate of the aquifer.

After Situation:

With the completion of the aquifer flow test, a known flow rate of the well will determine the correct flow rate and TDH on which a pump can be selected to support an irrigation of stockwater system.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,361.74

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $2,361.74

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 226 - Waste Facility Site Suitability and Feasibility Assessment

Scenario: #9 - Non-Dairy Livestock Operations, Onsite Evaluation for Planned Storage

Scenario Description:

Non-Dairy livestock operation. A Qualified Individual will conduct an onsite investigation. Soil data collection, investigation and interpretation of the properties and characteristics, results of tests and samples will be used to determine the appropriateness of the site for the storage facility. Scenario based on one proposed location for the planned storage.

Before Situation:

A waste storage, handling or treatment facility is planned for the operation. The proposed location has not be investigated for determination of suitability and feasibility.

After Situation:

An onsite investigation for soil properties and characteristics was conducted. The proposed location met the criteria to allow the type and size of the planned storage facility. The report documents all data and results.

Feature Measure: One site evaluated

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,399.31

Total Cost per Unit: $3,399.31

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 226 - Waste Facility Site Suitability and Feasibility Assessment

Scenario: #25 - Dairy Livestock Operations, Onsite Evaluation for Planned Storage

Scenario Description:

Livestock operation is Dairy. A Qualified Individual will conduct an onsite investigation. Soil data collection, investigation and interpretation of the properties and characteristics, results of tests and samples will be used to determine the appropriateness of the site for the storage facility. Scenario based on one proposed location for the planned storage.

Before Situation:

A waste storage, handling or treatment facility is planned for the operation. The proposed location has not be investigated for determination of suitability and feasibility.

After Situation:

An onsite investigation for soil properties and characteristics was conducted. The proposed location met the criteria to allow the type and size of the planned storage facility. The report documents all data and results.

Feature Measure: One site evaluated

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,746.99

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $4,746.99

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 227 - Evaluation of Existing Waste Storage Facility Components

Scenario: #9 - Livestock Operation, One to Two Components

Scenario Description:

A Qualified Individual conducts an on-site investigation of up to 2 manure and wastewater handling and storage structures and equipment at the facilities where the livestock are housed. The investigation report will determine whether or not an existing component is in good operating condition. Typical evaluation of 1-2 storage structures, collection, may include pump.

Before Situation:

A waste storage facility and associated equipment is in use on the production area. The existing structure has not been evaluated for good operating condition. New or expanded waste storage and handling facilities could fail is the existing structure is n

After Situation:

The Qualified Individual concludes that the existing storage components are in good working order OR has identified the component needs corrective. The CEMA report contains all data and recommendations.

Feature Measure: Per Production Site structur

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,908.89

Total Cost per Unit: $3,908.89

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 227 - Evaluation of Existing Waste Storage Facility Components

Scenario: #25 - Livestock Operation, Three to Five Components

Scenario Description:

A Qualified Individual conducts an on-site investigation of all manure and wastewater handling and storage structures and equipment at the facilities where the livestock are housed. The investigation report will determine whether or not an existing component is in good operating condition. Typical livestock production site has 2-5 storage and collection structures and may include pump.

Before Situation:

A waste storage facility and associated equipment is in use on the production area. The existing structure has not been evaluated for good operating condition. New or expanded waste storage and handling facilities could fail is the existing structure is n

After Situation:

The Qualified Individual concludes that the existing storage components are in good working order OR has identified the component needs corrective. The CEMA report contains all data and recommendations.

Feature Measure: Per Operation 2-5 Structure

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,618.85

Total Cost per Unit: $4,618.85

Based on North Dakota average costs. Individual county costs may vary.

Practice: 227 - Evaluation of Existing Waste Storage Facility Components

Scenario: #41 - Livestock Operation, Greater Than Five Components

Scenario Description:

A Qualified Individual conducts an on-site investigation of all manure and wastewater handling and storage structures and equipment at the facilities where the livestock are housed. The investigation report will determine whether or not an existing component is in good operating condition. Typical livestock production site has 5 or more storage and collection structures and pump(s).

Before Situation:

A waste storage facility and associated equipment is in use on the production area. The existing structure has not been evaluated for good operating condition. New or expanded waste storage and handling facilities could fail is the existing structure is n

After Situation:

The Qualified Individual concludes that the existing storage components are in good working order OR has identified the component needs corrective. The CEMA report contains all data and recommendations.

Feature Measure: Per Operation Structures

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,970.24

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $5,970.24

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 228 - Agricultural Energy Assessment

Scenario: #9 - Large, Three Enterprises

Scenario Description:

An agricultural producer wishes to obtain an energy assessment of their agricultural operation. The operation has 3 enterprises where at least I consists of > 2500 acres of crops, > 1000 animal units, more than 6 irrigation pumps, or > 40,000 sq. ft. of heated greenhouse. An enterprise is defined in the ASABE S612 Performing On-farm Energy Audits Standard. Large operations are described above. The Ag Energy CEMA is an assessment of the energy consuming activities and components of an agricultural operation and includes the requirements of a Type 2 energy audit as described in the ASABE S612 standard. An Ag Energy CEMA includes a baseline assessment of the of systems, equipment, and facilities using a typical year of energy use and recommended measures to prioritize on-farm opportunities to increase energy efficiency and reduce energy use. A Certified TSP will accomplish all work in accordance with the requirements of the CEMA 228 Agricultural Energy Assessment Activity. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. The producer currently manages an operation as described above. Producer intends to collaborate with a certified TSP to develop an energy use assessment of their entire opera

After Situation:

The producer has obtained services from a certified TSP to develop an energy assessment. The CEMA 228 criteria include a baseline assessment using a typical year of energy use, energy savings of recommended improvement measures, and information useful for prioritizing implementation of the measures. The documentation may include recommendations for associated conservation practices which address energy efficiency. The Ag Energy CEMA meets the basic quality criteria for the CEMA 228 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $8,476.77

Total Cost per Unit: $8,476.77

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 228 - Agricultural Energy Assessment

Scenario: #25 - Large, Greater Than or Equal to Four Enterprises

Scenario Description:

An agricultural producer wishes to obtain an energy assessment of their agricultural operation. The operation has 4 or more enterprises where at least I consists of > 2500 acres of crops, > 1000 animal units, more than 6 irrigation pumps, or > 40,000 sq. ft. of heated greenhouse. An enterprise is defined in the ASABE S612 Performing On-farm Energy Audits Standard. Large operations are described above. The Ag Energy CEMA is an assessment of the energy consuming activities and components of an agricultural operation and includes the requirements of a Type 2 energy audit as described in the ASABE S612 standard. An Ag Energy CEMA includes a baseline assessment of the of systems, equipment, and facilities using a typical year of energy use and recommended measures to prioritize on-farm opportunities to increase energy efficiency and reduce energy use. A Certified TSP will accomplish all work in accordance with the requirements of the CEMA 228 Agricultural Energy Assessment Activity. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. The producer currently manages an operation as described above. Producer intends to collaborate with a certified TSP to develop an energy use assessment of their entire opera

After Situation:

The producer has obtained services from a certified TSP to develop an energy assessment. The CEMA 228 criteria include a baseline assessment using a typical year of energy use, energy savings of recommended improvement measures, and information useful for prioritizing implementation of the measures. The documentation may include recommendations for associated conservation practices which address energy efficiency. The Ag Energy CEMA meets the basic quality criteria for the CEMA 228 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $10,156.14

Total Cost per Unit: $10,156.14

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 228 - Agricultural Energy Assessment

Scenario: #41 - Large, Two Enterprises

Scenario Description:

An agricultural producer wishes to obtain an energy assessment of their agricultural operation. The operation has 2 enterprises where at least I consists of > 2500 acres of crops, > 1000 animal units, more than 6 irrigation pumps, or > 40,000 sq. ft. of heated greenhouse. An enterprise is defined in the ASABE S612 Performing On-farm Energy Audits Standard. Large operations are described above. The Ag Energy CEMA is an assessment of the energy consuming activities and components of an agricultural operation and includes the requirements of a Type 2 energy audit as described in the ASABE S612 standard. An Ag Energy CEMA includes a baseline assessment of the of systems, equipment, and facilities using a typical year of energy use and recommended measures to prioritize on-farm opportunities to increase energy efficiency and reduce energy use. A Certified TSP will accomplish all work in accordance with the requirements of the CEMA 228 Agricultural Energy Assessment Activity. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. The producer currently manages an operation as described above. Producer intends to collaborate with a certified TSP to develop an energy use assessment of their entire opera

After Situation:

The producer has obtained services from a certified TSP to develop an energy assessment. The CEMA 228 criteria include a baseline assessment using a typical year of energy use, energy savings of recommended improvement measures, and information useful for prioritizing implementation of the measures. The documentation may include recommendations for associated conservation practices which address energy efficiency. The Ag Energy CEMA meets the basic quality criteria for the CEMA 228 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,797.40

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $6,797.40

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 228 - Agricultural Energy Assessment

Scenario: #57 - Medium, Greater Than or Equal to Four Enterprises

Scenario Description:

An agricultural producer wishes to obtain an energy assessment of their agricultural operation. The operation has 4 or more enterprises where at least I consists of 301 to 2500 acres of crops, < 301 to 1000 animal units, 3 - 6 irrigation pumps, or 20,001 to 40,000 sq. ft. of heated greenhouse. An enterprise is defined in the ASABE S612 Performing On-farm Energy Audits Standard. Medium operations are described above. The Ag Energy CEMA is an assessment of the energy consuming activities and components of an agricultural operation and includes the requirements of a Type 2 energy audit as described in the ASABE S612 standard. An Ag Energy CEMA includes a baseline assessment of the of systems, equipment, and facilities using a typical year of energy use and recommended measures to prioritize on-farm opportunities to increase energy efficiency and reduce energy use. A Certified TSP will accomplish all work in accordance with the requirements of the CEMA 228 Agricultural Energy Assessment Activity. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. The producer currently manages an operation as described above. Producer intends to collaborate with a certified TSP to develop an energy use assessment of their entire opera

After Situation:

The producer has obtained services from a certified TSP to develop an energy assessment. The CEMA 228 criteria include a baseline assessment using a typical year of energy use, energy savings of recommended improvement measures, and information useful for prioritizing implementation of the measures. The documentation may include recommendations for associated conservation practices which address energy efficiency. The Ag Energy CEMA meets the basic quality criteria for the CEMA 228 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $8,930.59

Total Cost per Unit: $8,930.59

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 228 - Agricultural Energy Assessment

Scenario: #73 - Small, Greater Than or Equal to Four Enterprises

Scenario Description:

An agricultural producer wishes to obtain an energy assessment of their agricultural operation. The operation has 4 or more enterprises where 1 is not larger than < 300 acres of crops, < 300 animal units, 1 - 2 irrigation pumps, < 20,000 sq. ft. of heated greenhouse, or maple syrup processing. An enterprise is defined in the ASABE S612 Performing On-farm Energy Audits Standard. Small operations are described above. The Ag Energy CEMA is an assessment of the energy consuming activities and components of an agricultural operation and includes the requirements of a Type 2 energy audit as described in the ASABE S612 standard. An Ag Energy CEMA includes a baseline assessment of the of systems, equipment, and facilities using a typical year of energy use and recommended measures to prioritize on-farm opportunities to increase energy efficiency and reduce energy use. A Certified TSP will accomplish all work in accordance with the requirements of the CEMA 228 Agricultural Energy Assessment Activity. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. The producer currently manages an operation as described above. Producer intends to collaborate with a certified TSP to develop an energy use assessment of their entire opera

After Situation:

The producer has obtained services from a certified TSP to develop an energy assessment. The CEMA 228 criteria include a baseline assessment using a typical year of energy use, energy savings of recommended improvement measures, and information useful for prioritizing implementation of the measures. The documentation may include recommendations for associated conservation practices which address energy efficiency. The Ag Energy CEMA meets the basic quality criteria for the CEMA 228 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $7,918.84

Total Cost per Unit: $7,918.84

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 228 - Agricultural Energy Assessment

Scenario: #89 - Medium, Three Enterprises

Scenario Description:

An agricultural producer wishes to obtain an energy assessment of their agricultural operation. The operation has 3 enterprises where at least I consists of 301 to 2500 acres of crops, < 301 to 1000 animal units, 3 - 6 irrigation pumps, or 20,001 to 40,000 sq. ft. of heated greenhouse. An enterprise is defined in the ASABE S612 Performing On-farm Energy Audits Standard. Medium operations are described above. The Ag Energy CEMA is an assessment of the energy consuming activities and components of an agricultural operation and includes the requirements of a Type 2 energy audit as described in the ASABE S612 standard. An Ag Energy CEMA includes a baseline assessment of the of systems, equipment, and facilities using a typical year of energy use and recommended measures to prioritize on-farm opportunities to increase energy efficiency and reduce energy use. A Certified TSP will accomplish all work in accordance with the requirements of the CEMA 228 Agricultural Energy Assessment Activity. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. The producer currently manages an operation as described above. Producer intends to collaborate with a certified TSP to develop an energy use assessment of their entire opera

After Situation:

The producer has obtained services from a certified TSP to develop an energy assessment. The CEMA 228 criteria include a baseline assessment using a typical year of energy use, energy savings of recommended improvement measures, and information useful for prioritizing implementation of the measures. The documentation may include recommendations for associated conservation practices which address energy efficiency. The Ag Energy CEMA meets the basic quality criteria for the CEMA 228 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $7,251.21

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $7,251.21

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 228 - Agricultural Energy Assessment

Scenario: #105 - Small, Three Enterprises

Scenario Description:

An agricultural producer wishes to obtain an energy assessment of their agricultural operation. The operation has 3 enterprises where 1 is not larger than < 300 acres of crops, < 300 animal units, 1 - 2 irrigation pumps, < 20,000 sq. ft. of heated greenhouse, or maple syrup processing. An enterprise is defined in the ASABE S612 Performing On-farm Energy Audits Standard. Small operations are described above. The Ag Energy CEMA is an assessment of the energy consuming activities and components of an agricultural operation and includes the requirements of a Type 2 energy audit as described in the ASABE S612 standard. An Ag Energy CEMA includes a baseline assessment of the of systems, equipment, and facilities using a typical year of energy use and recommended measures to prioritize on-farm opportunities to increase energy efficiency and reduce energy use. A Certified TSP will accomplish all work in accordance with the requirements of the CEMA 228 Agricultural Energy Assessment Activity. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. The producer currently manages an operation as described above. Producer intends to collaborate with a certified TSP to develop an energy use assessment of their entire opera

After Situation:

The producer has obtained services from a certified TSP to develop an energy assessment. The CEMA 228 criteria include a baseline assessment using a typical year of energy use, energy savings of recommended improvement measures, and information useful for prioritizing implementation of the measures. The documentation may include recommendations for associated conservation practices which address energy efficiency. The Ag Energy CEMA meets the basic quality criteria for the CEMA 228 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,239.46

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $6,239.46

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 228 - Agricultural Energy Assessment

Scenario: #121 - Medium, Two Enterprises

Scenario Description:

An agricultural producer wishes to obtain an energy assessment of their agricultural operation. The operation has 2 enterprises where at least I consists of 301 to 2500 acres of crops, < 301 to 1000 animal units, 3 - 6 irrigation pumps, or 20,001 to 40,000 sq. ft. of heated greenhouse. An enterprise is defined in the ASABE S612 Performing On-farm Energy Audits Standard. Medium operations are described above. The Ag Energy CEMA is an assessment of the energy consuming activities and components of an agricultural operation and includes the requirements of a Type 2 energy audit as described in the ASABE S612 standard. An Ag Energy CEMA includes a baseline assessment of the of systems, equipment, and facilities using a typical year of energy use and recommended measures to prioritize on-farm opportunities to increase energy efficiency and reduce energy use. A Certified TSP will accomplish all work in accordance with the requirements of the CEMA 228 Agricultural Energy Assessment Activity. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. The producer currently manages an operation as described above. Producer intends to collaborate with a certified TSP to develop an energy use assessment of their entire opera

After Situation:

The producer has obtained services from a certified TSP to develop an energy assessment. The CEMA 228 criteria include a baseline assessment using a typical year of energy use, energy savings of recommended improvement measures, and information useful for prioritizing implementation of the measures. The documentation may include recommendations for associated conservation practices which address energy efficiency. The Ag Energy CEMA meets the basic quality criteria for the CEMA 228 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,571.84

Total Cost per Unit: $5,571.84

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 228 - Agricultural Energy Assessment

Scenario: #137 - Small, Two Enterprises

Scenario Description:

An agricultural producer wishes to obtain an energy assessment of their agricultural operation. The operation has 2 enterprises where 1 is not larger than < 300 acres of crops, < 300 animal units, 1 - 2 irrigation pumps, < 20,000 sq. ft. of heated greenhouse, or maple syrup processing. An enterprise is defined in the ASABE S612 Performing On-farm Energy Audits Standard. Small operations are described above. The Ag Energy CEMA is an assessment of the energy consuming activities and components of an agricultural operation and includes the requirements of a Type 2 energy audit as described in the ASABE S612 standard. An Ag Energy CEMA includes a baseline assessment of the of systems, equipment, and facilities using a typical year of energy use and recommended measures to prioritize on-farm opportunities to increase energy efficiency and reduce energy use. A Certified TSP will accomplish all work in accordance with the requirements of the CEMA 228 Agricultural Energy Assessment Activity. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. The producer currently manages an operation as described above. Producer intends to collaborate with a certified TSP to develop an energy use assessment of their entire opera

After Situation:

The producer has obtained services from a certified TSP to develop an energy assessment. The CEMA 228 criteria include a baseline assessment using a typical year of energy use, energy savings of recommended improvement measures, and information useful for prioritizing implementation of the measures. The documentation may include recommendations for associated conservation practices which address energy efficiency. The Ag Energy CEMA meets the basic quality criteria for the CEMA 228 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,560.09

Total Cost per Unit: $4,560.09

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 228 - Agricultural Energy Assessment

Scenario: #153 - Large, One Enterprise

Scenario Description:

An agricultural producer wishes to obtain an energy assessment of their agricultural operation. The operation has either > 2500 acres of crops, > 1000 animal units, more than 6 irrigation pumps, or > 40,000 sq. ft. of heated greenhouse. An enterprise is defined in the ASABE S612 Performing On-farm Energy Audits Standard. A large operation is described above. The Ag Energy CEMA is an assessment of the energy consuming activities and components of an agricultural operation and includes the requirements of a Type 2 energy audit as described in the ASABE S612 standard. An Ag Energy CEMA includes a baseline assessment of the of systems, equipment, and facilities using a typical year of energy use and recommended measures to prioritize on-farm opportunities to increase energy efficiency and reduce energy use. A Certified TSP will accomplish all work in accordance with the requirements of the CEMA 228 Agricultural Energy Assessment Activity. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. The producer currently manages an operation as described above. Producer intends to collaborate with a certified TSP to develop an energy use assessment of their entire opera

After Situation:

The producer has obtained services from a certified TSP to develop an energy assessment. The CEMA 228 criteria include a baseline assessment using a typical year of energy use, energy savings of recommended improvement measures, and information useful for prioritizing implementation of the measures. The documentation may include recommendations for associated conservation practices which address energy efficiency. The Ag Energy CEMA meets the basic quality criteria for the CEMA 228 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,118.03

Total Cost per Unit: $5,118.03

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 228 - Agricultural Energy Assessment

Scenario: #169 - Medium, One Enterprise

Scenario Description:

An agricultural producer wishes to obtain an energy assessment of their agricultural operation. The operation has either 301 to 2500 acres of crops, < 301 to 1000 animal units, 3 - 6 irrigation pumps, or 20,001 to 40,000 sq. ft. of heated greenhouse. An enterprise is defined in the ASABE S612 Performing On-farm Energy Audits Standard. A medium operation is described above. The Ag Energy CEMA is an assessment of the energy consuming activities and components of an agricultural operation and includes the requirements of a Type 2 energy audit as described in the ASABE S612 standard. An Ag Energy CEMA includes a baseline assessment of the of systems, equipment, and facilities using a typical year of energy use and recommended measures to prioritize on-farm opportunities to increase energy efficiency and reduce energy use. A Certified TSP will accomplish all work in accordance with the requirements of the CEMA 228 Agricultural Energy Assessment Activity. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. The producer currently manages an operation as described above. Producer intends to collaborate with a certified TSP to develop an energy use assessment of their entire opera

After Situation:

The producer has obtained services from a certified TSP to develop an energy assessment. The CEMA 228 criteria include a baseline assessment using a typical year of energy use, energy savings of recommended improvement measures, and information useful for prioritizing implementation of the measures. The documentation may include recommendations for associated conservation practices which address energy efficiency. The Ag Energy CEMA meets the basic quality criteria for the CEMA 228 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,892.47

Total Cost per Unit: $3,892.47

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 228 - Agricultural Energy Assessment

Scenario: #185 - Small, One Enterprise

Scenario Description:

An agricultural producer wishes to obtain an energy assessment of their agricultural operation. The operation has either < 300 acres of crops, < 300 animal units, 1 - 2 irrigation pumps, < 20,000 sq. ft. of heated greenhouse, or maple syrup processing. An enterprise is defined in the ASABE S612 Performing On-farm Energy Audits Standard. A small operation is described above. The Ag Energy CEMA is an assessment of the energy consuming activities and components of an agricultural operation and includes the requirements of a Type 2 energy audit as described in the ASABE S612 standard. An Ag Energy CEMA includes a baseline assessment of the of systems, equipment, and facilities using a typical year of energy use and recommended measures to prioritize on-farm opportunities to increase energy efficiency and reduce energy use. A Certified TSP will accomplish all work in accordance with the requirements of the CEMA 228 Agricultural Energy Assessment Activity. Natural Resource Concern: Energy Efficiency of Equipment and Facilities.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. The producer currently manages an operation as described above. Producer intends to collaborate with a certified TSP to develop an energy use assessment of their entire opera

After Situation:

The producer has obtained services from a certified TSP to develop an energy assessment. The CEMA 228 criteria include a baseline assessment using a typical year of energy use, energy savings of recommended improvement measures, and information useful for prioritizing implementation of the measures. The documentation may include recommendations for associated conservation practices which address energy efficiency. The Ag Energy CEMA meets the basic quality criteria for the CEMA 228 activity as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,880.72

Total Cost per Unit: $2,880.72

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 297 - Feral Swine Damage Assessment

Scenario: #21 - Observation

Scenario Description:

200 acre tract (all land uses) on which feral swine have negatively impacted water quality (and associated aquatic organisms), soil health and vegetative conditions onsite. Wildlife habitat has been diminished due to feral swine out-competing native species for the same resources (hard and soft mast, tubers, invertebrates), as well as negatively affecting plant regeneration and production. Some species of native wildlife onsite are at risk from predation by feral swine as well as from diseases carried and transmitted either directly or indirectly by feral swine.

Before Situation:

Agricultural producer currently has no plan or knowledge of how resource concerns are caused or exacerbated by the presence of feral swine. Within existing land uses, the producer is interested in management of land to reduce impacts caused by feral swine

After Situation:

As a result of feral swine surveillance (coupled with resource and inventory of baseline conditions), the nature and extent of natural resource concerns caused or exacerbated by the presence of feral swine are understood through resource assessments sufficient to inform development of a plan of action to meet quality criteria for all identified resource concerns.

Feature Measure: Management Site

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,027.36

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $1,027.36

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 297 - Feral Swine Damage Assessment

Scenario: #22 - Data Collection

Scenario Description:

200 acre tract (all land uses) on which feral swine have negatively impacted water quality (and associated aquatic organisms), soil health and vegetative conditions onsite. Wildlife habitat has been diminished due to feral swine out-competing native species for the same resources (hard and soft mast, tubers, invertebrates), as well as negatively affecting plant regeneration and production. Some species of native wildlife onsite are at risk from predation by feral swine as well as from diseases carried and transmitted either directly or indirectly by feral swine.

Before Situation:

Agricultural producer is currently or soon will be implementing feral swine component of a conservation plan but the effectiveness of those activities in improving resource conditions is unknown.

After Situation:

Sufficient data and information have been collected to evaluate resource condition relative to baseline conditions and the effectiveness of the feral swine management actions. Necessary adaptive management actions are identified and implemented. (Note: All management activities directly involving feral swine, such as trapping, euthanasia and disposal of carcasses will be the responsibility of the landowner, APHIS, or other partners. NRCS will have no role in these activities.)

Feature Measure: Management Site

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,601.77

Total Cost per Unit: $1,601.77

Based on North Dakota average costs. Individual county costs may vary.

Practice: 313 - Waste Storage Facility

Scenario: #3 - Buried Concrete Tank, Less Than or Equal to 14,999 Cubic Feet

Scenario Description:

This scenario consists of installing a concrete tank that has a design storage volume from 5,000 to 14,999 CF that is totally or partially buried and has an open top. The tank can also be under an animal facility with the top cover of either slats or solid concrete lid/floor. Design volume does not include freeboard. Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

Before Situation:

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This

After Situation:

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Tank typically 7' deep, with a bottom area of 1400 SF, and a design storage volume of approximately 9,000 cubic feet plus 6" freeboard. Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate. Volume does not include 6" of freeboard.

Feature Measure: Design Storage Volume

Scenario Unit: Cubic Foot

Scenario Typical Size: 9,000.0

Scenario Total Cost: $47,090.87

Total Cost per Unit: $5.23

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 313 - Waste Storage Facility

Scenario: #6 - Above Ground Steel or Concrete Structure

Scenario Description:

An above ground circular glass lined steel or concrete structure constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This typical scenario has a design storage volume of 66,000 ft3. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), Waste Treatment (629), and Pumping Plant (533).

Before Situation:

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled

After Situation:

An above ground storage structure provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size : design storage volume 66,000 ft3, (not included - 1' freeboard); based on 73' X 19' glass lined steel tank

Feature Measure: Design Storage Volume

Scenario Unit: Cubic Foot

Scenario Typical Size: 66,000.0

Scenario Total Cost: $272,429.82

Total Cost per Unit: $4.13

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 313 - Waste Storage Facility

Scenario: #7 - Composted Bedded Pack, Concrete Floor and Walls

Scenario Description:

A composted bedded pack facility is constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario is intended for situations where consistency of manure or geological conditions prohibit the use of earthen floors. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Concrete walls required to withstand the heavy equipment that the producer operates. Potential Associated Practices: Fence (382), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561) and Roofs and Covers (367).

Before Situation:

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled

After Situation:

Using a bedded pack provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design: floor area 4,000 ft2, (40' X 100'); 4' concrete wall height, 3' footing depth with a 6" concrete floor; 20' openings on each end of structure.

Feature Measure: Square Foot Floor Area

Scenario Unit: Square Foot

Scenario Typical Size: 4,000.0

Scenario Total Cost: $68,013.01

Total Cost per Unit: $17.00

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 313 - Waste Storage Facility

Scenario: #9 - Composted Bedded Pack, Earthen Floor and Wood Walls

Scenario Description:

This scenario consists of a dry stack facility with compacted earthen floor with wooden walls, posts and a concrete curb. This scenario is intended for dryer material such as poultry litter. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

Before Situation:

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This

After Situation:

The typical is 4,000 SqFt (40' x 100'). The earthen floor will be prepared by stripping the top 1' of soil and roller compacting an 18" thick compacted floor. Walls are 5' pressure treated wood (2" x 8" boards), 6" x 6" x 8' posts set 4' c-c with 6" concrete curbing. Walls allow for greater storage volume. Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Feature Measure: Square Foot Floor Area

Scenario Unit: Square Foot

Scenario Typical Size: 4,000.0

Scenario Total Cost: $17,177.33

Total Cost per Unit: $4.29

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 313 - Waste Storage Facility

Scenario: #10 - Composted Bedded Pack, Earthen Floor and Concrete Walls

Scenario Description:

This scenario consists of a dry stack facility (covered) with compacted earthen floor with concrete walls. This scenario is intended to provide storage for manure and agricultural by-products that is protected from the environment and can be either inside the animal housing area or a separate facility for separated solids. The purpose of this practice is to properly store manure and other agricultural by-products until they can be removed from the site for proper utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Compacted earth floors required to meet state guidelines for seepage should be installed with CPS 521-D, Pond Sealing or Lining - Compacted Clay Treatment. Potential Associated practices: 521D-Pond Sealing or Lining; Compacted Clay Treatment, 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 632 - Solid/Liquid Waste Separation, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

Before Situation:

Livestock are currently on open lots with runoff un-controlled. Un-controlled runoff is causing off-site damage due to sedimentation and elevated nutrient levels in receiving waters.

After Situation:

The typical size of the bedded pack Facility is 40' x 100' (4,000 SF). Facility has an earth floor and 4' high walls with 3' deep footings. A 10' opening is located on each end for access. When used as housing, the animal density can be increased by placing under roof and existing open lots abandoned. Using a bedded pack provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan.

Feature Measure: Square Foot Floor Area

Scenario Unit: Square Foot

Scenario Typical Size: 4,000.0

Scenario Total Cost: $28,715.38

Total Cost per Unit: $7.18

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 313 - Waste Storage Facility

Scenario: #11 - Composted Bedded Pack, Concrete Walls and Apron with Earthen Floor

Scenario Description:

This scenario consists of a dry stack facility (covered) with compacted earthen floor with concrete walls. This scenario is intended to provide storage for manure and agricultural by-products that is protected from the environment and can be either inside the animal housing area or a separate facility for separated solids. The purpose of this practice is to properly store manure and other agricultural by-products until they can be removed from the site for proper utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Compacted earth floors required to meet state guidelines for seepage should be installed with CPS 521-D, Pond Sealing or Lining - Compacted Clay Treatment. Concrete floor will be constructed behind the feed bunk in the area with largest manure accumulation, and also to provide an adequate base where equipment will be frequently removing manure. Potential Associated practices: 521D-Pond Sealing or Lining; Compacted Clay Treatment, 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 632 - Solid/Liquid Waste Separation, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

Before Situation:

Livestock are currently on open lots with runoff un-controlled. Un-controlled runoff is causing off-site damage due to sedimentation and elevated nutrient levels in receiving waters.

After Situation:

The typical size of the bedded pack Facility is 40' x 100' (4,000 SF). Facility has an earth floor and 4' high walls with 3' deep footings. It has a 12' x 100' concrete apron. A 10' opening is located on each end for access. When used as housing, the animal density can be increased by placing under roof and existing open lots abandoned. Using a bedded pack provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan.

Feature Measure: Square Foot Floor Area

Scenario Unit: Square Foot

Scenario Typical Size: 4,000.0

Scenario Total Cost: $40,903.06

Total Cost per Unit: $10.23

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 313 - Waste Storage Facility

Scenario: #13 - Dry Stack with Concrete Floor and No Walls

Scenario Description:

This scenario consists of a dry stack facility with reinforced concrete floor without side walls. This scenario is intended for situations where consistency of manure or geographical conditions prohibit earthen floors. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

Before Situation:

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This

After Situation:

The typical is 4,000 SqFt (40' x 100'). The facility floor is 6" reinforced concrete without side walls. Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Feature Measure: Square Foot Floor Area

Scenario Unit: Square Foot

Scenario Typical Size: 4,000.0

Scenario Total Cost: $45,057.88

Total Cost per Unit: $11.26

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 313 - Waste Storage Facility

Scenario: #14 - Dry Stack with Concrete Floor and Walls

Scenario Description:

This scenario consists of a dry stack facility with reinforced concrete floor with side walls. This scenario is intended for situations where consistency of manure or geographical conditions prohibit earthen floors. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. Concrete walls required to withstand the heavy equipment that the producer operates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

Before Situation:

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This

After Situation:

The typical is 4,000 SqFt (40' x 100'). The facility floor is 6" reinforced concrete with 4' walls on 3 sides. Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Feature Measure: Square Foot Floor Area

Scenario Unit: Square Foot

Scenario Typical Size: 4,000.0

Scenario Total Cost: $59,111.80

Total Cost per Unit: $14.78

Based on North Dakota average costs. Individual county costs may vary.

Practice: 313 - Waste Storage Facility

Scenario: #43 - Earthen Storage, Greater Than 50,000 Cubic Feet

Scenario Description:

An earthen waste impoundment constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario has a design storage volume of more than 50,000 ft3. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Earthen storage liners are addressed with another standard. Vehicular and equipment access is addressed in Heavy Use Area Protection (561) to adequately protect liner at agitation and access points. Potential Associated Practices: Pond Sealing or Lining, Compacted Soil Treatment (520), Pond Sealing or Lining, Pond Sealing or Lining, Geomembrane or Geosynthetic Clay Liner (521), Pond Sealing or Lining, Concrete (522), Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roofs and Covers (367), and Waste Separation Facility (632), Waste Treatment (629).

Before Situation:

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled

After Situation:

An earthen storage structure constructed from on-site material provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size: design storage volume 199,475 ft3; 157'X162' (top); 3:1 inside and outside side slopes; cut/fill ratio = 1.25; total depth = 13' 8" (operational depth = 12', operational volume = 170,775 ft3); (1' freeboard and 8" sludge accumulation).

Feature Measure: Design Storage Volume

Scenario Unit: Cubic Foot

Scenario Typical Size: 199,475.0

Scenario Total Cost: $46,639.58

Total Cost per Unit: $0.23

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 314 - Brush Management

Scenario: #5 - Mechanical and Chemical Control, Heavy Infestation

Scenario Description:

Removal of woody vegetation on gently sloping terrain with moderately deep to deep soils. The practice requires the felling and potential piling of trees and brush using a mechanical cutter, chopper, or other light equipment, and applying herbicide to cut stump resprouting tree/brush species, as necessary, in order to improve ecological site conditions. Brush density has met or exceeded heavy or high infestation (averaging >15% canopy depending upon species) levels based on ecological site potential as determined by state specific criteria. Typical unit is 10 acres.

Before Situation:

Area consist of heavy or high infestations of trees and shrub species which degrade desirable plant productivity, health and vigor of pasture or range units, thus promoting invasive non-herbaceous species and degrading wildlife habitat.

After Situation:

Woody species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and wildlife habitat is improved.

Feature Measure: Acres planned

Scenario Unit: Acre

Scenario Typical Size: 10.0

Scenario Total Cost: $5,186.13

Total Cost per Unit: $518.61

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 314 - Brush Management

Scenario: #6 - Chemical Control, Upland Areas

Scenario Description:

This practice is for the implementation of brush management on range, pasture or native pasture to reduce undesirable brush in uplands, and other areas not in, or directly adjacent to, streams, ponds, or wetlands. The typical method of control uses aerial or broadcast application of herbicides to control undesirable plants. Entire unit has infestation levels exceeding state identified levels; entire unit is treated with broadcast application.

Before Situation:

Brush species exceed desired levels resulting in degraded plant condition, loss of forage production, or degraded wildlife habitat. Densities of brush exceed levels indicated in the ecological site descriptions.

After Situation:

Brush has been treated to a level which results in improved plant condition, forage production, or wildlife habitat. The typical method of control is application of herbicides (basal or foliar location) on select individual plants.

Feature Measure: Acres treated

Scenario Unit: Acre

Scenario Typical Size: 50.0

Scenario Total Cost: $1,516.20

Total Cost per Unit: $30.32

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 314 - Brush Management

Scenario: #8 - Chemical Control, Spot Application

Scenario Description:

Apply foliar chemical brush management techniques (aerial fixed wing or ground rig) on isolated upland areas within a 80 acre planning unit (not directly adjacent to streams, ponds or wetlands) associated with rangeland (may include grazed forest, pasture, or other landuses) to control undesirable deciduous species in order to improve ecological/range site conditions. Treatment is applied to 10 acre isolated areas (not adjacent to a stream, wetland or pond), using broadcast/aerial herbicide(s) application, on the entire 10 acres to reduce or remove trees and/or brush which are not appropriate for the site(s). Foliar application of material using the most effective, low cost chemical(s).

Before Situation:

Plant, animal, or wildlife resource concerns associated with upland areas (not in or adjacent to streams, ponds, or wetlands) on grazed range (incl. grazed forest, pasture, or other landuses) which are adversely affected by undesirable trees and/or brush

After Situation:

Isolated upland areas infested with undesirable tree and/or shrub species within a range unit (incl. grazed forest, pasture, or other landuse) where reduction or removal of undesirable deciduous species (not adjacent to or within a stream, ponds, or wetlands) has been accomplished through the use of appropriate foliar chemical application to address plant, animal, and wildlife resource concerns, thus improving ecological/range site conditions.

Feature Measure: Acres planned

Scenario Unit: Acre

Scenario Typical Size: 10.0

Scenario Total Cost: $506.69

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $50.67

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 314 - Brush Management

Scenario: #38 - Mechanical and Chemical Control, Medium Infestation

Scenario Description:

Removal of woody vegetation on gently sloping to moderately deep to deep soils. The practice requires the felling of trees and brush using a mechanical cutter, chopper or other light equipment, and applying herbicide to cut stump resprouting tree/brush species, as necessary, in order to improve ecological site conditions. Brush density has met or exceeded medium or moderate infestation (averaging 6-15% canopy depending upon species) levels based on ecological site potential as determined by state specific criteria. Typical unit is 80 acres.

Before Situation:

Area consist of medium or moderate infestations of trees and shrub species which degrade desirable plant productivity, health and vigor of pasture or range units, thus promoting invasive non-herbaceous species and degrading wildlife habitat.

After Situation:

Woody species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend; hydrology and plant health and vigor is returning to near normal levels, and wildlife habitat is improved.

Feature Measure: Acres planned

Scenario Unit: Acre

Scenario Typical Size: 80.0

Scenario Total Cost: $14,844.77

Total Cost per Unit: $185.56

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 314 - Brush Management

Scenario: #375 - Mechanical Control, Less Than or Equal to One Acre

Scenario Description:

Using hand tools and small power tools to remove or cut off invasive woody plants at or below the root collar. Typically this scenario is for woody and non-herbaceous species that are in early phases of invasion and are degrading herbaceous plant health and vigor for the 1 acre small farm.

Before Situation:

Small farm area is in various phases of woody non-herbaceous species encroachment that degrades the biotic integrity of the site resulting in poor herbaceous plant health and vigor. Continued degradation results in increased invasive woody species and poo

After Situation:

Woody species are removed to achieve desirable biotic conditions for herbaceous plant health and vigor. Hydrological site characteristics and plant health and vigor are improved, and plant pest pressure from invasive woody species is reduced.

Feature Measure: Acres

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $565.37

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $565.37

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 314 - Brush Management

Scenario: #382 - Manual Control, Difficult Terrain

Scenario Description:

Using hand tools, including chainsaws, to mechanically treat woody plants on steep slopes or areas inaccessible by machines. Typical area is steep terrain (>25% slopes) or isolated infestations where mechanical cutter, chopper, or other light equipment cannot access mature woody plants to perform treatment. Application of herbicide to girdles and cuts of resprouting tree/brush species will be completed as necessary.

Before Situation:

Woody species (including mature, seed-bearing trees) are present and creating on-site degradation to ecosystem services as wells as increasing vulnerability to woody encroachment in adjacent lands. Resource concern of plant pest pressure (invasive species

After Situation:

Woody species are removed to achieve the desired plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition improves and risk of woody encroachment to adjacent lands declines.

Feature Measure: Acres planned

Scenario Unit: Acre

Scenario Typical Size: 5.0

Scenario Total Cost: $5,310.65

Total Cost per Unit: $1,062.13

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 315 - Herbaceous Weed Treatment

Scenario: #1 - Chemical Control, Ground or Aerial Application

Scenario Description:

Land unit on which weed control would be beneficial in order to set back the plant community succession, improve the ecological condition, and improve forage conditions for domestic livestock or wildlife. The practice entails the eradication of vegetation by use of weed treatment using ground or aerial equipment to apply chemicals, in order to eliminate noxious weeds, promote forage productivity, and improve ecological condition.

Before Situation:

Area consists of excessive stands of herbaceous weeds in existing or newly seeded or planted stands. Excessive weed growth degrades health and vigor of native herbaceous species, promoting noxious and invasive species or undesirable plant species and degr

After Situation:

Herbaceous weeds are treated and controlled to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Desirable plant community is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and wildlife habitat is improved.

Feature Measure: Acres treated

Scenario Unit: Acre

Scenario Typical Size: 160.0

Scenario Total Cost: $3,531.51

Total Cost per Unit: $22.07

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 315 - Herbaceous Weed Treatment

Scenario: #3 - Mechanical Control

Scenario Description:

Removal of light infestations of herbaceous weeds on gently sloping terrain with moderately deep to deep soils. The practice entails the removal of herbaceous weeds by the use of a mower, brush hog, disc, or other light equipment, in order to reduce fuel load and improve the ecological site condition. Weeds have exceeded desired levels based on ecological site potential. For organic and non-organic farms.

Before Situation:

Area consists of excessive stands of herbaceous weeds degrading the health and vigor of native herbaceous species and wildlife habitat while promoting noxious and invasive species encroachment.

After Situation:

Herbaceous weeds are removed to achieve the desired plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor are returning to near normal levels, and wildlife habitat is improved.

Feature Measure: Acres treated

Scenario Unit: Acre

Scenario Typical Size: 20.0

Scenario Total Cost: $310.46

Total Cost per Unit: $15.52

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 315 - Herbaceous Weed Treatment

Scenario: #85 - Mechanical Control, Less Than or Equal to One Acre

Scenario Description:

Using hand and small power tools to remove or cut off herbaceous invasive plants at or below the root collar. Typically this scenario is for herbaceous invasive species that are degrading the 1 acre small farm.

Before Situation:

Small farm area is in various phases of herbaceous species encroachment that degrades the biotic integrity resulting in poor plant health and vigor, and/or wildlife habitat. Continued degradation results in increased plant pest pressure, loss of plant div

After Situation:

Herbaceous species are removed to achieve desirable biotic conditions and improved plant health and vigor, and/or wildlife habitat. Hydrological site characteristics are improved, and plant pest pressure from invasive herbaceous species are reduced.

Feature Measure: acres

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $382.48

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $382.48

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 316 - Animal Mortality Facility

Scenario: #2 - Incineration, 50 to 100 Cubic Feet

Scenario Description:

This scenario consists of installing a manufactured Type IV incinerator designed to handle 350 to 850 lbs. of average daily mortality for the species and size of the operation. Typically very large poultry or medium sized swine operations. System shall use high temperature (>1,300 degrees F) incineration with a secondary combustion or afterburner chamber prior to flue discharge. After determining average daily mortality in lbs., select smallest incinerator that meets capacity. Payment made per unit of actual chamber size obtained from manufacturers' product literature. This option is not typically least-cost. In most states a roofed static pile with concrete floor and bins would be considered least cost. Therefore consider reducing payment rate as per State Conservationist discretion. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors are reduced, however, in non-attainment areas, certain states may require a higher level of processing such as gasification or other approved methods. Potential Associated Practices: Heavy Use Area Protection (561), Fence (382), Critical Area Planting (342), Access Road (560), Waste Storage Facility (313), Nutrient Management (590), Roofs and Covers (367), Critical Area Planting (342).

Before Situation:

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from inco

After Situation:

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete incineration, and protection from predators to minimize pathogen survival or spreading. In non-attainment areas, certain states may require a higher level of processing such as gasification or different methods. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Incinerator installed to handle 700 lbs. per day average mortality for a medium poultry or swine operation. Included is a concrete slab to set the incinerator on and a diesel fuel tank. Ash materials to be stored in suitable containers until land disposal as per the nutrient management plan or landfilled.

Feature Measure: Incinerator Chamber Volum

Scenario Unit: Cubic Foot

Scenario Typical Size: 55.8

Scenario Total Cost: $17,987.73

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $322.36

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 316 - Animal Mortality Facility

Scenario: #4 - In-Vessel-Rotary Drum, Less Than 700 Cubic Feet

Scenario Description:

This scenario consists of installing a horizontal rotary drum to compost smaller poultry and swine facility mortality. It can handle between 250 and 600 lbs. per day of mortality plus equal or higher volumes of carbon material (i.e. wood chips). A secondary composting storage area is required to finish materials. Payment quantity based on interior volume of rotary composter in cubic feet of smallest drum that can process daily mortality as per manufacturers' recommendations. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Scenario is needed where the producer has a limited footprint for the installed practice. Potential Associated Practices: Roofs and Covers (367), Waste Storage Facility (313), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

Before Situation:

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from inco

After Situation:

Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Installed a 5' diameter by 22' long rotary drum on two concrete pads that can process 325 lbs. of mortality per day. Drum rotation moves and mixes mortality and wood chips. Site preparation includes topsoil removal, gravel pad, and concrete pads and slab at two locations plus small floor and walls to complete composting. Input material reduced by 40-60 percent and put into 4' high, three sided, 20'x 20' concrete bin with 10'x20 concrete pad for secondary composting. Carbon source is placed into a three sided 30' x 30' with 4' high walls. Area can be protected by adding Roofs and Covers (367) standard.

Feature Measure: Volume of Drum

Scenario Unit: Cubic Foot

Scenario Typical Size: 432.0

Scenario Total Cost: $63,759.38

Total Cost per Unit: $147.59

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 316 - Animal Mortality Facility

Scenario: #5 - In-Vessel-Rotary Drum, Greater Than or Equal to 700 Cubic Feet

Scenario Description:

This scenario consists of installing a horizontal rotary drum to compost larger poultry and swine facility mortality. It can handle between 600 and 1,000 lbs. per day of mortality plus equal or higher volumes of carbon material (i.e. wood chips). A secondary composting storage area is required to finish materials. Payment quantity based on interior volume of rotary composter in cubic feet of smallest drum that can process daily mortality as per manufacturers' recommendations. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Scenario is needed where the producer has a limited footprint for the installed practice. Potential Associated Practices: Roofs and Covers (367), Waste Storage Facility (313), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

Before Situation:

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from inco

After Situation:

Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Installed a 5' diameter by 54' long rotary drum on two concrete pads that can process 810 lbs. of mortality per day. Drum rotation moves and mixes mortality and wood chips. Site preparation includes topsoil removal, gravel pad, concrete pads, slab at two locations plus concrete floor and walls to complete composting. Input material reduced by 40-60 percent and put into 4' high, three sided, 30'x 30' concrete bin with 10'x30' concrete pad for secondary composting. Area can be protected by adding Roofs and Covers (367) standard.

Feature Measure: Volume of Drum

Scenario Unit: Cubic Foot

Scenario Typical Size: 1,079.0

Scenario Total Cost: $86,423.19

Total Cost per Unit: $80.10

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 316 - Animal Mortality Facility

Scenario: #6 - Static Pile with Earthen Pad

Scenario Description:

This scenario consists of installing an impervious earthen pad to compost large animal mortalities, typically dairy cow mortality, in a static windrow or single pile. Additional carbon based bulking material is added to facilitate aeration and provide a proper C:N ratio. Piles turned at least once to go into another heat cycle prior to land application. Access is infrequent. This option may not be desirable for sites with limited area, karst topography, and not isolated from of public view. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (378), Diversion (362), Subsurface Drain (606), and Underground Outlet (620)). Vegetative Treatment Area (635), Composting (317), Roofs and Covers (367), Heavy Use Area Protection (561)

Before Situation:

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from inco

After Situation:

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Construct a 50' x 150' compacted earth surface. Site can handle mortality for a 100 cow dairy with associated heifers and calves. On site soils can be recompacted to meet required imperviousness. Include sufficient area for processing equipment access. Single piles or windrows to minimize runoff. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area or vegetated treatment area as per regulations. Site preparation includes removal of top 1' and recompacting.

Feature Measure: Pad Area

Scenario Unit: Square Foot

Scenario Typical Size: 7,500.0

Scenario Total Cost: $4,471.09

Total Cost per Unit: $0.60

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 316 - Animal Mortality Facility

Scenario: #9 - Static Pile with Concrete Pad

Scenario Description:

This scenario consists of installing a concrete pad over permeable soils, karst topography, frequently accessed sites or sites with regulatory requirements. Typically associated with large dairy (1,000 cows plus heifers) or beef animal mortality with an average daily mortality of 175 lbs./day. Area sized to compost animal mortality as a static pile or windrow with equipment around materials. Sufficient carbon based bulking material added to allow natural aeration and a proper C:N ratio. Water is added to maintain moisture content. Piles typically turned at least once to go into another heat cycle prior to final disposal, typically land application. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area or vegetated treatment area as per regulations. Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

Before Situation:

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from inco

After Situation:

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Construct a 60'x95' concrete surface to process mortality. Concrete 5" thick with light reinforcement. A hydrant is installed at the site to allow for moisture content control. Typical layout is 18' wide piles with 8' wide access area is around each pile or windrow. Site preparation includes topsoil removal, minimal regrading and compaction, installing gravel or sand subbase and then concrete.

Feature Measure: Pad Area

Scenario Unit: Square Foot

Scenario Typical Size: 5,700.0

Scenario Total Cost: $53,353.83

Total Cost per Unit: $9.36

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 316 - Animal Mortality Facility

Scenario: #10 - Static Pile with Wood Bins

Scenario Description:

This scenario consists of installing a group of small bins along one side and a long narrow bin on the backside of a concrete pad to compost poultry or small swine mortality in static pile(s) that have sufficient bulking material to allow natural aeration. Piles are turned to go through a second heat cycle prior to final land application. The roofed portion of the facility is addressed with Roofs and Covers (367). Size of facility based on daily mortality and sizing procedures accepted in particular state. Organic sites will require more frequent replacement of lumber. Potential Associated Practices: Roofs and Covers (367), Heavy Use Area Protection (561), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Roof Runoff Structure (558), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

Before Situation:

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from inco

After Situation:

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Install facility on a 18' x 40' concrete pad with 4 bins (5' H x 10' W x 6' Length) along the front side and one 8'w by 40' long secondary bin. Bin wall consists of a 1' concrete curb and 4' of treated lumber. Roofed portion is addressed under Roofs and Covers (367). Site preparation includes topsoil removal, installing 4" of gravel, setting posts , installing concrete slab, and installing wooden walls and doors. Piles turned to go through a second heat cycle prior to final land application.

Feature Measure: Total Bin Area

Scenario Unit: Square Foot

Scenario Typical Size: 720.0

Scenario Total Cost: $19,839.40

Total Cost per Unit: $27.55

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 316 - Animal Mortality Facility

Scenario: #13 - Static Pile with Concrete Bins, Hydrant

Scenario Description:

This scenario consists of installing a two or more of concrete bins, open on one end on a concrete pad to compost larger quantities of poultry or mature swine mortality in static pile(s) that have sufficient bulking material to allow natural aeration. Piles are turned to go through a second heat cycle prior to final land application. Water is added to maintain moisture content. The roofed portion of the facility is addressed in Cover and Roofs (367). Size of facility based on daily mortality and sizing procedures accepted in particular state. Scenarios are needed to meet permit differences between states and sizes of operations (some states in the region do not approve wood walls). Potential Associated Practices: Roofs and Cover (367), Heavy Use Area Protection (561), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Roof Runoff Structure (558), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

Before Situation:

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from inco

After Situation:

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Install a 20' deep by 48' long pad with four bins with 8' high walls and one end open. Roofed portion is addressed under Roofs and Covers (367). Site preparation includes topsoil removal, installing 4" of gravel, installing concrete slab, and installing 8' high concrete walls. A hydrant is installed to aid in maintaining moisture content. Piles are turned by moving to adjacent bin to go through a second heat cycle prior to final land application.

Feature Measure: Total Bin Area

Scenario Unit: Square Foot

Scenario Typical Size: 960.0

Scenario Total Cost: $36,124.08

Total Cost per Unit: $37.63

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 317 - Composting Facility

Scenario: #1 - Concrete Floor and Walls

Scenario Description:

The composting facility, with concrete floor and walls between bins only, is installed to address water quality concerns and disease vectors resulting from improper waste disposal by providing a dedicated facility for storage and treatment, and by creating a compost product that can be used in multiple ways including land application for enrichment of crop ground. This scenario is applicable when geological, soil, or climate conditions, or space limitations for structure footprint, or other site limitations make this scenario more suitable than a structure with wood bin walls on a concrete floor. All animal mortality composting shall be done using Practice Standard 316 - Animal Mortality Facility. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for water control (587), Diversion (362), Pipeline (516), Subsurface Drain (606), Heavy Use Area Protection (561), Roofs and Covers (367), Roof Runoff Structure (558), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Underground Outlet (620) and Vegetative Treatment Area (635).

Before Situation:

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This

After Situation:

Manure, litter and other agricultural by-products are being controlled, by the collection at the source, and stored properly, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. The typical composter is designed to handle organic material from a livestock operation. The typical composter is 42' x 14' with 5' high concrete walls. Strip top 1' of soil and roll compact same back into sub-floor. The bins are constructed on a 7" concrete slab used to store and stabilize manure, litter and other agricultural by-products from a four house complex on any farm.

Feature Measure: Square Foot Floor Area

Scenario Unit: Square Foot

Scenario Typical Size: 588.0

Scenario Total Cost: $14,081.42

Total Cost per Unit: $23.95

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 317 - Composting Facility

Scenario: #3 - Open Lot and Earthen Floor

Scenario Description:

The composting facility is installed to address water quality concerns and disease vectors resulting from improper waste disposal by providing a dedicated facility for storage and treatment, and by creating a compost product that can be used in multiple ways including land application for enrichment of crop ground. This scenario is applicable when geological, soil, and climate conditions are appropriate for earth floors and are allowed by state and local regulations. All animal mortality composting shall be done using Practice Standard 316 - Animal Mortality Facility. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for water control (587), Diversion (362), Pipeline (516), Subsurface Drain (606), Heavy Use Area Protection (561), Roofs and Covers (367), Roof Runoff Structure (558), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Underground Outlet (620) and Vegetative Treatment Area (635).

Before Situation:

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This

After Situation:

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. This scenario consists of removing 0.5' of surface material and compacting back into place 1' of soil to create a compacted, impervious earthen floor to act as a working area to store organic material in a static pile or windrow that has sufficient carbon based bulking material to allow natural aeration. Piles typically turned at least once to go into another heat cycle prior to final disposal, typically land application. Typical pad 50' x 200' on an improved compacted earthen surface. Include sufficient area for processing equipment access. Single piles or windrows to minimize runoff. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area or vegetated treatment area as per regulations. Site preparation includes topsoil removal, compaction of subsoil, and reinstalling topsoil, compacted.

Feature Measure: Square Foot Floor Area

Scenario Unit: Square Foot

Scenario Typical Size: 10,000.0

Scenario Total Cost: $4,706.84

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $0.47

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 317 - Composting Facility

Scenario: #31 - Farm Pad and Bins

Scenario Description:

The typical facility size is 6 feet by 9 feet and is comprised of a two-bin system, NOT TO EXCEED 75 sq-ft. The composting facility is installed on a small, urban or organic farm to address water quality concerns, pest/rodent concerns, and disease vectors resulting from improper vegetative waste disposal by providing a dedicated facility for storage and treatment, and by creating a compost product that can be used in multiple ways including land application for enrichment of crop ground. Screening is provided to limit access by vermin. Cost may be higher per unit than traditional compost facilities due to construction access limitations. Potential Associated Practices: Pond Sealing or Lining, Compacted Soil (520), Pond Sealing or Lining, Geomembrane or Geosynthetic Clay Liner (521), Pond Sealing or Lining, Concrete (522), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Diversion (362), Livestock Pipeline (516), Subsurface Drain (606), Heavy Use Area Protection (561), Roofs and Covers (367), Roof Runoff Structure (558), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Underground Outlet (620) and Vegetative Treatment Area (635), Stormwater Runoff Control (570).

Before Situation:

Manure and other vegetative waste are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed. This situation p

After Situation:

Manure and other agricultural by-products are being controlled by collection at the source and properly stored at an environmentally suitable location, until such time that they are utilized in a proper manner, typically in accordance with a nutrient management plan. This is incorporated as part of the overall waste management system meeting the National Engineering Handbook (NEH), Part 651, Agricultural Waste Management Field Handbook (AWMFH) that has been developed to also account for end use of the product from the composting facility. This scenario consists of installing a composting structure on a concrete pad. Concrete pad is 6'x9' on a compacted gravel surface. Include sufficient area for accessing compost structure. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area or vegetated treatment area as per regulations. Site preparation includes topsoil removal, compaction of subsoil, and installing a geotextile plus compacted gravel, concrete pad, and composting structure.

Feature Measure: Square Foot Floor Area

Scenario Unit: Square Foot

Scenario Typical Size: 54.0

Scenario Total Cost: $4,475.87

Total Cost per Unit: $82.89

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 317 - Composting Facility

Scenario: #64 - In-Vessel, Less Than 8 Cubic Yards

Scenario Description:

Installation of an in-vessel composter (rotary drum, forced air, or containerized with mechanical turning) to facilitate the decomposition of manure and/or other organic material into a final product sufficiently stable for storage, on farm use and application to land as a soil amendment. The raw inputs are primarily obtained for agricultural production or processing. The compost can be reused in the operation, utilized for crop production, soil improvement and/or marketed to the public. Typical size is for an in-vessel composter with a drum capacity of 4 CY with an approximate width of 4ft and length of 10 ft. The drum capacity is typically 85% of the nominal dimensions of the drum. This includes a concrete foundation for the composter of 6ft x 20ft to facilitate an area to collect finished compost. A secondary storage facility may require additional bin storage, which is not included. This scenario does not apply to routine disposal of livestock or poultry carcasses. Potential associated practices: Roofs and Covers (367), Waste Storage Facility (313), Fence (382), Critical Area Planting (342), Nutrient Management (590)

Before Situation:

Raw materials are stockpiled on-site and hauled to a landfill or directly to a field without treatment. Odors and vectors are routinely an issue following rain events.

After Situation:

An in-vessel composter with a drum capacity of 4 CY is installed to facilitate the composting of the organic materials as described. Potential for runoff, vectors, and odors are significantly reduced. The compost material is more stable and can be reused as described in the standard.

Feature Measure: Drum Capacity

Scenario Unit: Cubic Foot

Scenario Typical Size: 108.0

Scenario Total Cost: $24,801.27

Total Cost per Unit: $229.64

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 320 - Irrigation Canal or Lateral

Scenario: #1 - Irrigation Canal

Scenario Description:

This scenario is the construction of an Irrigation Canal or Lateral. Typical construction dimensions are 4' wide bottom x 3' deep x 1320' length with a side slope of 2:1. Resource concerns: Excess/Insufficient Water - Inefficient Use of Irrigation Water. Associated Conservation Practices: 388-Irrigation Field Ditch; 443-Irrigation System, Surface or Subsurface; 533-Pumping Plant; 430-Irrigation Pipeline; 587 - Structure for Water Control; 449 - Irrigation Water Management

Before Situation:

Water supply for an area is inadequate for crop production and irrigation water application is inefficient.

After Situation:

An earthen canal that has adequate capacity to convey sufficient irrigation water to meet the demands of the system and make irrigation practical for the crops being grown.

Feature Measure: Volume of earth excavated

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,467.0

Scenario Total Cost: $3,903.37

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $2.66

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 325 - High Tunnel System

Scenario: #98 - Gothic for Snow and Wind

Scenario Description:
Used for contiguous US states in areas with high snowfall. A gothic style (peaked) manufactured frame of tubular steel (30 x 70 ft.) with end walls and/or truss supports covered with 4-year 6 mil plastic. Costs are based on purchase of manufactured kit and landowner installing the structure. Structure must be installed to manufacturer's specifications.

Before Situation:
Cropland where extension of the growing season is needed. Additional resource concerns that may need to be addressed include soil erosion, soil condition, water quality, water quantity, and plant condition.

After Situation:
A high tunnel structure has been installed and he growing season has been extended for 1-4 months on average. Plant health and vigor has been improved.

Feature Measure: Area of Tunnel Installed

Scenario Unit: Square Foot

Scenario Typical Size: 2,160.0

Scenario Total Cost: $16,614.41

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $7.69

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 325 - High Tunnel System

Scenario: #116 - Gothic for Snow and Wind, Small

Scenario Description:

Use in areas with expected snow and wind loads on sites less than 1 acre. Gothic-style (arched) manufactured frame of tubular steel (less than or equal to 20 ft x 30 ft.) covered with 4-year warrantee, 6 mil UV resistant plastic. Costs are based on purchase of manufactured kit and landowner installation of structure. Structure must be installed to manufacturer's specifications. Associated practices might include CPS Roof Runoff Structure (588), Underground Outlet (620), Critical Area Planting (342), Mulching (484).

Before Situation:

Cropland where extension of the growing season is needed. Primary resource concern addressed will be plant health and vigor.

After Situation:

High Tunnel structure has been installed and the growing season has been extended for 1-4 months on average. Plant health and vigor is improved.

Feature Measure: Area of High Tunnel Installe

Scenario Unit: Square Foot

Scenario Typical Size: 600.0

Scenario Total Cost: $8,136.84

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $13.56

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 327 - Conservation Cover

Scenario: #45 - Introduced with Forgone Income

Scenario Description:

This practice applies on organically managed land needing permanent protective cover. This practice typically involves conversion from an intensive organic cropping system to permanent non-native vegetation (scenario includes non-native grass/legume mix). The typical size of the practice is 20 acres. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, develop wildlife habitat, and reduce air quality impacts.

Before Situation:

Crops such as vegetables and small fruit crops are organically grown and harvested. Full width tillage is utilized, weeds controlled mainly by cultivation. Soil surface residue amounts average 10% or less. Erosion exceeds tolerable rates and sediment may

After Situation:

The 327 Implementation Requirements have been developed for the site and has been applied. Organically managed land covered with permanent non- native grass/legume mix vegetation has reduced soil erosion, reduced water/sediment runoff, and improved air quality due to the elimination of dust emissions. . Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

Feature Measure: Area planted

Scenario Unit: Acre

Scenario Typical Size: 50.0

Scenario Total Cost: $23,878.39

Total Cost per Unit: $477.57

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 327 - Conservation Cover

Scenario: #46 - Native Species with Forgone Income

Scenario Description:
This practice applies on conventional or organically managed land needing permanent protective cover. This practice typically involves conversion from an intensive cropping system to permanent native vegetation (scenario includes native grass/legume mix). The typical size of the practice is 50 acres. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, develop wildlife habitat, and reduce air quality impacts. Applies to conventional or organic systems.

Before Situation:
Crops such as vegetables and small fruit crops may be conventionally or organically grown and harvested. Full width tillage is utilized, weeds controlled mainly by cultivation. Soil surface residue amounts average 10% or less. Soil erosion exceeds tolerab

After Situation:
The 327 Implementation Requirements have been developed for the site and applied. Managed land covered with permanent native grass/legume mix vegetation has reduced soil erosion, reduced water/sediment runoff, and improved air quality due to the elimination of dust emissions. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

Feature Measure: Area planted

Scenario Unit: Acre

Scenario Typical Size: 50.0

Scenario Total Cost: $29,523.06

Total Cost per Unit: $590.46

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 327 - Conservation Cover

Scenario: #47 - Pollinator Species with Forgone Income

Scenario Description:

Permanent vegetation, including a mix of native grasses, legumes, and forbs (mix may also include non-native species), established on land needing permanent vegetative cover that provides habitat for pollinators. Typical practice size is variable depending on site; this scenario uses 1 ac as the typical size. In addition to providing pollinator habitat, this practice scenario may also reduce sheet and rill erosion, improve soil quality, improve water quality, and improve air quality. The practice may also provide wildlife habitat. Practice applicable on cropland, odd areas, corners, etc. Applies to conventional or organic systems.

Before Situation:

Crops such as vegetables and small fruit crops may be conventionally or organically grown and harvested. Full width tillage is utilized, weeds controlled mainly by cultivation. Soil surface residue amounts average 10% or less. Soil erosion exceeds tolerab

After Situation:

The 327 Implementation Requirements have been developed for the site and applied. Managed land covered with permanent pollinator habitat including a mix of native grasses, legumes, and forbs (mix may also include non-native species). This practice may also reduce soil erosion, reduce water/sediment runoff, and improve air quality due to the elimination of dust emissions. Plants sown for pollinator habitat may also provide cover for beneficial insects and wildlife. This scenario does not apply to critical area plantings.

Feature Measure: Area planted

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $1,005.41

Total Cost per Unit: $1,005.41

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 327 - Conservation Cover

Scenario: #48 - Introduced Species

Scenario Description:

The land is covered with permanent non-native grass vegetation resulting in reduced soil erosion and water/sediment runoff, and the elimination of dust emissions which improves air quality significantly. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings. Applies to conventional or organic systems.

Before Situation:

Crops such as corn, soybeans, or cotton may be conventionally or organically grown and harvested. Full width tillage is utilized, weeds controlled by cultivation and/or chemical application. Soil surface residue amounts average 10% or less. Soil erosion e

After Situation:

The 327 Implementation Requirements have been developed for the site and applied. The land is covered with permanent non-native grass vegetation resulting in reduced soil erosion and water/sediment runoff, and the elimination of significant dust emissions which improves air quality. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

Feature Measure: Area planted

Scenario Unit: Acre

Scenario Typical Size: 50.0

Scenario Total Cost: $11,117.60

Total Cost per Unit: $222.35

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 327 - Conservation Cover

Scenario: #49 - Native Species

Scenario Description:

This practice applies on land to be retired from agricultural production and on other lands needing permanent protective cover. This practice typically involves conversion from a clean-tilled (conventional tilled) intensive cropping system to permanent native vegetation (scenario includes native grass). The typical size of the practice is 50 acres. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, develop wildlife habitat, and reduce air quality impacts. Applies to conventional or organic systems

Before Situation:

Crops such as corn, soybeans, or cotton may be conventionally or organically grown and harvested. Full width tillage is utilized, weeds controlled by cultivation and/or chemical application. Soil surface residue amounts average 10% or less. Soil erosion e

After Situation:

The 327 Implementation Requirements have been developed for the site and applied. The land is covered with permanent native grass vegetation which reduces soil erosion and water/sediment runoff, and eliminates dust emissions which improves air quality. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

Feature Measure: Area planted

Scenario Unit: Acre

Scenario Typical Size: 50.0

Scenario Total Cost: $14,452.03

Total Cost per Unit: $289.04

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 327 - Conservation Cover

Scenario: #102 - Pollinator Mix-Small Footprint

Scenario Description:

Permanent vegetation, including a mix of grasses, legumes and forbs established on any land needing permanent vegetative cover that provides habitat, cover, and food for pollinators. Typical size varies depending on the site feasibility for length and width. Urban sites typical size is 2000 square feet (20x100 ft). This scenario included mechanical site preparation. This practice scenario may also reduce wind and water erosion, improve soil quality, reduce water quality degradation and reduce air emissions of particulate matter or greenhouse gases. Applies to conventional and organic systems. This scenario does not applied to areas needing Critical Area Planting.

Before Situation:

Crop rotation include specialty crops such as vegetable and fruit/berry production that benefit from pollinator activity. Urban agricultural sites do not provide for pollinator habitat at this time. Planting operations include mechanical removal of weeds.

After Situation:

The 327 implementation requirements have been developed for the site and applied. Land is in permanent vegetative cover reducing erosion and sediment delivery to water. Pollinator habitat has successfully established providing habitat and cover for pollinators and beneficial insects.

Feature Measure: Area of conservation Cover I

Scenario Unit: 1,000 Square Feet

Scenario Typical Size: 2.0

Scenario Total Cost: $342.04

Total Cost per Unit: $171.02

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 328 - Conservation Crop Rotation

Scenario: #95 - Specialty Crop, Small

Scenario Description:

Scenario applies to Urban sites less than a 1/2 acre with a rotation of organic or non-organic specialty crops (fruits and vegetable) are produced as part of a conservation management system to treat one or more of the following resource concerns: 1) Reduce sheet, rill and wind erosion, 2) Maintain or increase soil health and organic matter content, 3) Reduce water quality degradation due to excess nutrients, 4) Improve soil moisture efficiency, 5) Reduce the concentration of salts and other chemicals from saline seeps, 6) Reduce plant pest pressures, 7) Provide feed and forage for domestic livestock, and 8) Provide food and cover habitat for wildlife, including pollinator forage, and nesting. This practice payment is provided to acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical urban specialty crop farm. Cost represents typical situations for organic and non-organic producers.

Before Situation:

This rotation consisted of growing specialty crops. Fields range from nearly flat to B and C slopes. Erosion, soil quality, and pest management are the primary concern. Removal of residue from the planted area is common leaving bare soil.

After Situation:

The rotation established adds diversity of plant material organic matter, higher residue amounts that will treat one or more of the following resource concerns on organic and non- organic farms: reduce sheet, rill and wind erosion, maintain or increase soil health and organic matter content, improve soil moisture efficiency or reduce plant pest pressure.

Feature Measure: area planned

Scenario Unit: 1,000 Square Feet

Scenario Typical Size: 15.0

Scenario Total Cost: $722.23

Total Cost per Unit: $48.15

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 328 - Conservation Crop Rotation

Scenario: #113 - Small Grain

Scenario Description:

Current crop rotation includes at least two different crop types. This practice payment is provided to the producer for the time needed to plan and implement the logistics of adding a winter annual or spring planted small grain into crop rotation to effectively implement a conservation crop rotation on a cropland farm by adding a small grain crop for either forage or grain to their cropping system. The crop is intended to be a harvested. No foregone income. Cost represents typical situations for conventional and organic producers.

Before Situation:

Small grain has not been grown on field within the past 3 years. Growth of a small grain included as a cover crop on field does not restrict implementation. Fields range from nearly flat to C and D slopes. Erosion, soil quality, and pest management are th

After Situation:

A rotation is established with a small grain that may treat one or more of the following purposes: reduce sheet, rill and wind erosion, maintain or increase soil health and organic matter content, reduce water quality degradation due to excess nutrients, improve soil moisture efficiency, reduce plant pest pressures, provide feed and forage for domestic livestock, and provide openings for other conservation practice implementation. This scenario would allow for earlier harvest window compared to other row crops potentially allowing for better implementation of cover crops.

Feature Measure: acres

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $2,657.81

Total Cost per Unit: $66.45

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 329 - Residue and Tillage Management, No Till

Scenario: #16 - No-Till and Strip-Till, Herbicide

Scenario Description:

This practice typically involves conversion from a clean-tilled (conventional tilled) system to no-till or strip-till system on 100 acres of cropland. This involves managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting soil-disturbing activities used to establish and harvest crops. The practice is used to reduce sheet and rill erosion, reduce wind erosion, improve soil quality, reduce CO2 losses from the soil, reduce energy use, increase plant available moisture and provide food and escape cover for wildlife. The no-till/strip-till system includes non-tillage types of weed control, which may include the use of herbicides and may also include a period of no till fallow. System is applicable in both irrigated and non-irrigated fields organic and non-organic operations. Herbicide treatment is to burndown weeds in the residue prior to planting the crop.

Before Situation:

Row crops or small grains are grown and harvested. Full width tillage is performed prior to planting and weed control during crop production is typically cultivation and chemical application. Fields are disked immediately following harvest, with additiona

After Situation:

The Implementation Requirements for 329 Residue Management, No Till/Strip Till is prepared and installed. Managing crop residue on the surface of a field (typical 100 acre) year around according to the 329 practice plan while limiting soil disturbing activities to those which place nutrients, and plant crops that meet the minimum criteria in the 329 practice standard. All crops are seeded/planted with a no-till drill or no-till/strip-till planter, which minimizes soil disturbance while establishing good seed-soil contact. All residues are to be maintained on the soil surface in a uniform distribution over the entire field and not burned or removed. Crop residues provide soil surface cover throughout the year. Runoff and erosion are reduced and no rills are visible on the soil surface. Wind erosion is reduced by standing residues and surface cover. Over time, soil health is improved due to the additional biomass (crop residues), ground cover, and soil infiltration. Crop residues and/or cover crop residues left on the soil surface may maximize weed control by increasing allelopathic and mulching effect, and provides cover for wildlife. The practice would require reducing soil disturbance and erosion and increasing biomass returned to the soil in sufficient amounts to achieve increased SCI and decreased STIR.

Feature Measure: Area planted

Scenario Unit: Acre

Scenario Typical Size: 100.0

Scenario Total Cost: $3,977.57

Total Cost per Unit: $39.78

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 329 - Residue and Tillage Management, No Till

Scenario: #31 - No-Till, Less Than Half Acre

Scenario Description:

Scenario applies to Urban sites less than a 1/2 acre with a rotation of organic or non-organic specialty crops (fruits and vegetable) are produced as part of a conservation management system to treat one or more of the following resource concerns: 1) Reduce sheet, rill and wind erosion, 2) Maintain or increase soil health and organic matter content, 3) Improve soil moisture efficiency, 4) Reduce plant pest pressures. This practice payment is provided to effectively implement no-till or strip-till management on a typical urban specialty crop farm. Cost represents typical situations for organic and non-organic producers.

Before Situation:

This rotation consisted of growing specialty crops. Fields range from nearly flat to B and C slopes. Erosion, soil quality, and pest management are the primary concern. Removal of residue from the planted area is common leaving bare soil-residue amounts a

After Situation:

The implementation requirements are written following CPS 329 Residue and Tillage Management to will treat one or more of the following resource concerns on organic and non- organic farms: reduce sheet, rill and wind erosion, maintain or increase soil health and organic matter content, improve soil moisture efficiency or reduce plant pest pressure. Soil disturbance is minimized with no-till drill or planter use. May include single slot opener and seedling or plugs follow. When pest management requires the removal of crop residue then planting beds are covered with cover crop using the 340 Cover Crop conservation practice. Runoff and erosion are reduced below T. No observed rills. Wind erosion reduced by maintaining surface cover. They system meets the soil condition index and STIR requirements.

Feature Measure: area planted

Scenario Unit: 1,000 Square Feet

Scenario Typical Size: 15.0

Scenario Total Cost: $816.04

Total Cost per Unit: $54.40

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 338 - Prescribed Burning

Scenario: #1 - Small Acreage / Limited Fire Resources

Scenario Description:

Applying a prescribed burn according to a designed burn plan and NRCS Prescribed Burning (338) standard and specifications in order to control undesirable species, improve wildlife habitat, improve plant productivity and/or quality, facilitate grazing distribution and maintain ecological processes. This scenario is based on a small burn area and typically applies under the following conditions: where the terrain of the majority of the area to be burned <15% slopes with herbaceous and/or low volatile woody fuel with no high volatile fuels. Scenario is also applicable on larger scale burns in Northern Great Plains but where trained personnel and/or locally available fire equipment is not readily available. Burned firebreaks used to achieve total firebreak width are part of these burns. (Constructed firebreak cost is not included in the cost of the burn. Refer to Firebreak (394) standard and cost scenarios).

Before Situation:

Desirable plant composition is lacking due to reduced plant vigor, invasive species, or improper livestock distribution.

After Situation:

Desirable plant composition is restored, plant vigor improved, and invasive species reduced. Forage production and quality for livestock and /or wildlife is improved.

Feature Measure: Acres planned

Scenario Unit: Acre

Scenario Typical Size: 80.0

Scenario Total Cost: $3,189.14

Total Cost per Unit: $39.86

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 338 - Prescribed Burning

Scenario: #78 - Pile

Scenario Description:

Burning of consolidated material created through mechanical treatment of large woody vegetation (juniper/pinon trees, large shrubs) under 314. Brush management. Typical unit is based on a 100 acre treatment area where brush management activities included cutting and piling of treated shrubs and trees to address habitat improvement for desired species and increase available forage for grazing and browsing animals. A prescribed burn plan will be completed as required by our 338 Standards and Specifications.

Before Situation:

Remnant material has been piled following mechanical large woody vegetation treatment. Untreated piles serve as perches and hiding cover for raptors, corvids, and ground predators which may negatively affect desired wildlife species such as sage grouse. P

After Situation:

Treated area has reduced threats to desired wildlife species, improved wildlife habitat and access to forage resources. Ecological conditions of the site should resemble expected attributes and functions found within the ecological site description. Burned sites should be monitored to determine if additional practices such as 315- herbaceous weed treatment and/or 550- range seeding are needed to address additional concerns.

Feature Measure: Acres Planned

Scenario Unit: Acre

Scenario Typical Size: 100.0

Scenario Total Cost: $1,797.23

Total Cost per Unit: $17.97

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 340 - Cover Crop

Scenario: #17 - Basic

Scenario Description:

Typically a small grain or legume (may also use forage sorghum, radishes, turnips, buckwheat, etc.) will be planted as a cover crop immediately after harvest of a row crop, and will be followed by a row crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a drill. The cover crop should be allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop will be terminated using an approved herbicide prior to planting the subsequent crop.

Before Situation:

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare

After Situation:

Implementation Requirements according to Cover Crop (340) are prepared and implemented. Within 30 days after harvest of the row crop, fields are planted with a small grain or legume cover crop (may also use forage sorghum, radishes, turnips, buckwheat, etc.), typically rye or clover. The average field size is 40 acres. The cover crop is seeded with a drill. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced. Wind erosion is reduced by standing residues. The cover crop is terminated with an approved herbicide prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

Feature Measure: Area planted

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $3,385.40

Total Cost per Unit: $84.63

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 340 - Cover Crop

Scenario: #19 - Multi-Species

Scenario Description:

Typically the multi-species cover crop (two or more species) mix includes a small grain, a legume, and may include other species such as forage sorghum, radishes, turnips, buckwheat, etc.). This mix will address all the purposes of the Cover Crop (340) standard. Typically the cover crop is seeded immediately after harvest of a row crop, but may be inter-seeded into a row crop using a broadcast seeder, drill, or similar device. The cover crop will be followed by another row crop and will utilize the residue as a mulch. The cover crop should be allowed to generate as much biomass as possible without delaying planting of the following crop. The cover crop will be terminated using an approved herbicide or tillage prior to planting the subsequent crop and terminated per the NRCS Cover Crop Termination Guidelines.

Before Situation:

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less resulting in bare s

After Situation:

Implementation Requirements according to Cover Crop (340) are prepared and implemented. Within 30 days after the harvest of row crop, fields are planted with a multi-species (2 or more species) cover crop mix that generally includes a small grain, a legume, and may include other species such as forage sorghum, radishes, turnips, buckwheat, etc. The average field size is 40 acres. The cover crop is seeded with a drill, broadcast seeder, aerial broadcast, or other method. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced. Wind erosion is reduced by standing residues. The cover crop is terminated with an approved herbicide prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

Feature Measure: Area planted

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $4,175.40

Total Cost per Unit: $104.38

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 340 - Cover Crop

Scenario: #85 - Multi-Species, 1,000 Square Feet

Scenario Description:

Typical cover crop is more than one plant species, planted immediately after harvest of a crop and will be followed by a new crop. Cover crops are planted in the production bed typically 4000 square feet. Implementation is mostly hand labor or labor intensive. Cover crop is mechanically terminated in urban agricultural sites with State and local laws, ordinance and zoning restrictions on use of agrichemicals.

Before Situation:

Crop rotation include specialty crops such sweet corn, vegetables, or root crops are grown and harvested through out growing season and into mid-late fall. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind ero

After Situation:

Implementation Requirements according to Cover Crop (340) are prepared and implemented. The cover crop is seeded by hand. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover at the critical period when cover is needed usually late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced. Wind erosion is reduced by standing residues. The cover crop is mechanically terminated as late as feasible to maximize cover crop biomass production and meet the planting date needs of the next crop. Over time, soil health is improved due to additions of biomass, improvement of aggregate stability and infiltration/aeration.

Feature Measure: Area of Cover Crop Installed

Scenario Unit: 1,000 Square Feet

Scenario Typical Size: 4.0

Scenario Total Cost: $245.52

Total Cost per Unit: $61.38

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 342 - Critical Area Planting

Scenario: #26 - Normal Tillage, Native or Introduced

Scenario Description:

Establishment of permanent vegetation (Native and Introduced) on a site (both organic and non-organic) that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.

Before Situation:

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, wind, etc.) or due to newly constructed conservation practices such

After Situation:

Implementation Requirements are prepared and implemented according to the Critical Area Planting (342) standard. This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments will be incorporated at a depth of four to six inches to improve fertility and ensure establishment of permanent vegetative cover. The site will be stabilized, erosion reduced, and offsite damages reduced/eliminated.

Feature Measure: area seeded

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $404.19

Total Cost per Unit: $404.19

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 342 - Critical Area Planting

Scenario: #27 - Moderate Grading, Native or Introduced

Scenario Description:

Establishment of permanent vegetation (native and introduced) on a site that is void or nearly void of vegetation due to a natural or human disturbance. Costs include a dozer for grading and shaping of small gullies, seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.

Before Situation:

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from natural occurrences (fire, flood, etc.) or human disturbance. The exposed areas have visible rills and small

After Situation:

Implementation Requirements are prepared and implemented according to the Critical Area Planting (342) standard.. This typical 1.0 acre critical area is stabilized by grading and shaping the small gullies with a dozer and then applying fertilizer, lime and seed. The site will be stabilized, erosion reduced, and offsite damages reduced/eliminated.

Feature Measure: area seeded

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $998.02

Total Cost per Unit: $998.02

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 342 - Critical Area Planting

Scenario: #28 - Heavy Grading, Native or Introduced

Scenario Description:

Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural or human disturbance. Costs include a dozer for grading and shaping of moderate to severe gullies, seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.

Before Situation:

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from natural occurrences (fire, flood, etc.) or human disturbance. The exposed areas have visible rills and modera

After Situation:

Implementation Requirements are prepared and implemented according to the Critical Area Planting (342) standard. This typical 1.0 acre critical area is stabilized by grading and shaping the moderate to severe gullies with a dozer and then applying fertilizer, lime and seed. The site will be stabilized, erosion reduced, and offsite damages reduced/eliminated.

Feature Measure: area seeded

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $1,468.01

Total Cost per Unit: $1,468.01

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 345 - Residue and Tillage Management, Reduced Till

Scenario: #46 - Reduced Tillage

Scenario Description:

Mulch-till is managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting the soil-disturbing activities used to grow crops in systems where the entire field surface is tilled by the planter/drill or tillage tools prior to planting. This practice includes tillage methods commonly referred to as mulch tillage, vertical tillage, chiseling and disking, or the use of high disturbance drills without additional tillage. It applies to stubble mulching on summer-fallowed land, to tillage for annually planted crops, to tillage for planted crops and to tillage for planting perennial crops. All residue shall be uniformly spread or managed over the surface throughout the critical erosion period(s). All residue shall be uniformly distributed over the entire field and not burned or removed. These periods of intensive tillage have led to excessive soil loss, often above the soil loss tolerance (T), due to the loss of crop residue on the soil surface. The NRCS erosion prediction model(s) will be used to review the farming operations and determine the amount of surface residue to manage throughout the rotation to keep soil loss below T. The producer will adopt a reduced till system to meet one or more of the practice purposes.

Before Situation:

Crops such as corn, soybeans, small grains, or cotton are grown and harvested. Fields are tilled immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil b

After Situation:

The Implementation Requirements are prepared following the criteria in the 345 Residue and Tillage Management, Reduced Till conservation practice standard. Reduced till applies to all cropland and other lands where crops are planted. This scenario includes the use of a reduce till systems and high disturbance drills, such as a hoe drill, air seeder, or no-till drill that disturbs a large percentage of soil surface during the planting operation. The residue that remains on the soil surface provides soil cover during late fall, throughout the winter, and into the early spring. Runoff and water/wind erosion are reduced and water quality improves. Over time, soil health is improved due to less tillage, the additional biomass, ground cover, soil infiltration, and plant diversity in the cropping system.

Feature Measure: Area planted

Scenario Unit: Acre

Scenario Typical Size: 100.0

Scenario Total Cost: $2,499.70

Total Cost per Unit: $25.00

Based on North Dakota average costs. Individual county costs may vary.

Practice: 345 - Residue and Tillage Management, Reduced Till

Scenario: #77 - Reduced Tillage, Less Than 0.5 Acres

Scenario Description:

Scenario applies to Urban sites less than a 1/2 acre with a rotation of organic or non-organic specialty crops (fruits and vegetable) are produced as part of a conservation management system to treat one or more of the following resource concerns: 1) Reduce sheet, rill and wind erosion, 2) Maintain or increase soil health and organic matter content, 3) Improve soil moisture efficiency, 4) Reduce plant pest pressures. This practice payment effectively implements a reduced tillage system on a typical urban specialty crop farm. Cost represents typical situations for organic and non-organic producers.

Before Situation:

This rotation consisted of growing specialty crops. Fields range from nearly flat to B and C slopes. Erosion, soil quality, and pest management are the primary concern. Removal of residue from the planted area is common leaving bare soil-residue amounts a

After Situation:

The implementation requirements are written following CPS 345 Residue and Tillage Management, Reduced Tillage to treat one or more of the following resource concerns on organic and non- organic farms: reduce sheet, rill and wind erosion, maintain or increase soil health and organic matter content, improve soil moisture efficiency or reduce plant pest pressure. Soil disturbance is minimized with no-till drill or planter use. May include single slot opener and seedling or plug planting follows. When pest management requires the removal of crop residue then planting beds are covered with cover crop using the 340 Cover Crop conservation practice. Runoff and erosion are reduced below T. No observed rills. Wind erosion reduced by maintaining surface cover. Over time, soil health is improved due to less tillage, the additional biomass, ground cover, soil infiltration, and plant diversity in the cropping system.

Feature Measure: area planted

Scenario Unit: 1,000 Square Feet

Scenario Typical Size: 15.0

Scenario Total Cost: $712.40

Total Cost per Unit: $47.49

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 348 - Dam, Diversion

Scenario: #67 - Fill, Rock and Gravel

Scenario Description:

A rock structure with a gravel bedding on geotextile is built to divert all or part of the water from a waterway or a stream to provide water in such a manner that it can be controlled and used beneficially for irrigation, livestock water, fire control, municipal or industrial uses, develop renewable energy systems, or recreation, to divert periodic damaging flows from one watercourse to another watercourse thereby reducing the damage potential of the flows. This structure will address the resource concerns of inefficient water use on Irrigated Land, inadequate water for livestock, and inadequate water supply for other beneficial uses.

Before Situation:

This practice applies where a diversion dam is needed as an integral part of an irrigation system or a water-spreading system designed to facilitate the conservation use of soil and water resources, Diversion of water from an unstable watercourse to a sta

After Situation:

A rock structure of approximately 1050 cubic yards with a gravel bedding of approximately 450 cubic yards on approximately 200 square yards of geotextile, built to divert all or part of the water from a waterway or a stream. This standard applies to structures of a permanent nature, constructed of materials having an expected life span consistent with the purpose for which the structure is designed. This structure will be an integral part of an irrigation system or a water-spreading system designed to facilitate the conservation use of soil and water resources, or diversion of water from an unstable watercourse to a stable watercourse as needed. The water supply available is adequate for the purpose for which it is to be diverted. Adverse environmental impacts resulting from the installation of the practice must be overcome. The rock structure provides beneficial uses for irrigation, livestock water, fire control, municipal or industrial uses, renewable energy systems, recreation, or to divert periodic damaging flows from one watercourse to another watercourse thereby reducing the damage potential of the flows. Any needed vegetation of disturbed areas must use Critical Area Planting (342). Other associated practices such as Channel Vegetation (322), Stream Habitat Improvement and Management (395), Channel Stabilization (584) will be as appropriate. Any needed head gates or flap gates to control the quantity of water being diverted must use Structure for Water Control (587).

Feature Measure: Fill in Cubic Yards

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,500.0

Scenario Total Cost: $174,109.58

Total Cost per Unit: $116.07

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 348 - Dam, Diversion

Scenario: #70 - Structure, Sheet Pile

Scenario Description:

A sheet pile structure with rock, built to divert all or part of the water from a waterway or a stream to provide water in such a manner that it can be controlled and used beneficially for irrigation, livestock water, fire control, municipal or industrial uses, develop renewable energy systems, or recreation, to divert periodic damaging flows from one watercourse to another watercourse thereby reducing the damage potential of the flows. This structure will address the resource concerns of inefficient water use on Irrigated Land, inadequate water for livestock, and inadequate water supply for other beneficial uses.

Before Situation:

This practice applies where a diversion dam is needed as an integral part of an irrigation system or a water-spreading system designed to facilitate the conservation use of soil and water resources, Diversion of water from an unstable watercourse to a sta

After Situation:

A sheet pile structure of approximately 3000 square feet with approximately 660 cubic yards of riprap is built to divert all or part of the water from a waterway or a stream. This standard applies to structures of a permanent nature, constructed of materials having an expected life span consistent with the purpose for which the structure is designed. This structure will be an integral part of an irrigation system or a water-spreading system designed to facilitate the conservation use of soil and water resources, or diversion of water from an unstable watercourse to a stable watercourse as needed. The water supply available is adequate for the purpose for which it is to be diverted. Adverse environmental impacts resulting from the installation of the practice must be overcome. The sheet pile structure provides beneficial uses for irrigation, livestock water, fire control, municipal or industrial uses, renewable energy systems, recreation, or to divert periodic damaging flows from one watercourse to another watercourse thereby reducing the damage potential of the flows. Any needed vegetation of disturbed areas must use Critical Area Planting (342). Other associated practices such as Channel Vegetation (322), Stream Habitat Improvement and Management (395), Channel Stabilization (584) will be as appropriate. Any needed head gates or flap gates to control the quantity of water being diverted must use Structure for Water Control (587).

Feature Measure: Area of sheet pile

Scenario Unit: Square Foot

Scenario Typical Size: 3,000.0

Scenario Total Cost: $216,032.99

Total Cost per Unit: $72.01

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 348 - Dam, Diversion

Scenario: #78 - Earthfill

Scenario Description:

An earth fill built to divert all or part of the water from a waterway or a stream to provide water in such a manner that it can be controlled and used beneficially for irrigation, livestock water, fire control, municipal or industrial uses, develop renewable energy systems, or recreation, to divert periodic damaging flows from one watercourse to another watercourse thereby reducing the damage potential of the flows. This structure will address the resource concerns of inefficient water use on Irrigated Land, inadequate water for livestock, and inadequate water supply for other beneficial uses.

Before Situation:

This practice applies where a diversion dam is needed as an integral part of an irrigation system or a water-spreading system designed to facilitate the conservation use of soil and water resources, Diversion of water from an unstable watercourse to a sta

After Situation:

An earth fill structure of approximately 1500 cubic yards is built to divert all or part of the water from a waterway or a stream. This standard applies to structures of a permanent nature, constructed of materials having an expected life span consistent with the purpose for which the structure is designed. This structure will be an integral part of an irrigation system or a water-spreading system designed to facilitate the conservation use of soil and water resources, or diversion of water from an unstable watercourse to a stable watercourse as needed. The water supply available is adequate for the purpose for which it is to be diverted. Adverse environmental impacts resulting from the installation of the practice must be overcome. The earth fill structure provides beneficial uses for irrigation, livestock water, fire control, municipal or industrial uses, renewable energy systems, recreation, or to divert periodic damaging flows from one watercourse to another watercourse thereby reducing the damage potential of the flows. Any needed vegetation of disturbed areas must use Critical Area Planting (342). Other associated practices such as Channel Vegetation (322), Stream Habitat Improvement and Management (395), Channel Stabilization (584) will be as appropriate. Any needed head gates or flap gates to control the quantity of water being diverted must use Structure for Water Control (587).

Feature Measure: Volume of Earth Fill

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,500.0

Scenario Total Cost: $15,380.31

Total Cost per Unit: $10.25

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 350 - Sediment Basin

Scenario: #2 - Basin

Scenario Description:

A sediment basin constructed with a low hazard class earthen embankment in an existing drainage way on agricultural, urban, or construction sites for the purpose of trapping sediment to preserve the capacity of reservoirs, ditches, canals, diversions, waterways and streams and to prevent undesirable deposition on bottom lands and other developed lands. The sediment basin is created by a compacted earth embankment and impounds more than 3 feet of water against the embankment. Resource concerns addressed include excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Surface water causes the sediment (and potentially pesticides and nutrients) to be transported into the riparian areas and water bodies downstream. The typical sediment basin has a drainage area of 5 acres.

Before Situation:

Disturbed areas on agricultural or urban land, or construction sites, have excessive erosion that leads to deterioration of downstream waters due to excessive sedimentation.

After Situation:

The typical sediment basin is an embankment of 1000 cy with excavated material from the pool area used to construct the embankment and auxiliary spillway. The embankment will be compacted earthfill. Sediments will be collected in the basin and the basin will be emptied through an engineered outlet. Associated practice(s): Other practices that may need to be implemented along with sediment basin to address all of the site specific resource concerns include: Critical Area Planting (342) and Mulching (484) where necessary to prevent erosion following construction activities, Structure for Water Control (587) or Underground Outlet (620) if using a dewatering device, Pond Sealing or Lining (521A,521B,521C,521D).

Feature Measure: Embankment volume

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,000.0

Scenario Total Cost: $5,283.04

Total Cost per Unit: $5.28

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 351 - Well Decommissioning

Scenario: #1 - Shallow Well, Greater Than 15 Inch Diameter

Scenario Description:

A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water. Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or according to local, State, Tribal, or Federal regulations. Install fill material (gravel, earth, concrete, and/or bentonite) consisting of 80% Gravel, 10% Cement or Bentonite, and 10% Earthfill.

Before Situation:

Shallow well or hand dug well that is greater than 15" diameter and less than 20 feet deep. Assume 30" diameter casing. Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or ac

After Situation:

Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidence. Associated practices: 342 Critical Area Seeding

Feature Measure: Length of well casing

Scenario Unit: Foot

Scenario Typical Size: 20.0

Scenario Total Cost: $1,584.68

Total Cost per Unit: $79.23

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 351 - Well Decommissioning

Scenario: #2 - Shallow Well, Less Than or Equal to 15 Inch Diameter

Scenario Description:

A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water. Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or according to local, State, Tribal, or Federal regulations. Install fill material (gravel, earth, concrete, and/or bentonite) consisting of 60% Gravel, 20% Concrete or Bentonite, and 20% Earthfill.

Before Situation:

Shallow well or hand dug well that is less than 15" diameter and less than 80 feet deep. Assume 12" diameter casing. Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or accor

After Situation:

Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidence. Associated practices: 342 Critical Area Seeding.

Feature Measure: Length of well casing

Scenario Unit: Foot

Scenario Typical Size: 80.0

Scenario Total Cost: $1,480.98

Total Cost per Unit: $18.51

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 351 - Well Decommissioning

Scenario: #3 - Drilled Well, Less Than 300 Feet

Scenario Description:
A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water.

Before Situation:
Drilled well with surface casing that is approximately 250 feet deep. Typically will be a well of less than 6" in diameter, or an artesian well which will require grout pumped and well filled from bottom up. Resource Concern - Water Quality Degradation

After Situation:
Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidence. Associated practices: 342 Critical Area Seeding

Feature Measure: Length of well casing

Scenario Unit: Foot

Scenario Typical Size: 250.0

Scenario Total Cost: $7,700.91

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $30.80

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 351 - Well Decommissioning

Scenario: #4 - Drilled Well, 300 to 1,000 Feet

Scenario Description:

A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water.

Before Situation:

Drilled well that is greater than 300 feet deep. Assume 6" diameter casing. Resource Concern - Water Quality Degradation

After Situation:

Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidence. Associated practices: 342 Critical Area Seeding

Feature Measure: Length of well casing

Scenario Unit: Foot

Scenario Typical Size: 500.0

Scenario Total Cost: $12,715.12

Total Cost per Unit: $25.43

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 356 - Dike and Levee

Scenario: #1 - Dike, Wetland

Scenario Description:

Construction of a barrier, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Payment includes stripping prior to fill placement and earthfill for embankment. Associated practices include, but are not limited to: PS327 Conservation Cover, PS656 Constructed Wetland, PS342 Critical Area Planting, PS378 Ponds, PS382 Fence, PS464 Irrigation Land Levelling, PS500 Obstruction Removal, PS528 Prescribed Grazing, PS587 Structure for Water Control, PS620 Underground Outlet, PS645 Upland Wildlife Management, PS658 Wetland Creation, PS659 Wetland Enhancement, PS657 Wetland Restoration, PS644 Wetland Wildlife Habitat Management.

Before Situation:

Site requires control of water level for purposes connected with crop production; fish and wildlife management; or wetland maintenance, improvement, restoration, or construction. An adequate quantity of soil suitable for constructing an earthen dike is av

After Situation:

Water level controlled by a stable earthen structure. Potential hazard to public safety, land or property mitigated; environmental benefit provided.

Feature Measure: Volume of Earthfill (includi

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,890.0

Scenario Total Cost: $9,915.22

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $5.25

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 356 - Dike and Levee

Scenario: #2 - Dike, Less Than or Equal to Six Feet

Scenario Description:

Construction of a barrier 6' or less in height, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Payment includes stripping prior to fill placement, excavation of a core trench, and earthfill for embankment. Associated practices include, but are not limited to: PS327 Conservation Cover, PS656 Constructed Wetland, PS342 Critical Area Planting, PS378 Ponds, PS382 Fence, PS464 Irrigation Land Levelling, PS500 Obstruction Removal, PS528 Prescribed Grazing, PS587 Structure for Water Control, PS620 Underground Outlet, PS645 Upland Wildlife Management, PS658 Wetland Creation, PS659 Wetland Enhancement, PS657 Wetland Restoration, PS644 Wetland Wildlife Habitat Management.

Before Situation:

Site is subject to flooding or inundation which poses a potential hazard to public safety, damage to land or property. Site may also require control of water level for purposes connected with crop production; fish and wildlife management; or wetland maint

After Situation:

Water level controlled by a stable earthen structure 6' or less in height. Potential hazard to public safety, land or property mitigated; environmental benefit provided.

Feature Measure: Length of constructed dike

Scenario Unit: Foot

Scenario Typical Size: 1,000.0

Scenario Total Cost: $30,568.44

Total Cost per Unit: $30.57

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 356 - Dike and Levee

Scenario: #3 - Dike, Greater Than Six Feet

Scenario Description:

Construction of a barrier > 6' in height, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Payment includes stripping prior to fill placement, excavation of a core trench, and earthfill for embankment. Associated practices include, but are not limited to: PS327 Conservation Cover, PS656 Constructed Wetland, PS342 Critical Area Planting, PS378 Ponds, PS382 Fence, PS464 Irrigation Land Levelling, PS500 Obstruction Removal, PS528 Prescribed Grazing, PS587 Structure for Water Control, PS620 Underground Outlet, PS645 Upland Wildlife Management, PS658 Wetland Creation, PS659 Wetland Enhancement, PS657 Wetland Restoration, PS644 Wetland Wildlife Habitat Management.

Before Situation:

Site is subject to flooding or inundation which poses a potential hazard to public safety, damage to land or property. Site may also require control of water level for purposes connected with crop production; fish and wildlife management; or wetland maint

After Situation:

Water level controlled by a stable earthen structure > 6' in height. Potential hazard to public safety, land or property mitigated; environmental benefit provided.

Feature Measure: Length of constructed dike

Scenario Unit: Foot

Scenario Typical Size: 1,000.0

Scenario Total Cost: $44,746.08

Total Cost per Unit: $44.75

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 360 - Waste Facility Closure

Scenario: #1 - Decommission, Concrete Storage

Scenario Description:

This practice scenario includes the decommissioning of a concrete storage and/or treatment structure or impoundment. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. This practice scenario does not include payment for the removal and land application of the manure, wastewater, slurry and/or sludge; however, all manure wastes shall be removed and properly land applied in accordance with Nutrient Management (590) prior to decommissioning of the structure. Associated practices: Nutrient Management (590), Critical Area Planting (342)

Before Situation:

An existing concrete waste storage structure is no longer functioning correctly or is not being used for its intended purpose. The structure may or may not contain manure, wastewater, slurry and/or sludge. It poses a safety hazard for humans and livestock

After Situation:

This scenario assumes a concrete waste storage structure with a volume of 48000 cubic feet (200' x 30' x 8') with 8" thick walls. The volume of earthwork (earthfill and/or excavation, final grading) required is approximately 75% of the storage volume. Decommissioning of a concrete waste storage structure will consist of collapsing the concrete sidewalls to 20% of their original height and filling the storage structure with earthfill. The concrete may be disposed off site if necessary. All manure and wastewater nutrient material shall be removed and land applied in accordance with Nutrient Management (590) prior to fill. After collapsing the side walls the remaining void will be filled with earthen material from a borrow source. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342) or planted to crops in accordance with Nutrient Management (590). Removing and properly utilizing the manure and waste water from the impoundment, demolition of any above grade concrete and the fill in of the concrete waste structure will address water quality degradation, air quality impacts and safety hazards The site may also become available for another use.

Feature Measure: Cubic Feet of storage to be

Scenario Unit: Cubic Foot

Scenario Typical Size: 48,000.0

Scenario Total Cost: $11,048.32

Total Cost per Unit: $0.23

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 360 - Waste Facility Closure

Scenario: #2 - Decommission, Earthen Impoundment

Scenario Description:

This practice scenario includes the decommissioning of an earthen storage and/or treatment structure or impoundment (embankment or excavated type) include any basins intended for sediment removal. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. This practice scenario does not include payment for the removal and land application of the manure, wastewater, slurry and/or sludge; however, all manure wastes shall be removed and properly land applied in accordance with Nutrient Management (590) prior to decommissioning of the structure. Associated practices: Nutrient Management (590), Critical Area Planting (342)

Before Situation:

The existing manure, runoff and/or waste water lagoon, storage pond or pit is no longer functioning correctly or is not being used for its intended purpose. The structure may or may not contain manure, wastewater, slurry and/or sludge. It poses a safety h

After Situation:

This scenario assumes a waste storage pond with total storage volume of 100,000 cubic feet over a footprint of 12150 square feet. The volume of earthwork (earthfill and excavation) required to breach the embankment and/or fill in the impoundment and perform final grading of the site is approximately 75% of the storage volume. The volume of earthwork will include 60% as excavation and 40% as compacted earthfill. An additional excavation of 450 cubic yards is assumed to remove contaminated soil below original design over the entire footprint of pond. Structural removal, as necessary, may include the removal and disposal of the synthetic liner, sealing or removal and disposal of waste transfer components and other appurtenances associated with closure of the facility. This practice scenario does not include payment for the removal and land application of the manure, wastewater, slurry and/or sludge; however, all manure wastes shall be removed and properly land applied in accordance with Nutrient Management (590) prior to decommissioning of the structure. If present, the synthetic liner will be removed and properly disposed of. All inflow devices and associated appurtenances will be removed and properly disposed of. The embankment will be breached and the excavation filled in with the embankment material or hauled in earthfill. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342) or planted to crops in accordance to Nutrient Management (590). Closure of the waste impoundment will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment and earthfill of the structure. The site will also become available for another use.

Feature Measure: Storage Volume

Scenario Unit: Cubic Foot

Scenario Typical Size: 100,000.0

Scenario Total Cost: $11,954.85

Total Cost per Unit: $0.12

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 360 - Waste Facility Closure

Scenario: #3 - Convert to Freshwater

Scenario Description:

This practice scenario includes the conversion of an earthen storage and/or treatment structure or impoundment (embankment or excavated type) to fresh water storage. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. This practice scenario does not include payment for the removal and land application of the manure, wastewater, slurry and/or sludge; however, all manure wastes shall be removed and properly land applied in accordance with Nutrient Management (590) prior to decommissioning of the structure. Associated practices: Nutrient Management (590), Critical Area Planting (342)

Before Situation:

The existing manure, runoff and/or waste water lagoon, storage pond or pit is no longer functioning correctly or is not being used for its intended purpose. The structure may or may not contain manure, wastewater, slurry and/or sludge. It poses a safety h

After Situation:

This scenario assumes a waste storage pond with total storage volume of 100,000 cubic feet over a footprint of 12150 square feet. Excavation of 450 cubic yards is assumed to remove contaminated soil below original design over the entire footprint of pond. Structural removal, as necessary, may include the removal and disposal of the synthetic liner, sealing or removal and disposal of waste transfer components and other appurtenances associated with closure of the facility. This practice scenario does not include payment for the removal and land application of the manure, wastewater, slurry and/or sludge; however, all manure wastes shall be removed and properly land applied in accordance with Nutrient Management (590) prior to decommissioning of the structure. If present, the synthetic liner will be removed and properly disposed of. All inflow devices and associated appurtenances will be removed and properly disposed of. The embankment will be breached and the excavation filled in with the embankment material or hauled in earthfill. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342) or planted to crops in accordance to Nutrient Management (590). Closure of the waste impoundment will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment and earthfill of the structure. The site will also become available for another use.

Feature Measure: Cubic feet of structural stor

Scenario Unit: Cubic Foot

Scenario Typical Size: 100,000.0

Scenario Total Cost: $6,440.85

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $0.06

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 360 - Waste Facility Closure

Scenario: #13 - Decommission, Feedlot

Scenario Description:

This practice scenario includes the remediation of the soil on an abandoned feedlot previously used to feed animals on a bare earthen lot. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. Associated practices: Nutrient Management (590), Critical Area Planting (342).

Before Situation:

The feedlot is abandoned. Vegetation has not been reestablished. The high level of nutrients in the soil is preventing volunteer establishment of native vegetation. Rainfall and nutrients on the bare earth feedlot pose a risk to surface water from contami

After Situation:

This scenario is based on a 3 acre feedlot. Surveys and testing have determined the manure pack averages 8 inches in depth and the level of nutrients in the 4 inches of soil below the manure pack is too high to treat insitu with vegetation. Payment under this scenario includes only activities associated with the soil remediation. Soil remediation activities in this scenario include removing the nutrient enriched manure pack and soil, an average of 12 inches below the existing surface (130,680 CF). The excavated surface will be vegetated with a mix of salt tolerant plants in conformance with Critical Area Planting, Code 342. Nutrient level testing and field application of the removed soil shall be performed according to nutrient planning in conformance with Nutrient Management, Code 590. Shaping and crowning of the soil material on the disturbed area and critical area seeding will be done to provide drainage, complete the site remediation and establish vegetation. Operation and maintenance of the site will include nutrient testing the following year to determine if the soil has been remediated and surface and ground water resource concerns have been addressed. In this scenario, samples at four (4) locations will be taken at 6, 12, 18 and 24 inches at the end of Year 1. Fence and feed bunk removal is to be performed under Obstruction Removal, Code 500.

Feature Measure: Acres of soil remediated

Scenario Unit: Acre

Scenario Typical Size: 3.0

Scenario Total Cost: $48,095.51

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $16,031.84

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 360 - Waste Facility Closure

Scenario: #37 - Decommission, Underbarn

Scenario Description:

This practice scenario includes the decommissioning of a concrete waste storage facility which is located under an existing building, which will remain after the waste storage structure is closed. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. This practice scenario does not include payment for the removal and land application of the manure, wastewater, slurry and/or sludge; however, all manure wastes shall be removed and properly land applied in accordance with Nutrient Management (590) prior to decommissioning of the structure. Associated practices: Nutrient Management (590).

Before Situation:

An existing underbarn concrete waste storage structure is no longer functioning correctly or is not being used for its intended purpose. The structure may or may not contain manure, wastewater, slurry and/or sludge. It poses a safety hazard for humans and

After Situation:

This scenario assumes a concrete waste storage structure, which is located under a building, with the top dimensions of 40 ft x 60 ft .x 8 ft total depth with vertical walls, with 10" thick walls. The total structural storage volume of 19,2000 cubic feet. The majority of the walls will remain in place, but a 15' section of wall will be removed as well as breaking up 4, 4' x 4' holes to inspect for contamination and removing the beams and slats on the top of the structure. The rest of the floor or slats are broken up, but doesn't need to be removed. The structure is then filled with material. All manure and wastewater nutrient material shall be removed and land applied in accordance with Nutrient Management (590) prior to fill. Removing and properly utilizing the manure and waste water from the impoundment, demolition of any above grade concrete and the fill in of the concrete waste structure will address water quality degradation, air quality impacts and safety hazards The site may also become available for another use.

Feature Measure: Cubic feet of total storage

Scenario Unit: Cubic Foot

Scenario Typical Size: 19,200.0

Scenario Total Cost: $26,464.38

Total Cost per Unit: $1.38

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 362 - Diversion

Scenario: #1 - Diversion

Scenario Description:

An earthen channel constructed across long slopes with supporting ridge on lower side, to divert runoff away from farmsteads, gullies, critical erosion areas, construction areas or other sensitive areas. Outlet may be waterway, underground outlet. or other suitable outlet. Typical diversion is, 2300 feet long and requires 1 CY excavation per LF. Channel my be level or gradient and ridge may be vegetated or farmed. The quantity of excavation and fill is balanced.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contribu

After Situation:

Diversion is 2300 feet long installed using a dozer and/or scraper. Storm water runoff is diverted away from the area to be protected. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Underground Outlet (620), Mulching (484), and Subsurface Drainage (606).

Feature Measure: Diversion Excavated Volume

Scenario Unit: Cubic Yard

Scenario Typical Size: 2,300.0

Scenario Total Cost: $10,477.62

Total Cost per Unit: $4.56

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 366 - Anaerobic Digester

Scenario: #1 - Anaerobic Digester

Scenario Description:

An anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other by-products of animal agricultural operations will manage odors, reduce the net effect of greenhouse gas emissions, and/or reduce pathogens. This scenario is for a generic anaerobic digester. Energy generation is not included with this scenario. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).

Before Situation:

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed. This sit

After Situation:

Manure and other agricultural by-products are being treated such that odors are managed and/or pathogens are reduced. Effluent from the digester is disposed of or utilized in a proper manner in accordance with a nutrient management plan. The typical scenario also includes items necessary to maintain mesophylic or thermophilic temperatures for bacterial activity (i.e. piping and boiler or other heat source). Typical Design Scenario is each.

Feature Measure: Each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,969,074.26

Total Cost per Unit: $1,969,074.26

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 366 - Anaerobic Digester

Scenario: #7 - Covered Lagoon or Holding Pond

Scenario Description:

A covered lagoon can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other by-products of animal agricultural operations will manage odors, reduce the net effect of greenhouse gas emissions, and/or reduce pathogens. This scenario is for all livestock operation sizes. The waste holding/treatment area is covered by waste treatment lagoon (359) or waste storage facility (313) and the cover is addressed under roofs and covers (367). Selection of digester type will be based on effluent consistency. Costs for this scenario are only for system controls, gas collection, and flaring system. Energy generation is not included with this scenario. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).

Before Situation:

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed. This sit

After Situation:

Manure and other agricultural by-products are being treated such that odors are managed and/or pathogens are reduced. Effluent from the digester is disposed of or utilized in a proper manner in accordance with a nutrient management plan. A covered lagoon/holding pond typically has a flexible top installed over an earthen storage/treatment facility for the purpose of capturing the biogas. Typical Design Scenario: 1,000 animal units (715 - 1,400 lbs. dairy cows).

Feature Measure: Animals Units Contributing t

Scenario Unit: Animal Unit

Scenario Typical Size: 1,000.0

Scenario Total Cost: $485,364.40

Total Cost per Unit: $485.36

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 367 - Roofs and Covers

Scenario: #2 - Roof, Timber or Steel Sheet

Scenario Description:

A timber framed structure without enclosing sidewalls with a timber or steel "sheet" roof and supporting foundation. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues. Associated practices include Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Agrichemical Handling Facility (309), Roof Runoff Structure (558), and Waste Treatment (629).

Before Situation:

Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve of an existing or planned system. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess pr

After Situation:

A timber framed building with a timber or steel "sheet" roof and supporting foundation. Engineered and installed in accordance with appropriate building codes and permits. Typical size is 5,000 square feet and is over an approved animal waste management facility as a component of a CNMP. It is designed to prevent precipitation to allow proper management of animal waste streams (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

Feature Measure: Area under roof

Scenario Unit: Square Foot

Scenario Typical Size: 5,000.0

Scenario Total Cost: $69,444.25

Total Cost per Unit: $13.89

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 367 - Roofs and Covers

Scenario: #3 - Flexible Membrane Cover

Scenario Description:

A fabricated rigid, semi-rigid, or flexible membrane over a waste storage or treatment facility. The membrane will cover the entire surface of a waste storage or treatment facility (e.g. waste treatment lagoon or anaerobic digester). Cover will exclude precipitation and/or capture biogas for controlled release for flaring or anaerobic digestion. This scenario does not include the flare to convert methane to carbon dioxide. Associated practices include Waste Storage Facility (313), Waste Treatment Lagoon (359), Anaerobic Digester (366), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), Pumping Plant (533), and Waste Treatment (629).

Before Situation:

Applicable where the exclusion of precipitation from an animal waste storage or treatment lagoon will improve the management of an existing or planned system, capture and controlled release or flaring of emissions from an existing or planned agricultural

After Situation:

A 50,000 SF fabricated rigid, semi-rigid, or flexible membrane over a waste storage or treatment facility. The membrane will cover the entire surface of a waste storage or treatment facility (e.g. waste treatment lagoon or anaerobic digester). Precipitation is excluded from the animal waste storage or treatment lagoon

Feature Measure: Surface of Membrane

Scenario Unit: Square Foot

Scenario Typical Size: 50,000.0

Scenario Total Cost: $64,306.41

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $1.29

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 367 - Roofs and Covers

Scenario: #4 - Flexible Membrane Cover, Flare

Scenario Description:

A fabricated rigid, semi-rigid, or flexible membrane over a waste storage or treatment facility. The membrane will cover the entire surface of a waste storage or treatment facility (e.g. waste treatment lagoon or anaerobic digester). Cover will exclude precipitation and/or capture biogas for controlled release for flaring or anaerobic digestion. This scenario includes the flare to convert methane to carbon dioxide. Associated practices include Waste Storage Facility (313), Waste Treatment Lagoon (359), Anaerobic Digester (366), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), Pumping Plant (533), and Waste Treatment (629).

Before Situation:

Applicable where the exclusion of precipitation from an animal waste storage or treatment lagoon will improve the management of an existing or planned system, capture and controlled release or flaring of emissions from an existing or planned agricultural

After Situation:

A 50,000 SF fabricated rigid, semi-rigid, or flexible membrane over a waste storage or treatment facility. The membrane will cover the entire surface of a waste storage or treatment facility (e.g. waste treatment lagoon or anaerobic digester). This scenario includes the flare to convert methane to carbon dioxide.

Feature Measure: Surface of Membrane

Scenario Unit: Square Foot

Scenario Typical Size: 50,000.0

Scenario Total Cost: $536,056.41

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $10.72

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 368 - Emergency Animal Mortality Management

Scenario: #185 - Shallow Burial, Swine or Cattle

Scenario Description:

This scenario consists of the disposal of animal carcasses by burial in a shallow trench resulting from impacts related to the National Emergency. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, and organics being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. This scenario has been written to exclude feathered animals since early research has indicated that feathered animals do not break down quickly using this method. Potential Associated Practices: Critical Area Planting (342), Nutrient Management (590), Access Road (560), Fence (384)

Before Situation:

Animal mortality disposal is done in a manner that results in non-point source pollution of excessive nutrients, and organics being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomp

After Situation:

Emergency animal mortalities resulting from causes not related to disease are being buried in a shallow trench, that prevents non-point source pollution of excessive nutrients, and organics being transported into surface and groundwater resources. The is a new method of mortality disposal recommended by APHIS. 50 animal units (50,000 pound) of animal mortality is the maximum allowed for this method. Proper operation results in little to no odors, and protection from predators to minimize pathogen survival or spreading. An overall plan covers the disposal of animals as a result of catastrophic mortality events. This typical scenario was developed based on the disposal of livestock animal mortality by burial in an 18 inch deep by 8 foot wide trench. A 12 inch thick layer of carbon material is placed in the bottom of the trench. The carcass is placed in the trench and covered with 4 inches of carbon material. Then the excavated soil is placed over the entire trench area. The scenario includes equipment time and labor to excavate the trench, place carbon layer in the trench bottom, recover and transport carcasses to the shallow burial location, place carcasses in the trench and cover with more carbon and the excavated soil. Wood chips (45 pcf) will be used as the carbon source.

Feature Measure: Number of 1000 lbs. Animal

Scenario Unit: Animal Unit

Scenario Typical Size: 50.0

Scenario Total Cost: $10,659.35

Total Cost per Unit: $213.19

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 368 - Emergency Animal Mortality Management

Scenario: #201 - Composting, Carbon Material and Mobilization

Scenario Description:

This scenario consists of the disposal of animal carcasses by composting in a static windrow resulting from impacts related to the National Emergency. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, and organics being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. Potential Associated Practices: Critical Area Planting (342), Nutrient Management (590), Access Road (560)

Before Situation:

Animal mortality disposal is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors from incomplete composti

After Situation:

Emergency animal mortalities resulting from causes not related to disease are being disposed by composting in a static windrow that prevents non-point source pollution of excessive nutrients, and organics being transported into surface and groundwater resources. Proper operation results in little to no odors, and protection from predators. An overall plan covers the disposal of animals as a result of catastrophic mortality events. This typical scenario was developed based on the disposal of 30,000 pounds of animal mortality by composting on-site. The scenario includes equipment time and labor to recover and transport carcasses to the composting location and the building and turning of the pile at the appropriate time. Composting requires 5 cubic yards of carbon material per 1000 pounds of animal. Wood chips (45 pcf) will be used as the carbon source.

Feature Measure: Number of 1000 lbs. Animal

Scenario Unit: Animal Unit

Scenario Typical Size: 30.0

Scenario Total Cost: $17,909.67

Total Cost per Unit: $596.99

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 368 - Emergency Animal Mortality Management

Scenario: #217 - Incineration, Landfill or Render

Scenario Description:

This scenario consists of the disposal of animal carcasses by methods other than burial, incineration, landfill or rendering resulting from impacts related to the National Emergency. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. Potential Associated Practices: Critical Area Planting (342), Nutrient Management (590), Access Road (560)

Before Situation:

Animal mortality disposal is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens

After Situation:

Emergency animal mortalities resulting from causes not related to disease are being disposed in a manner, other than burial, incineration, landfill or rendering, that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, and protection from predators to minimize pathogen survival or spreading. An overall plan covers the disposal of animals as a result of catastrophic mortality events. This typical scenario was developed based on the disposal of livestock carcasses by composting on-site. The scenario assumes the grower will provide all equipment and labor and that 50% of the carbon for composting is available on-site.

Feature Measure: Number of 1000 lbs. Animal

Scenario Unit: Animal Unit

Scenario Typical Size: 30.0

Scenario Total Cost: $12,066.49

Total Cost per Unit: $402.22

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 368 - Emergency Animal Mortality Management

Scenario: #281 - Burial

Scenario Description:

This scenario consists of the on-site burial of animal mortalities resulting from impacts related to the National Emergency. An earthen pit is excavated to contain the mortalities, and earth cover is placed over the mortalities to provide protection from predators to minimize pathogen survival or spreading. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), and Diversion (362).

Before Situation:

Animal mortality disposal is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens

After Situation:

Catastrophic Animal mortalities resulting from causes not related to disease are being disposed in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, and protection from predators to minimize pathogen survival or spreading. An overall plan covers the burial of animals as a result of catastrophic mortality events. This typical scenario was developed based on the disposal of 25 head of mature cattle located near the area where the cattle have been found. The scenario includes equipment time and labor to recover and transport carcasses to the burial location. The scenario also includes a burial trench 4' deep plus 3' additional cover over carcasses. Construct a 6' x 60' (surface dimensions) burial site with appropriate cover. Site can handle mortality for 25 mature beef cattle. On site soils can be recompacted to meet required imperviousness. Include 3' overfill or mounding excavated material to provide for settlement of the burial site and divert or minimize offsite runoff. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area.

Feature Measure: Number of 1000 lbs. Animal

Scenario Unit: Animal Unit

Scenario Typical Size: 25.0

Scenario Total Cost: $4,010.29

Total Cost per Unit: $160.41

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 371 - Air Filtration and Scrubbing

Scenario: #3 - Traditional Horizontal Biofilter

Scenario Description:

Porous filter media is utilized to filter the exhaust from animal confinement facilities to allow microbial activity to reduce objectionable odors. The typical installation is a horizontal media bed supported by a treated lumber substructure to allow airflow from multiple fans to be directed beneath and then up through the media. Vertical biofilters may also be utilized. The filter media is a combination of wood chips to maintain porosity and compost to provide the microorganisms for the air filtering activity. A typical mix ratio would be 80% wood chips and 20% compost. Ventilation system component alterations that may be required to facilitate the biofilter application are not included in the cost computation. Payment includes materials, equipment, and labor costs for installing the biofilter. A stabilized area around the biofilter is not included and must be addressed through the associated practice of Heavy Use Area Protection (561), if needed. Resource concern: Air – Objectionable Odors

Before Situation:

The animal confinement facility has an uncontrolled airflow that is causing objectionable odors.

After Situation:

A 32' X 200" horizontal media bed, 20" thick is supported by a treated lumber substructure to allow airflow to be directed beneath and then up through the media is installed adjacent to a swine production facility. Exhaust from the facility is directed to flow through the biofilter media to reduce objectionable odors. Maintain ace of the media bed will be required on a 3-5 year cycle to maintain effectiveness. Associated practices include Heavy Use Area Protection (561), Amendments for Treatment of Agricultural Waste (591), Windbreak (380), Waste Storage Facility (313), Composting Facility (317), and CAP-Comprehensive Air Quality Management Plan (126).

Feature Measure: Biofilter Media Volume

Scenario Unit: Cubic Yard

Scenario Typical Size: 395.0

Scenario Total Cost: $19,583.17

Total Cost per Unit: $49.58

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 371 - Air Filtration and Scrubbing

Scenario: #6 - Single Pit Fan Biofilter

Scenario Description:

Establishment of a biofilter used to treat the air flow from a single waste pit ventilation fan in instances where control of the exhaust from all pit ventilation fans is not needed. Adequate moisture in the wood chip media is maintained for proper growth of bacteria. For each waste pit ventilation fan servicing a waste storage facility that is identified as exhausting odorous and/or particulate laden air into the atmosphere, a separate biofilter is installed. Payment includes materials, equipment, and labor costs for installing the biofilter. A stabilized area around the biofilter is not included and must be addressed through the associated practice of Heavy Use Area Protection (561), if needed.

Before Situation:

One or more pit ventilation fans of a manure storage facility on a Headquarters site are exhausting odorous and/or particulate laden air into the atmosphere.

After Situation:

Air Quality resource concerns are addressed through installation of the practice by reducing odors and/or particulate matter emissions. Exhaust from a 24” waste pit ventilation fan is piped to a 16’ wide by 20’ long by 4’ high horizontal biofilter constructed of a formed concrete bin that is filled with wood chip media, capable of handling 5,500 cubic feet per minute of airflow. The loading of odor and/or particulates into the air at the production facility is significantly reduced, resulting in a substantial improvement in air quality. Ammonia emissions are reduced approximately 60%; hydrogen sulfide about 80% and odor 60 to 80%. Associated practices include Heavy Use Area Protection (561), Amendments for Treatment of Agricultural Waste (591), Windbreak (380), Waste Storage Facility (313)and CAP-Comprehensive Air Quality Management Plan (126).

Feature Measure: Number of Biofilters Installe

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $24,030.37

Total Cost per Unit: $24,030.37

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 372 - Combustion System Improvement

Scenario: #2 - Combustion Engine Replacement, 50 to 99 Brake Horsepower

Scenario Description:

Older diesel engine replaced with new diesel engine repower (50-99 bhp). The existing diesel engine may be stationary or portable operating an irrigation pump or an auxiliary engine providing mechanical function for agricultural/forestry equipment. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

Before Situation:

An old or inefficient diesel engine powers an irrigation pumping plant or grain dryer fan, or is a backup power generation for a farming operation. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute

After Situation:

The repowered diesel engine (50-99 bhp) replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no costs have been included for a new pad. Additional costs may be incurred if a concrete pad is not present. For Air Quality: The repower diesel engine will be cleaner-burning and will emit less particulate matter and/or oxides of nitrogen than the previous existing engine. For Energy: Energy efficiency will be improved by at least 20%; the increase in energy efficiency for the modified unit must be supported by an energy analysis.

Feature Measure: Number of Engines Replace

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $15,377.91

Total Cost per Unit: $15,377.91

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 372 - Combustion System Improvement

Scenario: #3 - Combustion Engine Replacement, 100 to 199 Brake Horsepower

Scenario Description:

Older diesel engine replaced with new diesel engine repower (100-199 bhp). The existing diesel engine may be stationary or portable operating an irrigation pump or an auxiliary engine providing mechanical function for agricultural/forestry equipment. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

Before Situation:

An old or inefficient diesel engine powers an irrigation pumping plant or grain dryer fan, or is a backup power generation for a farming operation. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute

After Situation:

The repowered diesel engine (100-199 bhp) replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no costs have been included for a new pad. Additional costs may be incurred if a concrete pad is not present. For Air Quality: The repower diesel engine will be cleaner-burning and will emit less particulate matter and/or oxides of nitrogen than the previous existing engine. For Energy: Energy efficiency will be improved by at least 20%; the increase in energy efficiency for the modified unit must be supported by an energy analysis.

Feature Measure: Number of Engines Replace

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $23,417.28

Total Cost per Unit: $23,417.28

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 372 - Combustion System Improvement

Scenario: #6 - Combustion Engine to Electric Motor, 12 to 74 Horsepower

Scenario Description:

Replace an existing IC engine operating an irrigation well with a new electric motor (12-74 HP). An existing IC engine is stationary or portable (does not propel a vehicle and is not an auxiliary IC engine on a vehicle). This replacement provides the greatest emission reductions by eliminating NOx, VOC, and PM emissions from the source. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

Before Situation:

Irrigation pump with IC engine withdraws water from a well and provides water through a center pivot irrigation system. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource c

After Situation:

The electric motor replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no costs have been included for a new pad. Additional costs may be incurred if a concrete pad is not present. For Air Quality: The electric motor does not produce any on-farm emissions of oxides of nitrogen or particulate matter, resulting in a substantial emissions reduction on the farm. For Energy: Energy efficiency will be improved by at least 20%. For Plant Condition: Plant condition and vigor will be improved. For Water Quality: The potential for environmental damage due to leaks from the tanks and fuel lines has been eliminated. Plant uptake of available nutrients will be increased and less nutrients will be lost to surface and ground waters.

Feature Measure: Number of Combustion Uni

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $6,728.60

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $6,728.60

Practice: 372 - Combustion System Improvement

Scenario: #7 - Combustion Engine to Electric Motor, 75 to 149 Horsepower

Scenario Description:

Replace an existing IC engine operating an irrigation well with a new electric motor (75-149 HP). An existing IC engine is stationary or portable (does not propel a vehicle and is not an auxiliary IC engine on a vehicle). This replacement provides the greatest emission reductions by eliminating NOx, VOC, and PM emissions from the source. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

Before Situation:

Irrigation pump with IC engine withdraws water from a well and provides water through a center pivot irrigation system. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource c

After Situation:

The electric motor replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no costs have been included for a new pad. Additional costs may be incurred if a concrete pad is not present. For Air Quality: The electric motor does not produce any on-farm emissions of oxides of nitrogen or particulate matter, resulting in a substantial emissions reduction on the farm. For Energy: Energy efficiency will be improved by at least 20%. For Plant Condition: Plant condition and vigor will be improved. For Water Quality: The potential for environmental damage due to leaks from the tanks and fuel lines has been eliminated. Plant uptake of available nutrients will be increased and less nutrients will be lost to surface and ground waters.

Feature Measure: Number of Combustion Uni

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $12,640.40

Total Cost per Unit: $12,640.40

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 374 - Energy Efficient Agricultural Operation

Scenario: #1 - Ventilation, Exhaust

Scenario Description:

Replacement of a conventional exhaust fan with high volume, low speed, efficient exhaust fan. Fans being installed should be models previously tested by BESS Lab or the Air Movement and Control Association and be in top 20 percentile of fans tested. Practice certification will be through receipts and pictures from the applicant. Typical scenario includes the replacement of a 48" fan.

Before Situation:

Inefficient ventilation in an agricultural building.

After Situation:

High-efficiency ventilation system which reduces energy use. The new ventilation equipment will provide suitable air quality and reduce overall power requirements (kW) compared to the existing ventilation system as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $2,287.74

Total Cost per Unit: $2,287.74

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 374 - Energy Efficient Agricultural Operation

Scenario: #2 - Ventilation, Horizontal Air Flow

Scenario Description:

A system of fans are installed to create a horizontal air circulation pattern; the new system promotes efficient heat and moisture distribution. In a typical 10,000 square foot greenhouse, 10 HAF fans are needed. Fan performance meets Energy Audit efficiency criteria as tested by AMCA or BESS Labs.

Before Situation:

Inefficient air circulation system in a greenhouse.

After Situation:

High-efficiency air circulation system which reduces energy use. The new equipment will provide suitable air quality and reduce overall power requirements (kW) compared to the existing system as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $277.31

Total Cost per Unit: $277.31

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 374 - Energy Efficient Agricultural Operation

Scenario: #3 - Plate Cooler, Small

Scenario Description:

The installation of all stainless steel dual pass plate cooler, type 316 stainless steel. Practice certification will be through receipts and pictures from the applicant.

Before Situation:

Inefficient milk cooling (minimal pre-cooling of milk before entering the bulk tank).

After Situation:

High-efficiency milk cooling system which reduces energy use. The new milk cooling equipment will pre-cool the milk and reduce overall power requirements (kW) compared to the existing milk cooling system (where most of the cooling was accomplished in the bulk tank) as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $6,213.31

Total Cost per Unit: $6,213.31

Based on North Dakota average costs. Individual county costs may vary.

Practice: 374 - Energy Efficient Agricultural Operation

Scenario: #4 - Plate Cooler

Scenario Description:

The installation of all stainless steel dual pass plate cooler, type 316 stainless steel. Practice certification will be through receipts and pictures from the applicant.

Before Situation:

Inefficient milk cooling (minimal pre-cooling of milk before entering the bulk tank).

After Situation:

High-efficiency milk cooling system which reduces energy use. The new milk cooling equipment will pre-cool the milk and reduce overall power requirements (kW) compared to the existing milk cooling system (where most of the cooling was accomplished in the bulk tank) as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $42,135.32

Total Cost per Unit: $42,135.32

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 374 - Energy Efficient Agricultural Operation

Scenario: #5 - Scroll Compressor

Scenario Description:

Install a new scroll compressor, associated controls, wiring, and materials to retrofit an existing refrigeration system. A new condenser is not included in this typical scenario. Typical scenario includes a new 5 horsepower scroll compressor.

Before Situation:

Inefficient reciprocating compressor as a key component of the refrigeration system used to cool milk. The compressor is a critical part of a milk cooling system, affecting milk quality, system reliability, and system efficiency.

After Situation:

A more efficient scroll compressor, which will reduce energy use, is evidenced by the energy audit. A comparably sized scroll compressor provides refrigeration capacity at a higher efficiency than a reciprocating compressor. Newer scroll compressor systems typically reduce electricity use by 15 to 25 percent compared to reciprocating compressors. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Horse Power

Scenario Unit: Horsepower

Scenario Typical Size: 5.0

Scenario Total Cost: $3,703.15

Total Cost per Unit: $740.63

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 374 - Energy Efficient Agricultural Operation

Scenario: #6 - Variable Speed Drive, Less Than 5 Horsepower

Scenario Description:

The typical scenario consists of a variable speed drive (VSD) and appurtenances, such as hook-ups, control panels, wiring, control blocks, filters, switches, pads, etc. attached to an electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production. The motor size, on which the VSD is added, is less than 5 HP.

Before Situation:

The system is inefficient when a motor operates at constant speed to satisfy a load which varies as to flow rate and/or pressure requirements.

After Situation:

An on-farm energy audit has determined that energy use can be reduced through use of a VSD to control electric motors. After the VSD is applied, the motor speed can be adjusted to reduce power requirements and better match varied flow or pressure requirements. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: HP

Scenario Unit: Horsepower

Scenario Typical Size: 1.0

Scenario Total Cost: $1,104.86

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $1,104.86

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 374 - Energy Efficient Agricultural Operation

Scenario: #12 - Radiant System

Scenario Description:

Replace "pancake" Brood Heaters in a poultry house with Radiant Tube Heaters, or similar. Replacement will require the materials and labor to remove existing heating system, re-plumb gas lines, cables and wench system to retrofit new radiant tube heaters, and miscellaneous items to complete the installation. Alternate acceptable radiant heating systems can include radiant brooders and quad radiant systems as evidenced by the energy audit. The typical scenario consists of the replacement of 28 brood heaters with 6 radiant tube heaters.

Before Situation:

Inefficient heat distribution equipment, such as conventional "pancake" brood heaters. The Pancake brooder, mounted at a low installation height, primarily warms the air. They provide a one-to-two foot perimeter at desired temperatures around each brooder

After Situation:

Energy use is reduced through installation of a more efficient heater. Radiant tube heaters primarily warm objects within a direct line of sight (similar to the sun or an open fire). Air temperature is of relatively little importance for a radiant heating systems to be effective. As a result, radiant systems are typically installed 5' or more above the floor level. This height extends the distribution of the radiant heat over a larger area than is possible with pancake style heaters. A roughly 16' diameter radiant heat zone heats over twice that of a conventional pancake brooder. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 6.0

Scenario Total Cost: $11,265.31

Total Cost per Unit: $1,877.55

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 374 - Energy Efficient Agricultural Operation

Scenario: #13 - Heater, High Efficiency

Scenario Description:

Replace existing low efficiency heaters with new high efficiency heaters. High-efficiency heating systems include any heating unit with efficiency rating of 80%+ for fuel oil and 90%+ for natural gas and propane. Applications may be air heating/building environment and hydronic (boiler) heating for agricultural operations, including under bench, or root zone heating. An alternative to heater replacement might be the addition of climate control system and electronic temperature controls with +/- 1 degree F differential, to reduce the annual run time.

Before Situation:

Buildings heated with low efficiency heaters or heaters without proper electronic climate controls

After Situation:

Higher efficiency heaters reduce energy consumption, energy costs, and GHG emissions. These replacement systems can be fueled by natural gas, propane, or fuel oil. Associated practices/activities: 122-AgEMP - HQ and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Rated Heat Output

Scenario Unit: 1,000 BTU/Hour

Scenario Typical Size: 750.0

Scenario Total Cost: $18,105.69

Total Cost per Unit: $24.14

Based on North Dakota average costs. Individual county costs may vary.

Practice: 374 - Energy Efficient Agricultural Operation

Scenario: #14 - Attic Heat Recovery Vents

Scenario Description:

Install actuated inlets or automatic latching gravity inlets that draw warmer, drier air from the attic to assist with moisture and heat control when ventilation fans are being operated in poultry houses and swine barns. Other systems to transfer heat, as detailed in ASABE S612-compliant energy audit may also be used. Based on a 40' x 500' poultry house.

Before Situation:

Heated buildings with attic spaces but no means to transfer heat between the heated space, attic, and ambient (outside) air when relative conditions allow for reduced energy use.

After Situation:

Attic vents or inlets allow dry warm air from the attic to circulated through out the building. By using pre-warmed air from the attic less energy is needed for heating 122-AgEMP - HQ and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each inlet

Scenario Unit: Each

Scenario Typical Size: 14.0

Scenario Total Cost: $3,323.75

Total Cost per Unit: $237.41

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 374 - Energy Efficient Agricultural Operation

Scenario: #40 - Variable Speed Drive, Greater Than 15 Horsepower

Scenario Description:

The typical scenario consists of a variable speed drive (VSD) and appurtenances, such as hook-ups, control panels, wiring, control blocks, filters, switches, pads, etc. attached to an electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production. The motor size, on which the VSD is added, is larger than 15 HP.

Before Situation:

The system is inefficient when a motor operates at constant speed to satisfy a load which varies as to flow rate and/or pressure requirements.

After Situation:

An on-farm energy audit has determined that energy use can be reduced through use of a VSD to control electric motors. After the VSD is applied, the motor speed can be adjusted to reduce power requirements and better match varied flow or pressure requirements. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: HP

Scenario Unit: Horsepower

Scenario Typical Size: 50.0

Scenario Total Cost: $7,229.53

Total Cost per Unit: $144.59

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 374 - Energy Efficient Agricultural Operation

Scenario: #160 - Alley Scraper

Scenario Description:

The application of this practice consists of the installation of an electric powered alley scraper system to replace the use of tractors or skid steers for scraping and transferring manure in barn alleyways. Approximately 1 scraper is needed per 60 head of cows.

Before Situation:

The scraping and transferring manure with tractors or skid steers use energy inefficiently. Inefficient energy use, greenhouse gas emissions by mobile combustion equipment, and a recommendation to implement the improvement has been identified by an ASABE

After Situation:

A new, electric, alley scraper is installed to minimize the use of combustion systems for scraping and transferring manure. An analysis of the estimated annual energy savings is completed that includes estimating the annual gallons of fuel saved. Greenhouse gas emission reductions are computed and offset by the annual electric consumption of the alley scraper. The tractor or skid steer will not be used to scrape and transfer manure where the ally scraper is installed. Associated activities: CEMA 228 Agricultural Energy Assessment, DIA 120 Agricultural Energy Design.

Feature Measure: Number of alley scrapers

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $32,167.21

Total Cost per Unit: $32,167.21

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 374 - Energy Efficient Agricultural Operation

Scenario: #176 - System, Automatic Controller

Scenario Description:

The application of this practice consists of an automatic control system installed on a manually controlled agricultural system that is functioning. Typical components may include, but are not limited to, any of the following: wiring, sensors, data logger, logic controller, software, switches, and relay. The new automatic control system will be used to reduce energy use by equipment, or to reduce fuel use by mobile equipment that is used to travel to manually verify or adjust systems.

Before Situation:

A manually controlled system uses energy inefficiently in an agricultural operation. To reduce energy use, the system should be modified to either automatically control equipment directly or to minimize travel by vehicles, trucks, tractors, etc. to manual

After Situation:

Energy use is reduced by proper controls of equipment or by reducing the number of trips by vehicles to monitor and control equipment. An analysis of the estimated annual energy savings is completed. Associated activities: CEMA 228 Agricultural Energy Assessment, DIA 120 Agricultural Energy Design.

Feature Measure: Number

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,724.77

Total Cost per Unit: $1,724.77

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 374 - Energy Efficient Agricultural Operation

Scenario: #192 - Telemetry

Scenario Description:

The application of this practice consists of an automatic control system with wireless communications installed on a manually controlled agricultural system that is functioning. Typical components may include, but are not limited to, any of the following: wiring, sensors, data logger, logic controller, communication link, software, switches, and relay. The new automatic control system will be used to reduce energy use by equipment, or to reduce fuel use by mobile equipment that is used to travel to manually verify or adjust systems.

Before Situation:

A manually controlled system uses energy inefficiently in an agricultural operation. To reduce energy use, the system should be modified to either automatically control equipment directly or to minimize travel by vehicles, trucks, tractors, etc. to manual

After Situation:

Energy use is reduced by proper controls of equipment or by reducing the number of trips by vehicles to monitor and control equipment. An analysis of the estimated annual energy savings is completed. Associated activities: CEMA 228 Agricultural Energy Assessment, DIA 120 Agricultural Energy Design.

Feature Measure: Number

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $2,273.43

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $2,273.43

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 378 - Pond

Scenario: #1 - Excavated Pond

Scenario Description:

A low-hazard water impoundment structure on agricultural lands to maintain or improve water quality and to provide water for livestock, fish and wildlife, recreation, fire control, developing renewable energy systems and other related uses. Pond is created solely by excavation and impounds less than 3 feet against the embankment or spoil. Excavated material is spoiled, not placed in a designed embankment. Earthen spillway is constructed as needed. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition.

Before Situation:

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control or developing renewable energy systems, and other related uses, and to maintain or improve water quality. Failure of the pond will not result in

After Situation:

The typical pond is constructed by excavating 3000 cubic yards and spreading the spoil outside the pool area using a dozer or similar excavation equipment. Vegetation will be completed under critical area planting (342). Other associated practices include 382, 516, 521A, 533, 614, 587, 396.

Feature Measure: Excavated Volume

Scenario Unit: Cubic Yard

Scenario Typical Size: 3,000.0

Scenario Total Cost: $9,850.52

Total Cost per Unit: $3.28

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 378 - Pond

Scenario: #5 - Embankment Pond with greater than or equal to 24 inch Pipe

Scenario Description:

An earthen embankment dam with a principle spillway pipe greater than or equal to 24 inches, anti-seep collars or sand diaphragm, and excavated plunge pool basin. A low-hazard water impoundment structure on agricultural land to maintain or improve water quality and to provide water for livestock, fish and wildlife, recreation, fire control, developing renewable energy systems and other related uses. An earthen embankment will be constructed with a principle spillway conduit and earthen auxiliary spillway, as designed. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Cost estimate is based upon a typical amount of earthfill of 10,000 cubic yards, corrugated metal drop inlet principle spillway with a 11 ft riser and 100 ft barrel, and 82 Square feet of anti-seep collars. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control or developing renewable energy systems, and other related uses, and to maintain or improve water quality. Failure of the embankment will not res

After Situation:

The typical pond is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and creating an embankment. The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The earthen auxiliary spillway will be constructed as designed, and a principle spillway pipe will be used. Vegetation will be completed under critical area planting (342). Other associated practices include 382, 516, 521A, 533, 614, 587, 396.

Feature Measure: Cubic Yards of Earthfill

Scenario Unit: Cubic Yard

Scenario Typical Size: 10,000.0

Scenario Total Cost: $60,137.79

Total Cost per Unit: $6.01

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 378 - Pond

Scenario: #64 - Rehab Embankment Pond, With Principal Spillway

Scenario Description:

A previously built earthen embankment dam with a principal spillway pipe that is greater than 24" in diameter. Previously installed structure had embankment and pipe failure, and is in need of new pipe installation and embankment repair. Cost estimate is based upon shaping side slopes, replacing pipe and riser, and replacing with a typical amount of earthfill of 4250 cubic yards. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the structure and impacting the downstream water quality. Also presents a safety hazard of potential dam failure. Erosion from the gullies is allowing soil and possibly nutrients to be transpo

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

Feature Measure: Diameter Inch Foot of Barre

Scenario Unit: Diameter Inch Foot

Scenario Typical Size: 2,400.0

Scenario Total Cost: $36,507.49

Total Cost per Unit: $15.21

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 380 - Windbreak/Shelterbelt Establishment and Renovation

Scenario: #5 - Machine Plant Trees

Scenario Description:

Tree planting consisting of 2500 feet of trees for wind protection, energy conservation, wildlife habitat, air quality, snow management or to provide a visual screen. The planting may consist of shrubs, hardwood trees, conifers, or a combination. Trees and shrubs planted with a tree planting machine. Shrubs will be planted with a spacing of 4 to 6 feet and hardwoods/conifers 8 to 12 feet apart in the row with rows 16 feet apart. The scenario will include 1/4 shrubs, 1/2 hardwoods, and 1/4 conifers based on feet of trees. Herbivores (deer, rabbits, etc.) are NOT expected to browse tree seedlings, tree protection is not needed. This practice is typically applied to crop, pasture or range lands. This scenario includes an herbicide application to significantly reduce competition from annual and perennial grass weeds in the windbreak. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

Before Situation:

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screen or management of snow deposition

After Situation:

Wind velocity suitably reduced to minimize soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening.

Feature Measure: length of planted windbrea

Scenario Unit: Foot

Scenario Typical Size: 2,500.0

Scenario Total Cost: $1,860.80

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $0.74

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 380 - Windbreak/Shelterbelt Establishment and Renovation

Scenario: #6 - Machine Plant Trees with Tubes

Scenario Description:

Tree planting consisting of 2500 feet of trees for wind protection, energy conservation, wildlife habitat, air quality, snow management or to provide a visual screen. The planting may consist of shrubs, hardwood trees, conifers, or a combination. Trees and shrubs planted with a tree planting machine. Shrubs will be planted with a spacing of 4 to 6 feet and hardwoods/conifers 8 to 12 feet apart in the row with rows 16 feet apart. The scenario will include 1/4 shrubs, 1/2 hardwoods, and 1/4 conifers based on feet of trees. Herbivore (deer, rabbits, etc.) damage is likely, so each tree must be protected with a rigid tube tree shelter. This practice is typically applied to crop, pasture or range lands. This scenario includes an herbicide application to significantly reduce competition from annual and perennial grass weeds in the windbreak. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

Before Situation:

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screen or management of snow deposition

After Situation:

Wind velocity suitably reduced to minimize soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening.

Feature Measure: length of planted windbrea

Scenario Unit: Foot

Scenario Typical Size: 2,500.0

Scenario Total Cost: $3,961.30

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $1.58

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 380 - Windbreak/Shelterbelt Establishment and Renovation

Scenario: #84 - Renovation, Greater Than 8 Inches Diameter Breast Height, Machine Plant

Scenario Description:

Windbreak/shelterbelt renovation to remove and replace deteriorated, damaged, diseased, or unsuitable trees or shrubs. The treatment may include removal of entire rows, or removal of selected trees/shrubs in order to prepare for the necessary planting of replacement trees and shrubs within the footprint of an existing windbreak, to improve the health and function of the windbreak. The treatment uses mechanized equipment to remove trees and/or shrubs with average DBH > 8 inches. Trees and shrubs are cleared with a Dozer. All slash material from cutting and pruning is either scattered and crushed, piled and crushed, chipped, or removed from the treatment area. Machine planting is used to replace the trees/shrubs that were removed, to improve the effectiveness and longevity of the windbreak. Various types and combinations of plant materials may be used, including bare root and/or containerized trees/shrubs, and conifer and/or deciduous species or mixtures. Windbreak width of 60' and length of 726' are used in calculations; this is equivalent to an area of 1 acre. For planting that expands the footprint of an existing windbreak, use scenarios for Windbreak/Shelterbelt Establishment. Resource concerns include: Plant pest pressure, Plant productivity and health, Inadequate livestock shelter, Wind erosion.

Before Situation:

The health of trees and/or shrubs in a windbreak/shelterbelt has degraded as plants age, or plants may have been damaged by weather events or pests, decreasing the effectiveness of the original windbreak design. Plants lack leaf cover, have dead branches,

After Situation:

The integrity of 726 linear feet (one acre) of windbreak/ shelterbelt has been restored and is functioning properly to reduce wind impacts to plants, animals, humans, and structures.

Feature Measure: Length of Restoration

Scenario Unit: Foot

Scenario Typical Size: 726.0

Scenario Total Cost: $3,427.12

Total Cost per Unit: $4.72

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 380 - Windbreak/Shelterbelt Establishment and Renovation

Scenario: #111 - Renovation, Sod Release

Scenario Description:

Renovation to reduce competition from grass sod around trees/shrubs within a windbreak/shelterbelt. Apply appropriate herbicide to stress or kill competing sod vegetation between and/or within tree/shrub rows. The herbicide application is completed to significantly reduce competition from sod (grass) in the windbreak. Use WIN-PST or equivalent approved tool to evaluate herbicide impacts. Windbreak width of 60' and length of 726' are used in calculations, resulting in an area of 1 acre.

Before Situation:

The health of an existing windbreak/shelterbelt is deteriorating due to competition with grass sod. Trees/shrubs are dying or growth rate is reduced, and the windbreak/shelterbelt is not functioning as intended.

After Situation:

The integrity of 726 linear feet (one acre) of windbreak/ shelterbelt has been restored and it is functioning properly to reduce wind impacts to plants, animals, humans, and structures.

Feature Measure: Length of Renovation

Scenario Unit: Foot

Scenario Typical Size: 726.0

Scenario Total Cost: $480.25

Total Cost per Unit: $0.66

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 380 - Windbreak/Shelterbelt Establishment and Renovation

Scenario: #112 - Coppicing

Scenario Description:

Coppicing of selected trees and understory vegetation in a windbreak/shelterbelt is needed to ensure that species composition and stand structure continue to serve their intended purpose. Windbreak/shelterbelt renovation is carried out through manipulating species composition, structure, and stocking by the cutting of selected trees and understory vegetation for coppicing and by removing or disposing of slash so as to not interfere with the windbreak/shelterbelt renovation or other management operations. Windbreak width of 60' and length of 726' are used in calculations; this is equivalent to an area of 1 acre. For planting that expands the footprint of an existing windbreak, use scenarios for Windbreak/Shelterbelt Establishment. Resource concerns include: Plant pest pressure, Plant productivity and health, Plant composition and structure, Inadequate livestock shelter, Wind erosion.

Before Situation:

The health of trees and/or shrubs in a windbreak/shelterbelt has degraded as plants age, or plants may have been damaged by weather events or pests, decreasing the effectiveness of the original windbreak design. Plants lack leaf cover, have dead branches,

After Situation:

The integrity of 726 linear feet (one acre) of windbreak/shelterbelt has been restored and is functioning properly to reduce wind impacts to plants, animals, humans, and structures.

Feature Measure: Area of Renovation

Scenario Unit: Foot

Scenario Typical Size: 726.0

Scenario Total Cost: $2,617.77

Total Cost per Unit: $3.61

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 380 - Windbreak/Shelterbelt Establishment and Renovation

Scenario: #125 - One Row, Small

Scenario Description:

One row of containerized shrubs planted to address resource concerns; Inefficient Energy Use, Air Quality Impacts and/or Fish and Wildlife Habitat. This practice is typically applied on cropland at field edges and around homesteads.

Before Situation:

Agricultural field or farmstead needing protections from wind, additional wildlife food and cover, odor mitigation, visual screening. The area generally includes arid or drought conditions that greatly reduce the success of tree survival.

After Situation:

A windbreak of containerized shrubs is installed by hand planting shrubs 6 ft apart. Wind velocity suitably diminished to reduce soil erosion or energy loss. Additional wildlife food and cover, mixing of odor plumes and visual screening. Greatly improved success rate of the windbreak due to the supplemental water during establishment.

Feature Measure: Length of windbreak row

Scenario Unit: Foot

Scenario Typical Size: 100.0

Scenario Total Cost: $488.22

Total Cost per Unit: $4.88

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 382 - Fence

Scenario: #1 - Barbed Wire, Multi-Strand

Scenario Description:

Multi-strand, Barbed Wire - Installation of fence will allow for implementation of a grazing management plan that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Constructed using fencing materials rather than a pre-manufactured gate. The fence is typically 4 strands over 3/4 of a mile (3,960 ft).

Before Situation:

On grazing lands, health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, cattle access to water bodies is uncontrolled.

After Situation:

Installation of interior fencing will allow for implementation of a grazing management plan that allows adequate rest and recovery periods, protection of sensitive areas, improved water quality, reduction of noxious and invasive weeds. Fence includes posts, wire, fasteners, gates, etc. Four strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

Feature Measure: Length of Fence

Scenario Unit: Foot

Scenario Typical Size: 3,960.0

Scenario Total Cost: $13,130.36

Total Cost per Unit: $3.32

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 382 - Fence

Scenario: #7 - Electric, high tensile with energizer

Scenario Description:

Electric - Installation of fence will allow for implementation of a grazing management plan that allows for an adequate rest and recovery period, protection of sensitive areas, improved water quality, reduction of noxious and invasive weeds. Includes 3 strands of high tensile wire with energizer.

Before Situation:

On grazinglands, health and vigor are negatively impacted by poor grazing distribution, timing of grazing, and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, cattle access to water bodies is uncontrolled.

After Situation:

Installation of interior fencing will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive areas, improved water quality, reduction of noxious and invasive weeds. Fence includes posts, wire, fasteners, gates, fence charger, etc. Two to three strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

Feature Measure: Length of Fence

Scenario Unit: Foot

Scenario Typical Size: 2,640.0

Scenario Total Cost: $4,216.67

Total Cost per Unit: $1.60

Based on North Dakota average costs. Individual county costs may vary.

Practice: 382 - Fence

Scenario: #8 - Electric, high tensile with energizer and fence markers

Scenario Description:

Electric - Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive areas, improved water quality, reduction of noxious and invasive weeds. Includes 3 strands of high-tensile wire with energizer.

Before Situation:

On grazing lands, health and vigor are negatively impacted by poor grazing distribution, timing of grazing, and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, cattle access to water bodies is uncontrolled.

After Situation:

Installation of interior fencing will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive areas, improved water quality, reduction of noxious and invasive weeds. Fence includes posts, wire, fasteners, gates, fence charger, etc. Two to three strand wire is commonly installed. Fence will be installed with wildlife friendly considerations. The after condition includes markers placed on the fence to protect and deter wildlife, protected wildlife species include Sage grouse, Lesser Prairie Chicken, etc.

Feature Measure: Length of Fence

Scenario Unit: Foot

Scenario Typical Size: 2,640.0

Scenario Total Cost: $4,866.56

Total Cost per Unit: $1.84

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 382 - Fence

Scenario: #74 - Refabrication of existing fence for multispecies diversity

Scenario Description:

Multi-strand, Barbed Wire, Woven Wire - Installation of additional strands to fence will allow for implementation of a grazing management plan including multispecies animals that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Constructed using fencing materials rather than a pre-manufactured gate. The fence is typically 4 strands over a mile (5,280 ft).

Before Situation:

On grazing lands, health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, cattle access to water bodies is uncontrolled.

After Situation:

Installation of additional strands to interior fencing will allow for implementation of a grazing management plan for a multi specie grazing system that allows adequate rest and recovery periods, protection of sensitive areas, improved water quality, reduction of noxious and invasive weeds by supporting diverse specie grazing application. Each grazing specie targets different types of forages and when managed properly, will improve plant diversity and vigor. Fence includes posts, wire, fasteners, gates, etc. Four strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

Feature Measure: 5280

Scenario Unit: Foot

Scenario Typical Size: 5,280.0

Scenario Total Cost: $6,702.42

Total Cost per Unit: $1.27

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 382 - Fence

Scenario: #159 - Woven Wire, 96 Inch

Scenario Description:

Woven Wire fencing installed for large livestock such as Bison, large ungulate herbivores, captive cervidae that are not domesticated. Because of the size and behavior differences relative to domesticated livestock, fences, handling facilities and loading facilities must be more robust to accommodate bison. Fence allows for the implementation of a grazing management under a CPS 528 Prescribed Grazing plan. Fence facilities the movement of livestock for forage management and protection of sensitive areas. All fence components are included. Fence encloses <= 20 acres or 2640 foot linear run connection with 5-8 wire fencing. Install fence with considerations for wildlife corridors.

Before Situation:

Livestock have access to forage and sensitive areas without management of intensity, duration and frequency of grazing events. Plant productivity and health is degraded. Water quality may be impaired by sediment and livestock access to water.

After Situation:

Installation of the tall woven wire high tensile electric fence allows for grazing management to be implemented. Fence is installed to specifications meeting the producer's objective and livestock type. Fence is installed with wildlife friendly considerations and known wildlife corridors.

Feature Measure: length

Scenario Unit: Foot

Scenario Typical Size: 2,640.0

Scenario Total Cost: $22,964.72

Total Cost per Unit: $8.70

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 382 - Fence

Scenario: #191 - High Tensile, Five Wire Electric

Scenario Description:

A five strand high tensile wire fence which is electrified for large livestock such as Bison, large ungulate herbivores, captive cervidae that are not domesticated. Because of the size and behavior differences relative to domesticated livestock, fences, handling facilities and loading facilities must be more robust to accommodate bison. Fence allows for the implementation of a grazing management under CPS 528 Prescribed Grazing plan. Fence facilities the movement of livestock for forage management and protection of sensitive areas. All fence components are included. Fence encloses 40 acres. Install fence considering wildlife friendly design and adjustment for wildlife corridors.

Before Situation:

Livestock have access to forage and sensitive areas without management of intensity, duration and frequency of grazing events. Plant productivity and health is degraded. Water quality may be impaired by sediment and livestock access to water.

After Situation:

Installation of the 5 wire high tensile electric fence allows for grazing management to be implemented. Fence is installed to specifications meeting the producer's objective and livestock type. Fence is installed with wildlife friendly considerations and known wildlife corridors.

Feature Measure: length

Scenario Unit: Foot

Scenario Typical Size: 5,280.0

Scenario Total Cost: $17,177.85

Total Cost per Unit: $3.25

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 382 - Fence

Scenario: #227 - Virtual Fence, Startup Year One, Less Than or Equal to 50 Animals

Scenario Description:

This scenario will involve utilizing virtual fence to manage cattle distribution, frequency, duration according to objectives in the Grazing Management Plan (CPS 528). Design and implementation of a virtual fence with multiple subunits that will enhance grazing land health and ecosystem function as well as optimize efficiency and economic return. This scenario is for operations with less than 400 acres.

Before Situation:

This scenario will involve utilizing virtual fence to manage cattle distribution, frequency, duration according to objectives in the Grazing Management Plan (CPS 528). Design and implementation of a virtual fence with multiple subunits that will enhance g

After Situation:

Virtual fence used in conjunction with the Grazing Management Plan (CPS 528) will improve the distribution, frequency, intensity, and duration of grazing. Virtual fence will be used to manage livestock in a way that enhances grazing land health and function and improve harvest efficiencies of forage resources and protection of sensitive areas such as riparian areas, T &E habitat, recently burned areas, etc., by establishing subunits within the grazing unit. Grazing Management Plan objectives and VF system success will be evaluated through short term monitoring.

Feature Measure: Number of animals

Scenario Unit: Number

Scenario Typical Size: 50.0

Scenario Total Cost: $17,688.60

Total Cost per Unit: $353.77

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 382 - Fence

Scenario: #229 - Virtual Fence, Startup Year One, Sheep or Goat

Scenario Description:

This scenario will involve utilizing virtual fence to manage cattle distribution, frequency, duration according to objectives in the Grazing Management Plan (CPS 528). Design and implementation of a virtual fence with multiple subunits that will enhance grazing land health and ecosystem function as well as optimize efficiency and economic return. This scenario is for number of sheep and goats.

Before Situation:

Current grazing management exhibits undesirable and inefficient use of forage plants and may have a negative impact on grazing land health, as well as soil and water resources. Stocking rates are likely not aligned with the current level of production and

After Situation:

Virtual fence used in conjunction with the Grazing Management Plan (CPS 528) will improve the distribution, frequency, intensity, and duration of grazing. Virtual fence will be used to manage livestock in a way that enhances grazing land health and function and improve harvest efficiencies of forage resources and protection of sensitive areas such as riparian areas, T &E habitat, recently burned areas, etc., by establishing subunits within the grazing unit. Grazing Management Plan objectives and VF system success will be evaluated through short term monitoring.

Feature Measure: Number of Animals

Scenario Unit: Number

Scenario Typical Size: 50.0

Scenario Total Cost: $14,934.34

Total Cost per Unit: $298.69

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 382 - Fence

Scenario: #230 - Virtual Fence, Startup Year One, 51 to 199 Animals

Scenario Description:

This scenario will involve utilizing virtual fence to manage cattle distribution, frequency, duration according to objectives in the Grazing Management Plan (CPS 528). Design and implementation of a virtual fence with multiple subunits that will enhance grazing land health and ecosystem function as well as optimize efficiency and economic return. This scenario is for operations with number of head 150 head or less and with greater than 400 acres.

Before Situation:

Current grazing management exhibits undesirable and inefficient use of forage plants and may have a negative impact on grazing land health, as well as soil and water resources. Stocking rates are likely not aligned with the current level of production and

After Situation:

Virtual fence used in conjunction with the Grazing Management Plan (CPS 528) will improve the distribution, frequency, intensity, and duration of grazing. Virtual fence will be used to manage livestock in a way that enhances grazing land health and function and improve harvest efficiencies of forage resources and protection of sensitive areas such as riparian areas, T &E habitat, recently burned areas, etc., by establishing subunits within the grazing unit. Grazing Management Plan objectives and VF system success will be evaluated through short term monitoring.

Feature Measure: Number of Animals

Scenario Unit: Number

Scenario Typical Size: 100.0

Scenario Total Cost: $18,606.52

Total Cost per Unit: $186.07

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 382 - Fence

Scenario: #231 - Virtual Fence, Startup Year One, Greater Than or Equal to 200 Animals

Scenario Description:

This scenario will involve utilizing virtual fence to manage cattle distribution, frequency, duration according to objectives in the Grazing Management Plan (CPS 528). Design and implementation of a virtual fence with multiple subunits that will enhance grazing land health and ecosystem function as well as optimize efficiency and economic return. This scenario is for operations with number of head 150 or greater and with greater than 400 acres.

Before Situation:

Current grazing management exhibits undesirable and inefficient use of forage plants and may have a negative impact on grazing land health, as well as soil and water resources. Stocking rates are likely not aligned with the current level of production and

After Situation:

Virtual fence used in conjunction with the Grazing Management Plan (CPS 528) will improve the distribution, frequency, intensity, and duration of grazing. Virtual fence will be used to manage livestock in a way that enhances grazing land health and function and improve harvest efficiencies of forage resources and protection of sensitive areas such as riparian areas, T &E habitat, recently burned areas, etc., by establishing subunits within the grazing unit. Grazing Management Plan objectives and VF system success will be evaluated through short term monitoring.

Feature Measure: Number of Animals

Scenario Unit: Number

Scenario Typical Size: 350.0

Scenario Total Cost: $42,871.43

Total Cost per Unit: $122.49

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 384 - Woody Residue Treatment

Scenario: #13 - Mechanical and Manual Control, Chipping and Hauling Offsite

Scenario Description:

Reducing woody waste created during forestry, agroforestry activities by gathering, chipping, and hauling off site to achieve management objectives. Does not include transport from property to a commercial facility. Resource concerns include potential Emissions of particulate matter, potential Excessive plant pest pressure, and Wildfire hazard from excessive biomass accumulation .

Before Situation:

Woody residue causes management issues including resource access, fire hazard and sites for harboring pests.

After Situation:

Fire and pest issues are reduced. Air and energy resources are conserved.

Feature Measure: Acres treated

Scenario Unit: Acre

Scenario Typical Size: 20.0

Scenario Total Cost: $7,649.68

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $382.48

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 384 - Woody Residue Treatment

Scenario: #42 - Mechanical Control, Chaining

Scenario Description:

The use of heavy equipment (2 dozers with winches pulling a single anchor chain) to break over, crush, and scatter standing dead trees to achieve a conservation objective such as improving access for management purposes, recovering desirable plant community structure, reducing plant pest pressure (eliminating avian seed-dispersing perches), and/or enhancing wildlife habitat (eliminating raptor perches and vertical structure).

Before Situation:

Area consists of standing dead trees caused by a previous management activity or natural disturbance. The standing dead trees limit access for management purposes, degrade desirable plant community structure, increase plant pest pressure, and/or degrade w

After Situation:

Standing dead trees are broken over, crushed, and scattered within and amongst the lower herbaceous plant community to achieve conservation objectives such as improved access, improved desirable plant community structure, reduced plant pest pressure, and/or enhanced wildlife habitat.

Feature Measure: Acres Treated

Scenario Unit: Acre

Scenario Typical Size: 60.0

Scenario Total Cost: $10,195.71

Total Cost per Unit: $169.93

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 384 - Woody Residue Treatment

Scenario: #56 - Mechanical and Manual Control for Slash, Less Than 5 Tons per Acre

Scenario Description:

This scenario treats woody residue that is considered to be of low complexity. Low complexity could include residue amount, size, volatility and accessibility by equipment. An increase in one factor could cause the use of the medium scenario. Typically, treatment is implemented by hand tools and light equipment to lop and scatter, hand pile to reduce continuity of woody residue that addresses a resource concerns. In General, these could be used following a light thinning/pruning. Resource concerns include Excessive plant pest pressure, Air Quality emissions, Wildfire hazard from excessive biomass accumulation, and degraded plant condition and habitat.

Before Situation:

Area has low amount of woody residue (i.e. <5 tons/ac, 6in diameter) that is easily accessible. Residue was created by management activity or natural weather event that is causing a resource concern or potential resource concern.

After Situation:

The residue is treated to an acceptable level to address the resource concern.

Feature Measure: Acre

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $6,601.94

Total Cost per Unit: $165.05

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 384 - Woody Residue Treatment

Scenario: #72 - Mechanical and Manual Control for Slash, 5 to 15 Tons per Acre

Scenario Description:

This scenario treats woody residue that is considered to be a medium complexity. Medium complexity could include residue amount, size, volatility, and accessibility by equipment (moderate terrain). An increase in any of these factors could cause the need for the Heavy scenario. Typical treatment is implemented by medium sized equipment such as chipper, masticator, skid steer to reduce the dimensions of the woody residue to address resource concerns. Resource concerns include; Excessive plant pest pressure, Air Quality emissions, Wildfire hazard from excessive biomass accumulation, and degraded plant condition and habitat.

Before Situation:

Area has moderate amount of woody residue (i.e. 5-15 tons/ac, 8-12 in diameter). Residue was created by management activity or natural weather event that is causing a resource concern or potential resource concern.

After Situation:

The residue is treated to an acceptable level to address resource concern.

Feature Measure: Acre

Scenario Unit: Acre

Scenario Typical Size: 20.0

Scenario Total Cost: $13,943.98

Total Cost per Unit: $697.20

Based on North Dakota average costs. Individual county costs may vary.

Practice: 384 - Woody Residue Treatment

Scenario: #88 - Mechanical and Manual Control for Slash, Greater Than 15 Tons per Acre

Scenario Description:

This scenario treats woody residue that is considered to be a high complexity. high complexity could include residue amount, size, volatility, and accessibility by equipment (steep/rough terrain). Typical treatment is implemented by heavy sized equipment such as masticators, mulchers, drum choppers, (Hand work with chainsaws could be used on steep slopes) to reduce the dimensions of the woody residue to address resource concerns. Resource concerns include: Excessive plant pest pressure, Air Quality emissions, Wildfire hazard from excessive biomass accumulation, and degraded plant condition and habitat.

Before Situation:

Area has high amount of woody residue (i.e. >15 tons/ac, >12 in diameter). Residue was created by management activity or natural weather event that is causing a resource concern or potential resource concern.

After Situation:

The residue is treated to an acceptable level to address resource concern

Feature Measure: Acre

Scenario Unit: Acre

Scenario Typical Size: 20.0

Scenario Total Cost: $36,065.44

Total Cost per Unit: $1,803.27

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 384 - Woody Residue Treatment

Scenario: #104 - Restoration, Conservation Treatment After Catastrophic Events

Scenario Description:

Use equipment to treat slash and woody reside within an area following a Catastrophic Event such as fire, wind, severe pest outbreak, ice storm, etc. to help restore/rehabilitate the site. Resource concerns could include: Excessive plant pest pressure, Air Quality emissions, Wildfire hazard from excessive biomass accumulation, and degraded plant condition and habitat.

Before Situation:

A large amount of slash and woody residue is created as a result of a Catastrophic event. The event has caused tree-lodging, snags, broken tops, etc.; and treatment is both difficult and dangerous. The presence of this material causes many adverse effects

After Situation:

The material resulting from the catastrophic event is reduced to a level that will minimize the resource concerns.

Feature Measure: Acre

Scenario Unit: Acre

Scenario Typical Size: 20.0

Scenario Total Cost: $55,576.21

Total Cost per Unit: $2,778.81

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 384 - Woody Residue Treatment

Scenario: #120 - Air Curtain Burner

Scenario Description:
Addressing Air Quality Emissions Resource concerns by using an air curtain burner to replace open pile burning.

Before Situation:
Woody residue would typically be burned in open piles, resulting in substantial air quality issues

After Situation:
Air quality concerns are lessened by using air curtain burner instead of open pile burning.

Feature Measure: Acre

Scenario Unit: Acre

Scenario Typical Size: 50.0

Scenario Total Cost: $12,177.29

Total Cost per Unit: $243.55

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 384 - Woody Residue Treatment

Scenario: #128 - Mechanical and Manual Control, Consolidated Slash Pile

Scenario Description:

Treating the forest slash generated from a forest management activity to: Reduce hazardous fuels; Reduce the risk of insect and disease; Improve wildlife habitat. Slash is to be piled in small piles made by hand. Piles will be in forest openings and away from nearby trees so not to impact them when the piles are burned (burning to be contracted under practice 338-Prescribed Burning). Slash will be burned when the conditions are safe for burning. Hand work with chainsaws are used on steep slopes. Resource concerns include: Potential emission of particulate matter; Wildfire hazard from excessive biomass accumulation; Excessive plant pest pressure; and Habitat degradation.

Before Situation:

Forest slash resulting from a forest management activity such as pre-commercial thinning, pruning or creating a fuel break. Excessive amounts of slash that can not be managed by the lop and scatter method. Chipping or mastication of slash is not available

After Situation:

Fire, access, and pest issues are reduced with slash piled and subsequently burned. Additional benefits are improved wildlife habitat and reduced harm to humans/animals.

Feature Measure: Acres Treated

Scenario Unit: Acre

Scenario Typical Size: 30.0

Scenario Total Cost: $6,965.20

Total Cost per Unit: $232.17

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 386 - Field Border

Scenario: #31 - Native Species, Foregone Income

Scenario Description:

A strip of permanent vegetation established at the edge or around the perimeter of an agricultural field. Practice includes seedbed prep and planting of native species. The area of the field border is taken out of production.

Before Situation:

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field

After Situation:

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices within and between fields. Native grasses, legumes and forbs will be established in the field borders to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Native species shall be selected that do not function as a host for diseases of a field crop and have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

Feature Measure: number of acres

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $533.71

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $533.71

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 386 - Field Border

Scenario: #32 - Introduced Species, Foregone Income

Scenario Description:

A strip of permanent vegetation established at the edge or around the perimeter of an agricultural field. Practice includes seedbed prep and planting of introduced species. The area of the field border is taken out of production.

Before Situation:

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field

After Situation:

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices within and between fields. Introduced grasses and legumes will be established for the field border to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Introduced species of grasses, legumes, forbs or shrubs shall be selected that are adapted to site, will not function as a host for diseases of a field crop and have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

Feature Measure: Number of acres

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $426.11

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $426.11

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 386 - Field Border

Scenario: #33 - Pollinator, Foregone Income

Scenario Description:

A strip of permanent vegetation established at the edge or around the perimeter of an agricultural field. Practice includes seedbed prep and planting of pollinator friendly herbaceous species. The area of the field border is taken out of production.

Before Situation:

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field

After Situation:

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices within and between fields. Pollinator herbaceous plantings will provide species which flower throughout the growing season. This provides a source of nectar for adult pollinators and a diversity of herbaceous material for immature pollinator life stages and for nesting. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall meet the pollinator habitat requirements of the state and be adapted to site; not function as a host for diseases of a field crop and; have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

Feature Measure: Number of acres

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $948.66

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $948.66

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 386 - Field Border

Scenario: #81 - Field Border, Small

Scenario Description:

A strip of permanent vegetation established at the edge or around the perimeter of an agricultural field. Practice includes seedbed prep and planting of introduced plant species.

Before Situation:

Before practice conditions may vary based on farm size and location. Fields may have erosion by wind or water. Site provides little wildlife food or cover or pollinator habitat. Site soil organic matter is depleting. Particulate matter as dust is generate

After Situation:

The 386 Implementation Requirements have been developed and applied for the site. Field border widths are based on NRCS local design criteria specific to the purpose for installing the practices. Species selected shall be adapted to site and not host disease or pests of the adjacent field crop. Species have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

Feature Measure: planted area

Scenario Unit: 1,000 Square Feet

Scenario Typical Size: 2.0

Scenario Total Cost: $192.98

Total Cost per Unit: $96.49

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 388 - Irrigation Field Ditch

Scenario: #5 - Irrigation Field Ditch

Scenario Description:

This scenario is the construction of an Irrigation Field Ditch. Typical construction dimensions are 2' wide bottom x 2' deep x 1320' length with a side slope of 2:1. Resource concerns: Excess/Insufficient Water - Inefficient Use of Irrigation Water Associated Conservation Practices: 320-Irrigation Canal or Lateral; 443-Irrigation System, Surface or Subsurface Water; 533-Pumping Plant; 430-Irrigation Pipeline.

Before Situation:

Water supply for an area is inadequate for crop production and irrigation water application is inefficient.

After Situation:

An earthen canal that has adequate capacity to convey sufficient irrigation water to meet the demands of the system and make irrigation practical for the crops being grown.

Feature Measure: Volume of earth excavated

Scenario Unit: Cubic Yard

Scenario Typical Size: 587.0

Scenario Total Cost: $2,090.98

Total Cost per Unit: $3.56

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 390 - Riparian Herbaceous Cover

Scenario: #4 - Native Perennial Grasses, Legumes, and Forbs Mix, Foregone Income

Scenario Description:

Native Species: This scenario addresses inadequate herbaceous plant community function or diversity within the specific transitional zone between terrestrial and aquatic habitats in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time period. This scenario applies to work not covered under NRCS Conservation Practice Range Planting (550), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Streambank and Shoreline Protection (580), Vegetated Treatment Area (635), Wetland Enhancement (659), or Wetland Restoration (657). The typical setting for this scenario is usually a narrow strip between the aquatic and terrestrial habitats subject to intermittent flooding and saturated soils where the existing plant community has been disturbed, destroyed, or the species diversity is unable to provide proper function and/or adequate habitat. Where the establishment of a diverse riparian herbaceous plant community is desired, an adapted mix of native grasses, legumes, and/or forbs tolerant to the site conditions will be planted by broadcast and/or no-till or range drill seeding methods as necessary to accomplish the intended purpose(s). Where chemical control of undesirable vegetation, including invasives, is required to reduce competition for the desired plant community, the Herbaceous Weed Control (315) practice should be used. Seedbed preparation may require LIGHT TILLAGE (disking). WHEN POLLINATOR HABITAT IS A CONSIDERATION: Include 5-10 adapted forb species that bloom sequentially throughout the growing season where feasible. All grazing will be deferred during plant establishment which will consist of a minimum of one year, and in many cases longer. Typically there is no haying, and the only clipping during establishment will be for removal of weeds.

Before Situation:

The riparian zone, the specific area between terrestrial and aquatic habitats, is currently an undesirable or inadequate stand of perennial or annual vegetation and natural reseeding or vegetation management is unlikely to improve the plant community with

After Situation:

The riparian zone, the transitional zone between the terrestrial and aquatic habitats, is established to an adapted, diverse vegetative plant community and is under close management to ensure long term survival and ecological succession. The quality and quantity of the riparian zone components are managed to support the species that depend on it for habitat as well as the functions it performs for stabilizing the streambank and/or shoreline, dissipating stream energy and trapping sediment, and improving and/or maintaining water quality. These functions include: stream temperature moderation through shading, recruitment of non-woody organic matter, habitat for terrestrial insects and other riparian dependent species, streambank integrity, and filtration of contaminants from surface run-off into the stream. All grazing will be deferred during plant establishment which will consist of a minimum of one year, and in many cases longer. Typically there is no haying, and the only clipping during establishment will be for removal of weeds.

Feature Measure: Acres of Riparian Herbaceo

Scenario Unit: Acre

Scenario Typical Size: 5.0

Scenario Total Cost: $1,531.46

Total Cost per Unit: $306.29

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 390 - Riparian Herbaceous Cover

Scenario: #48 - Pollinator Habitat

Scenario Description:

Pollinator Habitat: This scenario addresses inadequate herbaceous plant community function or diversity within the specific transitional zone between terrestrial and aquatic habitats in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time. The typical setting for this scenario is a narrow strip between the aquatic and terrestrial habitats subject to intermittent flooding and saturated soils where the existing plant community has been disturbed, destroyed, or the species diversity is unable to provide adequate habitat. Where the establishment of a diverse riparian herbaceous plant community is desired, an adapted mix of grasses, sedges, rushes, ferns, legumes, and/or forbs tolerant to the site conditions will be planted. Site adapted species of grasses, legumes, and/or forbs will be planted by no-till or range drill seeding methods as necessary to accomplish the intended purpose(s). Where chemical control of undesirable vegetation, including invasive species, is required to reduce competition for the desired plant community the Herbaceous Weed Control (315) practice should be used. Include 5-10 adapted forb species that bloom sequentially throughout the growing season. This scenario applies to work not covered under NRCS Conservation Practice Range Planting (528), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Streambank and Shoreline Protection (580), Vegetated Treatment Area (635), Wetland Enhancement (659), or Wetland Restoration (657). This practice can be used nationwide.

Before Situation:

Riparian zone vegetation is currently an undesirable or inadequate stand of perennial or annual vegetation as determined by the NRCS Stream Visual Assessment Protocol. Natural reseeding or vegetation management is unlikely to improve the plant community w

After Situation:

The riparian zone is established to an adapted, diverse vegetative plant community and is under close management to insure long term survival and ecological succession. The quality and quantity of the riparian zone components are managed to support the species that depend on it for habitat as well as the functions it performs for stabilizing the streambank and/or shoreline, dissipating stream energy and trapping sediment, and improving and/or maintaining water quality. These functions include: stream temperature moderation through shading, recruitment of non-woody organic matter, habitat for terrestrial insects and other riparian dependent species, streambank integrity, and filtration of contaminants from surface run-off into the stream.

Feature Measure: Acres of Riparian Herbaceo

Scenario Unit: Acre

Scenario Typical Size: 0.5

Scenario Total Cost: $740.61

Total Cost per Unit: $1,481.22

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 391 - Riparian Forest Buffer

Scenario: #18 - Bare-root, machine planted

Scenario Description:

Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of machine planted bare-root shrubs, evergreen, and deciduous trees. One third of the area will be planted to each woody plant type. Planting for shrubs will be done at 6' x 6' spacing, evergreen tree spacing will be 12' x 15' and deciduous tree spacing at 15' x 15'. Tree shelters will be placed on the hardwoods and evergreens. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

Before Situation:

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and or

After Situation:

A buffer of trees and shrubs will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.

Feature Measure: Area of planting

Scenario Unit: Acre

Scenario Typical Size: 3.0

Scenario Total Cost: $7,128.81

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $2,376.27

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 393 - Filter Strip

Scenario: #25 - Native Species, Foregone Income

Scenario Description:

A strip or area of herbaceous vegetation that removes contaminants from overland flow. Practice includes seedbed prep and planting of native species. The area of the filter strip is taken out of production.

Before Situation:

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring

After Situation:

The 393 Implementation Requirements are developed for the site and applied. The planned filter strip will be established and maintained per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of native species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and seed. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on the contribution area while protecting environmentally-sensitive areas. The area of the filter strip is taken out of production.

Feature Measure: number of acres

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $634.19

Total Cost per Unit: $634.19

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 393 - Filter Strip

Scenario: #26 - Introduced Species, Foregone Income

Scenario Description:

A strip or area of herbaceous vegetation that removes contaminants from overland flow. Practice includes seedbed prep and planting of introduced species. The area of the filter strip is taken out of production.

Before Situation:

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring

After Situation:

The 393 Implementation Requirements are developed for the site and applied. The planned filter strip will be established and maintained per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of introduced species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and seed. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas. The area of the filter strip is taken out of production.

Feature Measure: Number of acres

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $541.42

Total Cost per Unit: $541.42

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 394 - Firebreak

Scenario: #2 - Vegetation with Bush Hog, 30 Feet

Scenario Description:

Installation of a short vegetative firebreak a minimum width of 30' around a 40 acre field/farm using a bush-hog mower. Generally water control devices such as water bars are not needed due either to the lack of steep terrain or the temporary nature of the firebreak. Resource concerns include Wildfire hazard from excessive biomass accumulation, Undesirable plant productivity and health, Inadequate plant structure and composition, and Habitat degradation.

Before Situation:

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn.

After Situation:

The property is adequately protected from wildfire or can be safely prescribe burned.

Feature Measure: Length of firebreak

Scenario Unit: Foot

Scenario Typical Size: 5,280.0

Scenario Total Cost: $1,002.77

Total Cost per Unit: $0.19

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 394 - Firebreak

Scenario: #15 - Bare Soil, Bladed or Disked, Greater Than or Equal to 30 Feet

Scenario Description:

Installing a bare-ground firebreak with a width of 30' or more on gently to strongly sloping slopes with equipment such as a dozer with a heavy disk. Using smaller equipment, erosion control devices such as water bars will be installed at approximately 15 to 25 per 1,000 feet of firebreak length. Devices will have stable outlets. Resource concerns include Wildfire hazard from excessive biomass accumulation, Undesirable plant productivity and health, Inadequate plant structure and composition, Habitat degradation, Soil erosion, and Excessive sediment in surface waters.

Before Situation:

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn. Wide firebreaks are needed due to topography, high wildfire risk or to their use as down-wind breaks for prescribed burns. Conditions su

After Situation:

The property is adequately protected from wildfire or can be safely prescribe burned and the potential for excessive erosion from the firebreak is minimized.

Feature Measure: Length of firebreak

Scenario Unit: Foot

Scenario Typical Size: 1,000.0

Scenario Total Cost: $4,945.09

Total Cost per Unit: $4.95

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #2 - Wood Structure, Root Wads, Instream

Scenario Description:

This scenario involves placement of large wood (logs, root wads, log structures) into a stream channel in order to improve aquatic habitat that currently does not meet planning criteria for stream species habitat. A stream assessment (i.e. Stream Visual Assessment Protocol) should be conducted in order to document habitat components lacking for aquatic species (i.e. large wood, pools). A project design for wood placement will be based on an assessment of the target stream reach characteristics and those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Large wood and root wads placed into the stream will mimic genus, age, and size of mature trees found in intact, reference riparian areas in the MLRA where the project is located. Large wood/trees with root wads intact should be placed in streams to create pool habitat according to NRCS engineering specifications and with close review & approval of a fish habitat biologist. Boulders placed to provide ballast shall only be used if the geomorphic setting and project design demand this component. The planned activity will meet the current 395 standard, and facilitating practice standards utilized, including timing of work windows required for protected aquatic and riparian species, and protecting/restoring vegetation and substrates of/to areas impacted by heavy equipment. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of project implementation. Monitoring records, demonstrating implementation of this scenario addressing resource concerns for stream species of concern, are required.

Before Situation:

In this stream reach, habitat for fish, aquatic insects and/or other stream species, is sub-optimal (as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 overall). The site does not have adequate food, cover, and/or habitat con

After Situation:

Stream habitat within the project reach is improving as a result of placing logs, root wads, and/or wood structures in the channel and/or along the stream bank. Hiding cover, food availability, refuge and pool habitat, for all stream species in the reach, is improving.

Feature Measure: Bankfull width x reach lengt

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $20,945.07

Total Cost per Unit: $20,945.07

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #3 - Rock Structure, Boulders Instream

Scenario Description:

This scenario describes the implementation of a stream habitat improvement and management project that places rock structures, individual boulders or boulder clusters in or adjacent to the stream channel as habitat components. A project design for boulder placement will be based on assessment of the target stream reach characteristics and those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Large rocks/boulders placed in the stream channel will mimic geologic material sizes typically present in the watershed or observed in intact, reference stream reaches in the MLRA where the project is located. Boulders should be placed in streams to create pool habitat and hydraulic complexity according to NRCS engineering specifications and with close review & approval of a fish habitat biologist onsite during implementation of the project design. Spawning gravel placement should be placed to restore spawning area substrates potentially disturbed by rock placement. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, spawning habitat, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of stream habitat assessment, and project implementation. Records, demonstrating implementation of this scenario addressing resource concerns for stream species of concern, are required.

Before Situation:

In this stream reach, habitat for fish, aquatic insects and other stream species is sub-optimal (as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 overall). The site does not have adequate food, cover, and/or habitat connect

After Situation:

Stream habitat within the project reach is improving as a result of placing boulders or constructing rock structures in the channel and/or along the stream bank. Hydraulic complexity of the habitat in the reach is increased, and hiding cover, food availability and refuge habitat for stream species is improving. Streambank vegetation is increasing and contributing to stability of the streambanks.

Feature Measure: Bankfull width x reach lengt

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $19,724.81

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $19,724.81

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #4 - Rock and Wood Structure

Scenario Description:

This scenario describes the implementation of a stream habitat improvement and management project where practices are focused on instream habitat improvement with a combination of rock AND wood structures. This scenario involves placement of large wood and rock structures into a stream channel in order to improve aquatic habitat that currently does not meet planning criteria for stream species habitat. A stream assessment (i.e. Stream Visual Assessment Protocol) should be conducted in order to document habitat components (such as large wood, pools) are not currently present in the stream or are limited for aquatic species. A project design for placement of habitat structures (boulders, boulder clusters, wood, wood structures) will be based on an assessment of (a) the target stream reach characteristics and (b) those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Large rocks/boulders placed in the stream channel will mimic geologic material sizes typically present in the watershed or observed in intact, reference stream reaches in the MLRA where the project is located. Rock boulder sizes should also reflect the geomorphic setting of the stream reach. Large wood placed into the stream under this scenario should be similar in species, age, and size (diameter) as trees found in the surrounding riparian area, to the extent possible. Wood, boulders and/or boulder clusters will be placed in the stream to create pool habitat and hydraulic complexity according to NRCS engineering specifications and with close review & approval of a fish habitat biologist onsite during the planning and implementation of the project. This scenario involves restoring one acre of stream. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of project implementation. Records demonstrating implementation of this scenario addressing resource concerns for stream species of concern will be required.

Before Situation:

In this stream reach, habitat for fish, aquatic insects and/or other stream species is sub-optimal as determined by the NRCS Stream Visual Assessment Protocol score of less than 5. The site does not have adequate food, cover, and/or habitat connectivity f

After Situation:

Stream habitat within the project reach is improving as a result of placing logs, rocks, or constructing wood and rock structures in the channel and/or along the stream bank. Hiding cover, food availability, refuge and pool habitat, for all stream species in the reach, is improving.

Feature Measure: Bankfull width x reach lengt

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $40,554.31

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $40,554.31

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #5 - Fish Barrier

Scenario Description:

This scenario describes the implementation of a stream habitat improvement and management project where practices are focused on the stream channel. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in protecting native aquatic fauna in the reach from competition or harassment from non-native fish. This action may also increase food availability for fish and other stream species located above the constructed barrier. Payment for implementation is to defray the costs of stream habitat assessment above the barrier, and project implementation. Records demonstrating that the implementation of this scenario will address resource concerns for aquatic and riparian species of concern will be required.

Before Situation:

In this stream corridor, native aquatic species are at risk as determined by the state fish and wildlife agency. NRCS Stream Visual Assessment Protocol for the reach being protected by a barrier meets planning criteria and provides habitat for native spec

After Situation:

Native fish inhabiting areas upstream of the newly constructed concrete barrier will not be adversely affected by interactions with non-native species/competitors.

Feature Measure: Each

Scenario Unit: Cubic Yard

Scenario Typical Size: 5.0

Scenario Total Cost: $47,806.32

Total Cost per Unit: $9,561.26

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 402 - Dam

Scenario: #3 - Pipe, Spillway

Scenario Description:

This scenario is the construction of an earthen embankment to impound water. A corrugated metal pipe (CMP) principal spillway will be constructed. A metal trash guard protects the spillway inlet. A circular CMP riser connects to a CMP barrel that runs through the dam to outlet safely downstream. A sand diaphragm is installed in the embankment. This scenario assists in addressing the resource concerns: excessive runoff, flooding or ponding, inefficient water use on irrigated land, reduced capacity of conveyances by sediment deposition.

Before Situation:

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control, flood control, or irrigation. The site meets satisfactory conditions according to the standard.

After Situation:

The typical dam is constructed by excavation and compaction to create an embankment. The principal spillway is completed by using a CMP riser with a metal trash guard and a CMP barrel. A sand diaphragm is installed. Vegetation will be completed under Critical Area Planting (342) standard. . Other associated practices such as; Fence (382), Pipeline (516), Pumping Plant (533), Watering Facility (614), Structure For Water Control (587), and Aquatic Organism Passage (396) will use the corresponding Standard(s) as appropriate.

Feature Measure: Embankment Volume

Scenario Unit: Cubic Yard

Scenario Typical Size: 25,000.0

Scenario Total Cost: $176,697.22

Total Cost per Unit: $7.07

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 410 - Grade Stabilization Structure

Scenario: #2 - Embankment, Pipe <24 inch

Scenario Description:

An earthen embankment dam with a principle spillway pipe less than 24 inches, anti-seep collars or sand diaphragm, and excavated plunge pool basin. Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 4000 cubic yards, 90 feet of 18" PVC, pipe with a canopy inlet, and 3 cubic yard sand diaphragm. A non-lined plunge pool protects the outlet channel. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

Feature Measure: Cubic Yards of Earthfill

Scenario Unit: Cubic Yard

Scenario Typical Size: 4,000.0

Scenario Total Cost: $29,149.39

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $7.29

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 410 - Grade Stabilization Structure

Scenario: #4 - Pipe Drop, Plastic

Scenario Description:

A pipe drop (i.e.: riser and barrel) grade stabilization structure designed and constructed using plastic pipe without anti-seep collars. This is typically an earthen dry dam structure with no permanent storage (water or sediment), however some structures may have some permanent pool / storage but do not have 35 years of sediment life. Payment rate is based upon the riser weir length (Diameter x 3.14) in feet times the length of the pipe barrel in (feet). Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a 2000 CY structure with a 6 ft high 24" (2') PVC riser with a 40 ft long barrel (2' x 3.14 x 40' = 251 SF). Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), and Irrigation Canal or Lateral (320) will use the corresponding Standard(s) as appropriate.

Feature Measure: Riser Weir Length x Barrel L

Scenario Unit: Square Foot

Scenario Typical Size: 251.0

Scenario Total Cost: $18,807.92

Total Cost per Unit: $74.93

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 410 - Grade Stabilization Structure

Scenario: #5 - Pipe Drop, Corrugated Metal Pipe

Scenario Description:

A pipe drop (i.e.: riser and barrel) grade stabilization structure designed and constructed with a metal anti-seep collar. This is typically a earthen dry dam structure with no permanent storage (water or sediment), however some structures may have some permanent pool / storage but do not have 35 years of sediment life. Payment rate is based upon the riser weir length (Diameter x 3.14) in feet times the length of the pipe barrel in (feet). Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a corrugated metal pipe drop structure with a 30", 12' tall riser and a 100' long 24" barrel (Riser Weir length x Barrel Length = 2.5ft x 3.14 x 100ft = 785). Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), and Irrigation Canal or Lateral (320) will use the corresponding Standard(s) as appropriate.

Feature Measure: Riser Weir Length x Barrel L

Scenario Unit: Square Foot

Scenario Typical Size: 785.0

Scenario Total Cost: $20,791.61

Total Cost per Unit: $26.49

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 410 - Grade Stabilization Structure

Scenario: #6 - Drop Structure, Box

Scenario Description:

A Straight, semicircular, or Box Drop structure composed of reinforced concrete used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a wall structure with a drop of 4 ft and weir length of 6 ft wide and is 6 ft deep with 3 ft above the crest. The unit of payment measurement is defined as cubic yards of concrete. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

Feature Measure: Cubic Yards of Concrete

Scenario Unit: Cubic Yard

Scenario Typical Size: 11.0

Scenario Total Cost: $14,037.94

Total Cost per Unit: $1,276.18

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 410 - Grade Stabilization Structure

Scenario: #7 - Drop Structure, Weir with Sheet Pile

Scenario Description:

A Straight structure composed of sheet pile metal used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a structure with a crest of 30 ft. The unit of payment measurement is defined as the area of sheet piling in square feet. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

Feature Measure: Area of Sheet piling

Scenario Unit: Square Foot

Scenario Typical Size: 350.0

Scenario Total Cost: $26,965.19

Total Cost per Unit: $77.04

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 410 - Grade Stabilization Structure

Scenario: #11 - Chute Structure, Rock

Scenario Description:

A trapezoidal structure constructed of rock riprap with a geotextile base. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a rock chute with a vertical drop of 6.5 feet and a width of 12'. The unit of payment measurement is defined as the volume of rock used in the chute in cubic yards. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

Feature Measure: Volume of Rock

Scenario Unit: Cubic Yard

Scenario Typical Size: 144.0

Scenario Total Cost: $22,896.03

Total Cost per Unit: $159.00

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 410 - Grade Stabilization Structure

Scenario: #12 - Drop Structure, Concrete Block Mat

Scenario Description:

A drop structure placed in a water course constructed of concrete blocks joined by cable or other means to form a flexible mat. These structures are used to stabilize the grade and control erosion in natural or artificial channels, prevent the formation/advancement of gullies, and enhance water quality and reduce pollution hazards. These are generally applied in areas where the concentration and flow velocity of water require structures to stabilize the grade, and vegetation alone will not protect the structure from erosion. The typical structure is 16' wide and removes 5' of grade in the channel with a 4:1 outlet slope. The unit of payment is the area of matting installed and includes inlet and outlet transition areas and side slopes. All associated earthwork and materials are included in the cost. Required re-vegetation of disturbed areas will use Critical Area Planting (342) or other appropriate seeding practices. Resource concerns addressed: gully erosion, concentrated flow erosion, degraded water quality due to suspended solids.

Before Situation:

The operator currently has gullies forming and/or advancing into crop or pasture land which negatively impacts the land use and downstream water quality. Erosion from the gullies results in soil loss and allows soil and nutrients to be transported to down

After Situation:

The advancement of and/or formation of gullies is stopped, and soil from gullies no longer leaves the field. Land use is restored or maintained and sedimentation and other pollution hazards are decreased, and downstream water quality is protected. Other associated practices include: Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (366), Grassed waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620).

Feature Measure: Square Feet of Mat.

Scenario Unit: Square Foot

Scenario Typical Size: 1,350.0

Scenario Total Cost: $14,027.04

Total Cost per Unit: $10.39

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 410 - Grade Stabilization Structure

Scenario: #29 - Dam and Spillway, Rehabilitation

Scenario Description:

A previously built earthen embankment dam with a principal spillway pipe that is greater than 24" in diameter. Previously installed structure had embankment and pipe failure, and is in need of new pipe installation and embankment repair. Cost estimate is based upon shaping side slopes, replacing pipe and riser, and replacing with a typical amount of earthfill of 4250 cubic yards. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the structure and impacting the downstream water quality. Also presents a safety hazard of potential dam failure. Erosion from the gullies is allowing soil and possibly nutrients to be transpo

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

Feature Measure: Diameter Inch Foot of Barre

Scenario Unit: Diameter Inch Foot

Scenario Typical Size: 2,400.0

Scenario Total Cost: $37,045.62

Total Cost per Unit: $15.44

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 412 - Grassed Waterway

Scenario: #5 - Waterway with Side Dikes or Checks

Scenario Description:

Typical practice is 2000 ' long, 40' bottom, 6:1 side slopes, 1.6' depth. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Fabric or stone checks are installed every 100 feet along the length of the waterway perpendicular to waterflow and are 2/3 the waterway top width to reduce maintenance and provide temporary protection until vegetation is established. Fabric Checks are installed 18" deep with 12" laid over on the surface. (Alternatively, rock checks or side dikes could be installed). This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding will be completed under the Critical Area Planting (342) Practice Standard with seeding area up to 20% greater than waterway area to account for buffer area along the waterway. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a resu

After Situation:

Installed grassed waterway is 2000 ' long, 40' bottom, 6:1 side slopes, 1.8' depth. Fabric checks are installed every 100 feet along the length of the waterway. The practice is installed using a dozer and/or scraper, with final grading with motor grader. Fabric or stone checks are installed with small backhoe and labor. Use Critical Area Planting (342) for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 2.7

Scenario Total Cost: $20,099.91

Total Cost per Unit: $7,389.67

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 412 - Grassed Waterway

Scenario: #13 - Waterway, high excavation volume per acre

Scenario Description:

Typical practice is 2600' long, 80' bottom, 6:1 side slopes, 3.0' depth. A grassed waterway is a shaped or graded channel, established with suitable vegetation, that carries surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Seeding will be completed under the Critical Area Planting (342) Practice Standard with seeding area up to 20% greater than waterway area to account for buffer area along the waterway. Costs include excavation and associated work to construct the overall shape and grade of the waterway. This scenario applies to Grassed Waterways with a high quantity of earthwork per acre, typically distinguished by a minimum excavation volume of 3,000 cubic yards per acre of waterway. Excavation volume is measured from the original ground surface to the finished ground surface.

Before Situation:

The field has a small to medium gully which is cutting deeper into the field over time. Excessive sedimentation and soil erosion result from ephemeral or classic gully erosion. Gully has formed in the field as a result of excessive runoff and/or poor crop

After Situation:

Installed grassed waterway is 2600' long, 80' bottom, 6:1 side slopes, 3.0' depth. The practice is installed using a dozer and/or scraper, although final grading may be accomplished using a motor grader. Use Critical Area Planting (342) for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). Inlet structures for the drainage tile, if needed, will be installed using Underground Outlet (620).

Feature Measure: Excavation Volume of Wate

Scenario Unit: Cubic Yard

Scenario Typical Size: 21,233.0

Scenario Total Cost: $82,692.85

Total Cost per Unit: $3.89

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 428 - Irrigation Ditch Lining

Scenario: #10 - Concrete Lining

Scenario Description:

Construct quarter mile of concrete (2.5 inch in thickness) lining in an existing ditch alignment to convey water from the source of supply to a field or fields in a farm distribution system. Typical scenario includes filling the old ditch with on-site fill material, compacting, and constructing an 8 ft pad with on site fill material. This scenario does not include any check or outlets gates. A trapezoidal trencher forms the ditch (typical cross-section: 1 ft bottom, 2 ft depth including freeboard, and 1:1 side slope) and lining with concrete slip forms (total width = 7.32 ft). Resource Concerns: Insufficient water - Inefficient use of irrigation water; Soil erosion - Excessive bank erosion from streams shorelines or channels. Associated Practices: 320-Irrigation Canal or Lateral; 388-Irrigation Field Ditch; 443-Irrigation System, Surface or Subsurface Water; 533-Pumping Plant; 430-Irrigation Pipeline; 587-Structure for Water Control.

Before Situation:

Leaky and erosive earthen irrigation ditch.

After Situation:

Impervious lining prevents seepage, reduces energy use and improves water quality and irrigation efficiency.

Feature Measure: Surface Area of Lining

Scenario Unit: Square Yard

Scenario Typical Size: 1,074.0

Scenario Total Cost: $25,194.44

Total Cost per Unit: $23.46

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 428 - Irrigation Ditch Lining

Scenario: #11 - Flexible Lining

Scenario Description:

Construct quarter mile of uncovered flexible membrane (30mil HDPE) lining in an existing ditch alignment to convey water from the source of supply to a field or fields in a farm distribution system. Typical scenario includes subgrade preparation via clearing & grubbing, shaping old channel with no bedding or geotextile cushion to place, and placing membrane with 8 inch tuck/anchor on each side (total liner width = 8 ft). Scenario assumes typical trapezoidal ditch (1 ft bottom, 2 ft depth including freeboard, and 1:1 side slope). Resource Concerns: Insufficient water - Inefficient use of irrigation water; Soil erosion - Excessive bank erosion from streams shorelines or channels. Associated Practices: 320-Irrigation Canal or Lateral; 388-Irrigation Field Ditch; 443-Irrigation System, Surface or Subsurface Water; 533-Pumping Plant; 430-Irrigation Pipeline; 587-Structure for Water Control.

Before Situation:

Leaky and erosive earthen irrigation ditch.

After Situation:

Impervious lining prevents seepage, reduces energy use and improves water quality and irrigation efficiency.

Feature Measure: Surface Area of Lining

Scenario Unit: Square Yard

Scenario Typical Size: 1,173.0

Scenario Total Cost: $14,387.39

Total Cost per Unit: $12.27

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 430 - Irrigation Pipeline

Scenario: #1 - PVC, by the pound

Scenario Description:

Description: Below ground installation of PVC pipeline. Typical practice sizes range from 6-inch to 12-inch. Construct 1,300 feet of 6-inch, pressure rating 80 psi (SDR 51), PVC plastic irrigation pipe (PIP) with appurtenances, installed below ground with a minimum of 2.5 feet of ground cover. The unit is weight of pipe in pounds. 1,300 feet of 6-inch, SDR 51 PVC PIP weighs 1.49 lb./ft, or a total of 1,937 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, dog-legs (risers), and inline valves. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant

Before Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Situation:

Pipeline installed to convey and/or distribute water to irrigation systems, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Feature Measure: Weight of pipe

Scenario Unit: Pound

Scenario Typical Size: 1,937.0

Scenario Total Cost: $10,831.46

Total Cost per Unit: $5.59

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 430 - Irrigation Pipeline

Scenario: #30 - HDPE, by the pound

Scenario Description:

Description: Below ground installation of HDPE (Iron Pipe Size & Tubing) pipeline. HDPE (IPS & Tubing) is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 6-inch. Construct 1/4 mile (1,320 feet) of 6-inch, Class 130 (SDR-13.5), HDPE pipeline with appurtenances, installed below ground with a minimum 2 feet of ground cover. The unit is weight of pipe material in pounds. 1,320 feet of 8-inch, Class 130 (SDR-13.5), HDPE weighs 4.024 lb./ft, or a total of 5,312 pounds. Appurtenances include: fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Situation:

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Feature Measure: Weight of Pipe

Scenario Unit: Pound

Scenario Typical Size: 5,312.0

Scenario Total Cost: $23,287.29

Total Cost per Unit: $4.38

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 430 - Irrigation Pipeline

Scenario: #33 - PVC, by pound, boring

Scenario Description:

Below ground installation of PVC pipeline. Typical practice sizes range from 6-inch to 12-inch. Construct 1,300 feet of 6-inch, pressure rating 80 psi (SDR 51), PVC plastic irrigation pipe (PIP) with appurtenances, installed below ground with a minimum of 2.5 feet of ground cover. Includes boring 52 lineal feet under a heavily used road, such as a state or county highway which has an average of 12' wide lanes, 6' shoulder width, and 8' width sideslopes. The unit is weight of pipe in pounds. 1,300 feet of 6-inch, SDR 51 PVC PIP weighs 1.49 lb./ft, or a total of 1,937 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, dog-legs (risers), and inline valves. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface &Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 -Pumping Plant

Before Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Situation:

Pipeline installed to convey and/or distribute water to irrigation systems, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Feature Measure: weight of pipe

Scenario Unit: Pound

Scenario Typical Size: 1,937.0

Scenario Total Cost: $18,103.03

Total Cost per Unit: $9.35

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 430 - Irrigation Pipeline

Scenario: #97 - PVC (Iron Pipe Size), less than or equal to 4 inch, Small Scale System

Scenario Description:

Below ground installation of PVC (Iron Pipe Size) pipeline. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 3-inch. Construct 260 feet of 3-inch, Class 125 (SDR-32.5), PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe material in pounds. 260 feet of 3-inch, Class 125 (SDR-32.5) PVC pipe weighs 0.730 lb./ft, or a total of 189.8 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface &Subsurface; 447 - Irrigation and Drainage Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Situation:

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Feature Measure: Length of Pipe

Scenario Unit: Linear Foot

Scenario Typical Size: 260.0

Scenario Total Cost: $2,689.96

Total Cost per Unit: $10.35

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 430 - Irrigation Pipeline

Scenario: #98 - HDPE (Iron Pipe Size and Tubing), less than or equal to 2 inch, Small Scale, No Joint Fusing

Scenario Description:

Below ground installation of HDPE (Iron Pipe Size &Tubing) pipeline. HDPE (IPS &Tubing) is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; and typical scenario size is 1-inch. Construct 260 feet of 1-inch, Class 130 (SDR 13.5), HDPE pipeline with appurtenances, installed below ground with a minimum 2 feet of ground cover. The unit is weight of pipe material in pounds. 260 feet of 1-inch, Class 130 (SDR-13.5), HDPE weighs 0.16 lb./ft, or a total of 42 pounds. Appurtenances include: fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface &Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer

Before Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Situation:

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Feature Measure: Weight of Pipe

Scenario Unit: Pound

Scenario Typical Size: 42.0

Scenario Total Cost: $1,058.75

Total Cost per Unit: $25.21

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 430 - Irrigation Pipeline

Scenario: #99 - Surface HDPE (Iron Pipe Size and Tubing), less than or equal to 2 inch, Small Scale

Scenario Description:

On-ground surface installation of HDPE (Iron Pipe Size &Tubing) pipeline. HDPE (IPS &Tubing) is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; and typical scenario size is 1-inch. Construct 260 feet of 1-inch, Class 130 (SDR 13.5), HDPE pipeline with appurtenances. The unit is weight of pipe material in pounds. 260 feet of 1-inch, Class 130 (SDR-13.5), HDPE weighs 0.16 lb./ft, or a total of 42 pounds. Appurtenances include: fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface &Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer

Before Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Situation:

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Feature Measure: Weight of Pipe

Scenario Unit: Pound

Scenario Typical Size: 42.0

Scenario Total Cost: $495.16

Total Cost per Unit: $11.79

Based on North Dakota average costs. Individual county costs may vary.

Practice: 430 - Irrigation Pipeline

Scenario: #117 - Boring, by the pound, small scale

Scenario Description:

Below ground installation of PVC pipeline. Typical practice sizes range from 1-inch to 2-inch. Construct 200 feet of 2-inch, pressure rating 125 psi (SDR 32.5), PVC plastic IPS with appurtenances, installed below ground with a minimum of 2.5 feet of ground cover. Includes boring 200 lineal feet under a heavily used road, such as a state or county highway which has an average of 12' wide lanes, 6' shoulder width, and 8' width sideslopes. The unit is weight of pipe in pounds. 200 feet of 2-inch SDR 32.5, PVC, IPS, weighs 0.36 lb./ft for a total of 73 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, dog-legs (risers), and inline valves. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface &Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 -Pumping Plant

Before Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Situation:

Pipeline installed to convey and/or distribute water to irrigation systems, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Feature Measure: weight of pipe

Scenario Unit: Pound

Scenario Typical Size: 73.0

Scenario Total Cost: $17,179.85

Total Cost per Unit: $235.34

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 436 - Irrigation Reservoir

Scenario: #1 - Embankment Dam

Scenario Description:

The reservoir, created by an embankment built across a natural depression, with an 18" diameter principal spillway outlet through the embankment, is controlled by a canal-style gate. Outlet structure is constructed with watertight plastic pipe appropriate for this use, commonly PVC pipe. Outlet can also serve as overflow protection with a 12" diameter standpipe and tee to the 18" pipe. Any watershed runoff will be diverted around reservoir. It will be built with approximately 4,500 cubic yards of on-site material. It will be about 19.9 feet high and 200 feet long and hold approximately 1,000,000 gallons (3 acre-feet). The top of berm will be 10 feet wide and the embankment side slopes will be 2.5 H to 1 V up and down stream. Resource concern: Insufficient Water - Inefficient use of irrigation water. Associated practices include: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 378 - Pond; 447 - Irrigation System, Tailwater Recovery; 484 - Mulching; and 342 - Critical Area Planting.

Before Situation:

Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application. Divert water around - no spillway

After Situation:

This is an embankment, installed across a natural off-stream intermittent watercourse, used to store water for subsequent irrigation. It will be used to accumulate and store water for timely and efficient application of water through an irrigation system The water source could be a well, irrigation district pipeline, and/or a pump from a stream. It is designed to deliver water by gravity to an open ditch or non-pressurized pipeline, generally in excess of 5 cfs. All earthen materials will be from on-site sources.

Feature Measure: Volume of Compacted Eartfi

Scenario Unit: Cubic Yard

Scenario Typical Size: 4,500.0

Scenario Total Cost: $26,323.08

Total Cost per Unit: $5.85

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 436 - Irrigation Reservoir

Scenario: #2 - Embankment Reservoir > 30 Acre-Feet

Scenario Description:

This is a very large embankment reservoir with a 18" diameter drain pipe through the embankment controlled by a canal-type gate. It is designed to accumulate, store, and deliver water by gravity to an open ditch or non-pressurized pipeline, in excess of 5 cfs. It will have a top width of 12ft and centerline length of embankment of 5,280 feet. Average fill of 10 feet and the side slopes will be no steeper than 3 H to 1 V inside and out. It will be built with approximately 105,000 cubic yards of on-site material. It will have a maximum water depth of 8 feet with 2 feet of freeboard and no auxiliary spillway. Volume is approximately 320 ac-ft (104,500,000 gallons). Critical Area Planting and Mulching is required. Resource Concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 447 - Irrigation System, Tailwater Recovery; 378 - Pond; 484 - Mulching; and 342 - Critical Area Planting.

Before Situation:

Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.

After Situation:

The rectangular reservoir will be built on a relatively flat site and be used to accumulate and store water for timely application through an irrigation system. The water source could be a stream or an irrigation district canal.

Feature Measure: Volume of Compacted Earth

Scenario Unit: Cubic Yard

Scenario Typical Size: 104,200.0

Scenario Total Cost: $454,309.36

Total Cost per Unit: $4.36

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 436 - Irrigation Reservoir

Scenario: #3 - Excavated Tailwater Pit

Scenario Description:

This is an excavated pit with a control structure. It is designed to accumulate, store, deliver or regulate water for a surface irrigation system. It will have a bottom width of 20 ft and length of 1,250 feet. The side slopes will be no steeper than 1.5 H to 1 V inside and out. It will be built with approximately 20,000 cubic yards of on-site material. It will have a maximum water depth of 10 feet with 1 feet of freeboard. Volume is approximately 12 ac-ft (3,950,303 gallons). Resource concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 447 - Irrigation System, Tailwater Recovery; 378 - Pond; 484 - Mulching; and 342 - Critical Area Planting.

Before Situation:

Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.

After Situation:

An excavated regulating reservoir will be built on a relatively flat site and be used to accumulate and store water for timely application through an irrigation system. The water source could be a stream or an irrigation district canal.

Feature Measure: Volume of Earth Excavated

Scenario Unit: Cubic Yard

Scenario Typical Size: 19,600.0

Scenario Total Cost: $50,433.69

Total Cost per Unit: $2.57

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 436 - Irrigation Reservoir

Scenario: #47 - Plastic tank, less than or equal to 1,000 gallons

Scenario Description:

A 1,000 Gallon, above-ground, High Density Polyethylene plastic enclosed tank, is installed on 6" of well-compacted drain rock or a 4" thick reinforced concrete support pad, to store water from a reliable source for irrigation of an area less than one acre. The scenario assumes the typical dimensions of the tank are 72" in diameter and 66" tall. The scenario also assumes a 96" diameter gravel base or concrete pad to extend a minimum of 12" past the base of tank for adequate foundation support. This cost estimate scenario is for cost of the tank and pad only and does not include estimate for pumps, pipe, or connecting fittings. Resource Concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 533 - Pumping Plant; 447 - Irrigation System, Tailwater Recovery.

Before Situation:

Insufficient volume of water to complete an irrigation cycle at the required flow rate.

After Situation:

An above-ground plastic tank, constructed to withstand the elements, is used to accumulate and store water between irrigation cycles for a very small irrigation system. This allows for an improved flow rate and timing of water application. Sources of water could be a well, a domestic water system, a large roof area, a water ram , or a pump drawing water from a stream.

Feature Measure: Volume of Tank Storage

Scenario Unit: Gallon

Scenario Typical Size: 1,000.0

Scenario Total Cost: $2,572.80

Total Cost per Unit: $2.57

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 441 - Irrigation System, Microirrigation

Scenario: #2 - Surface PE, with emitters, trees and shrubs

Scenario Description:

A micro-irrigation system, utilizing surface PE tubing (can be placed on trellis or above ground) with emitters to provide irrigation for an orchard, vineyard, windbreak, or other specialty crop grown in a grid pattern. The typical system is a permanent system, installed on a 3 row 1000' windbreak on the ground surface (total of 3000' lf). The windbreak has a plant spacing of 8 feet between trees. This system utilizes emitters at each tree or plant as the water application device, amounting to 375 emitters for this system. This system typically includes a filter system, PE tubing, HDPE or PVC manifolds, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr. at each individual lateral discharge point. Does not include Pump, Power source, Water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 380-Windbreak/Shelterbelt Establishment, 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 433 - Irrigation Flow Measurement, 610 - Salinity & Sodic Soil Management, 434 - Soil Moisture Measurement, 328-Conservation Crop Rotation, and 590 Nutrient Management.

Before Situation:

A tree row has an insufficient available water source causing plant health (establishment and persistence) concerns.

After Situation:

A surface placed microirrigation system is utilized to provide highly efficient irrigation to a tree row to address plant health concerns.

Feature Measure: Number of trees or shrubs

Scenario Unit: Each

Scenario Typical Size: 375.0

Scenario Total Cost: $1,522.60

Total Cost per Unit: $4.06

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 441 - Irrigation System, Microirrigation

Scenario: #3 - Surface PE, with emitters, high tunnel

Scenario Description:

A micro-irrigation system, utilizing surface PE tubing (can be placed on trellis or above ground) with emitters to provide irrigation in a seasonal high tunnel used for various vegetables or specialty crops grown in a grid pattern. The typical system is a permanent system, installed in a 30 ft by 72 ft high tunnel, with crop rows spaced at 12" to 18" with narrow alley walkways every other row. This system utilizes emitters at or near each plant as the water application device. This system typically includes a filter system, PE tubing, HDPE or PVC manifolds, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr. at each individual lateral discharge point. Does not include Pump, Power source, Water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 798-Seasonal High Tunnel System for Crops, 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 433 - Irrigation Flow Measurement, 610 - Salinity & Sodic Soil Management, 434 - Soil Moisture Measurement, 328-Conservation Crop Rotation, and 590 Nutrient Management.

Before Situation:

Vegetable or specialty crop has an insufficient available water source causing plant health (establishment and persistence) concerns.

After Situation:

A surface placed microirrigation system is utilized to provide highly efficient irrigation to vegetable or specialty crop to address plant health concerns.

Feature Measure: Area inside high tunnel syst

Scenario Unit: Square Foot

Scenario Typical Size: 2,160.0

Scenario Total Cost: $2,656.25

Total Cost per Unit: $1.23

Based on North Dakota average costs. Individual county costs may vary.

Practice: 441 - Irrigation System, Microirrigation

Scenario: #15 - Surface Tape <5 acres

Scenario Description:

A micro-irrigation system using drip tape or similar type micro-irrigation material placed on the soil surface for vegetables or field crops. Spacing of drip tape or similar type micro irrigation material is based on soil type or row alignment but will typically vary from 18" to 36". This system typically includes a filter system, PE manifolds fittings, drip tape, etc. This practice applies to systems designed to discharge < 60 gal/hr. at each individual discharge point. Does not include Pump, power source, water source. Surface placed drip tape will not meet the 441 practice life and will normally need replacement every year. After first installation drip tape will be replaced as operation and maintenance issue as required for proper operation of the system. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and Facilities. Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, 590 Nutrient Management, and 595-Itegrated Pest Management.

Before Situation:

A typical before irrigation situation would normally be an existing inefficient sprinkler or surface irrigation system for vegetable or other crop production system. The existing irrigation system would experience poor, nonuniform irrigation applications

After Situation:

A surface placed microirrigation system is utilized to provide highly efficient irrigation to a field. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced. Drip tape will be replaced as operation and maintenance issue as required for proper operation of the system. A typical scenario consists of a 1/2 acre irrigated field with lateral spacing of 2 feet.

Feature Measure: Acres in System

Scenario Unit: Acre

Scenario Typical Size: 0.5

Scenario Total Cost: $2,480.85

Total Cost per Unit: $4,961.70

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 441 - Irrigation System, Microirrigation

Scenario: #75 - Small Microirrigation System

Scenario Description:

A small scale surface microirrigation system using drip tape or similar type micro-irrigation material placed on the soil surface to irrigate vegetables or field crops. Typically applied on a 40' by 40' plot, with 24" spaced rows, and emitters on a 12" spacing. Submains break plot into several smaller zones. System includes disk filter and chemical injection for chemigation. Water meter is not included. Natural Resource Concern(s): Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533 - Pumping Plant, 449 - Irrigation Water Management, 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 328 - Conservation Crop Rotation, and 590 - Nutrient Management.

Before Situation:

A field has an inefficient garden-hose based sprinkler irrigation system causing irrigation water loss that impacts water quality and water quantity.

After Situation:

A surface placed microirrigation system is utilized to provide highly efficient irrigation to a small plot. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on-site water use is reduced.

Feature Measure: Microirrigation area

Scenario Unit: Square Foot

Scenario Typical Size: 1,600.0

Scenario Total Cost: $2,044.66

Total Cost per Unit: $1.28

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 442 - Sprinkler System

Scenario: #1 - Gravity to Pivot Conversion

Scenario Description:

Description: Installation of a low pressure center pivot system. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications). Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

Before Situation:

A 160 acre field is flood irrigated. Application of irrigation water is inefficient and non-uniform. Irrigation water is typically over applied in some parts of the field, and under applied in others. Deep percolation from the excess irrigation delivers e

After Situation:

The existing surface irrigation system is converted to a low pressure center pivot. Corners are converted to non-irrigated cropland. The pivot is 1300 feet in length with pressure regulators and low pressure sprinklers. The new irrigation system applies water efficiently and uniformly to maintain adequate soil water for the desired level of plant growth. Deep percolation and field runoff is eliminated and there are no excess nutrients, salts or pathogens delivered to the receiving waters. Irrigation induced runoff is eliminated. This center pivot scenario includes all hardware from the pivot point, including the concrete pad the pivot is placed on.

Feature Measure: Length of Center Pivot Later

Scenario Unit: Foot

Scenario Typical Size: 1,300.0

Scenario Total Cost: $118,268.00

Total Cost per Unit: $90.98

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 442 - Sprinkler System

Scenario: #3 - System Renovation, Renozzle with Drops

Scenario Description:

Center Pivot and Linear Move sprinkler systems are used in large crop fields with fairly regular field borders and flat topography. The scenario involves changing nozzles on center pivot or lateral move irrigation systems to low-pressure systems to improve efficiency of water use and reduce energy use. This scenario is intended for cropland areas where the objective is water or energy conservation. A typical scenario assumes a 1300 LF span, renozzled with low-pressure nozzles and pressure regulators on drops. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications), Inefficient Energy Use (Equipment and facilities e.g. pumping) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

Before Situation:

A center pivot is irrigating cropland that is being irrigated using a system in which all nozzles are operating above 35 psi on the mainline pipe. The nozzles are worn and water is applied non-uniformly. Water runs off the field and degrades the receiving

After Situation:

A Center Pivot or Linear Move sprinkler system with a span of 1300 linear feet is re-nozzled with low-pressure nozzles (<=35 psi) and pressure regulators on drops. The irrigation water is applied efficiently and uniformly to maintain adequate soil moisture for optimum plant growth. Runoff and deep percolation are eliminated, and the surface and ground water is no longer degraded. The irrigation induced soil erosion caused by runoff is also eliminated. The lower pressure sprinklers reduce the energy used by the pump when the pump is modified to match lower pressure requirements.

Feature Measure: Number of Nozzles Installed

Scenario Unit: Each

Scenario Typical Size: 232.0

Scenario Total Cost: $8,932.30

Total Cost per Unit: $38.50

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 442 - Sprinkler System

Scenario: #4 - Gravity to Pivot Conversion with VRI

Scenario Description:

Upgrading existing irrigation system with a more uniform and efficient (vendor provided and installed modular system) Center Pivot system for the purpose of protecting water quality and utilizing water effectively. Integrating variable application technology onto a center pivot system for precision zone placement of water along the length of the system for water savings. A variable application over the field based either 1) EM mapping and a grid system, 2) previous year(s) harvest yield maps or 3) soil properties, or combination of each. This scenario is a new system to replace an existing gravity system, with the proper components, nozzles, and pressure regulating devices, along with other needed components for installation of a VRI system for more effective utilization of water. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications), Inefficient Energy Use (Equipment and facilities e.g. pumping), and protection of wetland areas enrolled in conservation program and other environmentally sensitive areas. Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449), Wetland Restoration (657), Wetland Enhancement (658) Wetland Creation (659)

Before Situation:

Flood application of irrigation water is inefficient and non-uniform. Irrigation water is typically over applied in some parts of the field, and under applied in others. Deep percolation from the excess irrigation delivers excess nutrients salts, and chem

After Situation:

A new Center Pivot or Linear Move sprinkler system with a span of 1300 linear feet and a modular VRI system which increases irrigation efficiency and uniformity utilizing a modern center pivot system resulting in water savings. The irrigation water is applied efficiently and uniformly to maintain adequate soil moisture for optimum plant growth. Runoff and deep percolation are eliminated, and the surface and ground water is no longer degraded. The irrigation induced soil erosion caused by runoff is also eliminated. The lower pressure requirements of the sprinklers reduces the energy used by the pump.

Feature Measure: Length of Center Pivot or La

Scenario Unit: Foot

Scenario Typical Size: 1,300.0

Scenario Total Cost: $178,900.00

Total Cost per Unit: $137.62

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 442 - Sprinkler System

Scenario: #5 - VRI System Retrofit Zone

Scenario Description:

Integrating variable application technology onto a center pivot system for precision zone placement of water along the length of the system for water savings. A variable application over the field based either 1) EM mapping and a grid system, 2) previous year(s) harvest yield maps or 3) soil properties, or combination of each. This scenario is to renovate a previously irrigation system with proper modular components and pressure regulating devices, with GPS for field location and new control panel to update existing panel, along with other needed components to install a VRI system for more effective utilization of water. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications), Inefficient Energy Use (Equipment and facilities e.g. pumping), and protection of wetland areas enrolled in conservation program and other environmental sensitive areas. Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449), Wetland Restoration (657), Wetland Enhancement (658) Wetland Creation (659)

Before Situation:

A center pivot or lateral move system has low pressure sprinklers. Water runs off the field and degrades the receiving waters. Deep percolation in some parts of the field degrades the ground water quality. The runoff from the field causes soil erosion. Th

After Situation:

A Center Pivot or Linear Move sprinkler system with a span of 1300 linear feet is has modular VRI components added to the system which increases irrigation efficiency and uniformity utilizing a modern center pivot system resulting in water savings. The irrigation water is applied efficiently and uniformly to maintain adequate soil moisture for optimum plant growth. Runoff and deep percolation are eliminated, and the surface and ground water is no longer degraded. The irrigation induced soil erosion caused by runoff is also eliminated. The lower pressure requirements of the sprinklers reduces the energy used by the pump.

Feature Measure: Length of Center Pivot or La

Scenario Unit: Foot

Scenario Typical Size: 1,300.0

Scenario Total Cost: $65,209.22

Total Cost per Unit: $50.16

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 442 - Sprinkler System

Scenario: #67 - Small Solid Set, Above Ground Laterals

Scenario Description:

A permanent solid set irrigation system with buried submains and above ground laterals such as polyethylene flexible tubing. The typical system is installed on a 2 acre orchard or nursery, with plant spacing of 15 feet x 22 feet. Laterals are spaced 22 feet apart, however other spacing for this scenario apply. This system utilizes sprayers or minisprinklers at each tree or plant. This system typically includes a filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, and emitters. System installation does not include a flowmeter, Pump, Power source, Irrigation Water Conveyance to the irrigated field, or Water source (well or reservoir). Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449).

Before Situation:

The typical installation will be on an orchard, nursery, or vineyard with an existing inefficient irrigation system.

After Situation:

An irrigation system is utilized to provide improved distribution uniformity and irrigation efficiency to an orchard, nursery, or vineyard. Runoff and water applications are reduced, resulting in offsite water quality improvement and on site water use reduction.

Feature Measure: Area in Irrigation System

Scenario Unit: Acre

Scenario Typical Size: 2.0

Scenario Total Cost: $7,156.53

Total Cost per Unit: $3,578.27

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 442 - Sprinkler System

Scenario: #72 - Linear Move System

Scenario Description:

Installation of a linear or lateral move sprinkler system with sprinklers on drops with or without drag hoses to improve irrigation efficiency and reduce soil erosion. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications), Inefficient Energy Use (Equipment and facilities e.g. pumping) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449) Payment rate is figured per foot of installed hardware length.

Before Situation:

A 76 acre field is flood irrigated. Application of irrigation water is inefficient and non-uniform. Irrigation water is typically over applied in some parts of the field, and under applied in others. Deep percolation from the excess irrigation delivers ex

After Situation:

A typical unit is approximately 76 acres in size with the sprinkler system up to 1280 feet in length with drop tubes that have a minimum of 30" spacing. The new irrigation system has a coefficient of uniformity above 85%. Irrigation water is efficiently and uniformly applied to maintain adequate soil water for the desired level of plant growth. Deep percolation and field runoff is eliminated and there are no excess nutrients, salts or pathogens delivered to the receiving waters. Irrigation induced runoff is eliminated.

Feature Measure: Length of Linear Move Later

Scenario Unit: Foot

Scenario Typical Size: 1,280.0

Scenario Total Cost: $183,835.67

Total Cost per Unit: $143.62

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 443 - Irrigation System, Surface and Subsurface

Scenario: #2 - Aluminum Gated Pipe

Scenario Description:

Installation of surface Aluminum gated pipe to efficiently convey and distribute irrigation water in irrigation furrows, borders, or contour levees. A typical scenario would include 1,320 feet of 10-inch Aluminum gated pipe, with 40 inch gate spacing used to irrigate 60 acres. Appurtenances include: gates, couplings, fittings, in-line valves, pressure relief valves, and air vent valves. Does not include flow meters, or a permanent inlet structure with or without filtration. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable Plant productivity and health. Associated Practices: 464-Irrigation Land leveling, 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 328-Conservation Crop Rotation, and 590 Nutrient Management.,

Before Situation:

Typical before situation would include conveyance of water to surface irrigation distribution points with earthen ditches and distribution to individual furrows, borders, or contour levies by siphon tubes. The existing system would experience significant

After Situation:

The installation of aluminum gated pipe will improve distribution uniformity, irrigation efficiency, and eliminate or reduce ditch seepage by conveying and distributing irrigation water in irrigation furrows, borders, or contour levees.

Feature Measure: Area of field served by pipe

Scenario Unit: Acre

Scenario Typical Size: 60.0

Scenario Total Cost: $18,469.35

Total Cost per Unit: $307.82

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 443 - Irrigation System, Surface and Subsurface

Scenario: #3 - Polyvinyl Chloride (PVC) Gated Pipe

Scenario Description:

Installation of surface PVC gated pipe to efficiently convey and distribute irrigation water in irrigation furrows, borders, or contour levees. A typical scenario would include 1,320 feet of 10-inch PVC gated pipe, with 40 inch gate spacing used to irrigate 60 acres. Appurtenances include: gates, couplings, fittings, in-line valves, pressure relief valves, and air vent valves. Does not include flow meters, or a permanent inlet structure with or without filtration. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable Plant productivity and health. Associated Practices: 464-Irrigation Land leveling, 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 328-Conservation Crop Rotation, and 590 Nutrient Management.,

Before Situation:

Typical before situation would include conveyance of water to surface irrigation distribution points with earthen ditches and distribution to individual furrows, borders, or contour levies by siphon tubes. The existing system would experience significant

After Situation:

The installation of PVC gated pipe will improve distribution uniformity, irrigation efficiency, and eliminate or reduce ditch seepage by conveying and distributing irrigation water in irrigation furrows, borders, or contour levees.

Feature Measure: Area of field served by pipe

Scenario Unit: Acre

Scenario Typical Size: 60.0

Scenario Total Cost: $9,452.63

Total Cost per Unit: $157.54

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 447 - Irrigation and Drainage Tailwater Recovery

Scenario: #4 - Drainage Water Recycling

Scenario Description:

A drainage water recycling system is constructed to collect water from a subsurface drainage system and apply the water back to the field through the existing drainage system at appropriate times of year. Drainage water from the subsurface drainage system will be collected in a pond. If a pond needs to be constructed, it will be designed and built to meet NRCS CPS 378 criteria; the pond is separate from this scenario. A sump will be constructed so that the collected drainage water in the pond can be recovered and recycled through a pipeline system. The pipeline system utilizes a recirculating pipe and includes a buried storage tank at the upper end of the field to allow the pump to cycle. The recirculating pipe length is measured from the location of the sump at the pond to the location of the storage tank, and the distribution pipe from the storage tank to connect up to the drainage system. A water control structure allows the operator to control the timing and amount of water to enter back into the drainage water management system. This scenario applies to all types of drainage water recycling systems; the typical implementation scenario design is based on a 40 acre subsurface drainage system approx. 1320 ft on each side (1/4 mile square field, with an average land slope of 2%,) with a soil type of Drummer silty clay loam having an average drain flow of 0.132 cm/day. A pump moves water from the sump at a rate that can supply the crop field 0.1 inch of water in an 8 hour period. The recirculating pipe is 6??? PVC, 1150 ft long from sump to storage tank. Resource concerns that will be addressed by this practice: Nutrients Transported to Surface Water, Pesticides transported to surface water, Pathogens and chemicals from manure, biosolids, or compost applications transported to surface water, Plant productivity and health.

Before Situation:

Drained water from the field travels off farm in a drainage ditch, carrying excess nutrients with it, and causing water quality issues downstream.

After Situation:

Drainage water from a subsurface drainage system is collected and directed into a recovery system where the drained water and associated nutrients can be recycled and reused. The drainage water is reapplied through the subsurface drainage system to the crop field during times of year when the extra water will not negatively affect the crop or field operations. The subsurface drainage system must be capable of being managed using drainage water management so that the reapplied water will soak into the soil instead of drain off; retrofit the drainage system if needed using CPS 606 and 587. Use CPS 378 if a pond is not already in place to capture the drainage water. Drainage water from the field is no longer a significant contributor of nutrients to surface water. Associated practices are Pond (378), Subsurface Drain (606), Drainage Water Management (554), Structure for Water Control (587) and Critical Area Planting (342).

Feature Measure: Length of Recirculating Pipe

Scenario Unit: Linear Foot

Scenario Typical Size: 1,150.0

Scenario Total Cost: $35,627.90

Total Cost per Unit: $30.98

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 449 - Irrigation Water Management

Scenario: #2 - IWM, Intermediate Technique, 1st year

Scenario Description:

This practice includes the installation of electrical soil moisture sensors such as capacitance or resistance sensors that are monitored to determine soil moisture. This scenario includes purchasing soil moisture sensors, installation equipment (probe or auger), and a data logger to log continuous soil moisture data that can be downloaded to a personal computer and associated graphing software. This scenario is intended to be used as a one-time payment for the first year in multiple year IWM contracts. Typical Scenario involves installation of sensors at a single location in a 125 acre field of sprinkler irrigated cropland. Producer periodically monitors soil moisture sensors during the growing season. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 449- Irrigation Water Management, 587-Structure for water Control, 328-Conservation Crop Rotation, 590-Nutrient Management, 442-Irrigation System, Sprinkler, and Irrigation System, Microirrigation 441.

Before Situation:

Producer uses feel method to estimate soil moisture for scheduling irrigation in the field.

After Situation:

Producer has installed at least three sensors at each monitoring site to a depth of three feet with one sensor representing each foot of depth. Producer periodically downloads continuously recorded soil moisture measurements that are used to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use.

Feature Measure: Number of measuring sites

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $2,316.47

Total Cost per Unit: $2,316.47

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 449 - Irrigation Water Management

Scenario: #3 - IWM, Intermediate Technique, Subsequent Years

Scenario Description:

This practice includes the installation of electrical soil moisture sensors such as capacitance or resistance sensors that are monitored to determine soil moisture. This scenario includes the installation of soil moisture sensors and a data logger(s) to log continuous soil moisture data that can be downloaded to a personal computer and associated graphing software. This scenario is intended to be used as a subsequent payment for multiple year IWM contracts after the monitoring equipment was purchased or is already available. Typical Scenario involves installation of sensors at a single location in a 125 acre field of sprinkler irrigated cropland. Producer periodically monitors soil moisture sensors during the growing season. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 449- Irrigation Water Management, 587-Structure for water Control, 328-Conservation Crop Rotation, 590-Nutrient Management, 442-Irrigation System, Sprinkler, and Irrigation System, Microirrigation 441.

Before Situation:

Producer uses feel method to estimate soil moisture for scheduling irrigation in the field.

After Situation:

Producer has installed at least three sensors at each monitoring site to a depth of three feet with one sensor representing each foot of depth. Producer periodically downloads continuously recorded soil moisture measurements that are used to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use.

Feature Measure: Acres under irrigation

Scenario Unit: Acre

Scenario Typical Size: 125.0

Scenario Total Cost: $1,337.19

Total Cost per Unit: $10.70

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 449 - Irrigation Water Management

Scenario: #4 - IWM, Advanced Technique

Scenario Description:

A high intensity irrigation water management system for producers using a checkbook method with advanced methods of determining irrigation water applied, and estimating crop evapotranspiration, monitoring field soil moisture, or monitoring crop temperature stress. Typical methods include flow measurement, daily record keeping, and use of real-time evapotranspiration estimates (such as those provided dedicated weather stations) and/or soil moisture sensors with automated data logging to monitor field soil moisture content and/or crop temperature. For this scenario, soil moisture is determined by automated soil moisture monitoring stations equipped with telemetry data. Irrigation amounts are recorded from a flow meter near the pump. Telemetry data is automatically sent to a computer with irrigation software. Irrigator also receives real time data via mobile phone applications. Some data such as total water applied may be entered into computer software manually. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 449- Irrigation Water Management, 587-Structure for water Control, 328-Conservation Crop Rotation, 590-Nutrient Management, 442-Irrigation System, Sprinkler, and Irrigation System, Microirrigation 441.

Before Situation:

The farmer decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 125 acre corn field with sprinkler irrigation.

After Situation:

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

Feature Measure: Irrigation system

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $4,250.88

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $4,250.88

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 449 - Irrigation Water Management

Scenario: #88 - IWM w weather station

Scenario Description:

This practice includes the installation of a weather station that is monitored to determine crop water use, status of heat and/or frost conditions to permit the producer to make informed irrigation decisions. The installation includes the purchase and installation of equipment, and a data logger to log continuous weather data including rainfall, temp, solar radiation, humidity, wind speed and soil moisture sensors that can be downloaded to a personal computer and associated graphing software. Typical Scenario involves installation on a 120 acre field of irrigated cropland. Producer periodically monitors the station during the growing season to determine timing and amounts of water to apply based on soil moisture sensors, field checks and weather station data. Producer keeps records of collected data and resulting irrigation decisions. This scenario only applies to year one of IWM. The appropriate labor-only IWM scenario applies in subsequent contract years. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Water Quality; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface

Before Situation:

To meet crop water requirements, the producer schedules irrigations based on the calendar and what has apparently worked in the past. For cooling/frost protection, irrigation start and run times are based on broad regional weather forecasts.

After Situation:

Producer has installed a weather station and periodically downloads continuously recorded data that is used to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use. Field checks are made by irrigator to ground truth station data with crop.

Feature Measure: Number of weather stations

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $6,411.84

Total Cost per Unit: $6,411.84

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 449 - Irrigation Water Management

Scenario: #137 - Basic IWM < 1 acre

Scenario Description:

A low Intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). The irrigation water management system is typically located on a small-scale agricultural operation cultivated by an individual or a group of people (e.g., repurposed land, private or community-gardens). Multiple crops are grown in the same space or within the growing season on less than 1 acre. For a typical scenario, soil moisture is determined by the feel method, volumes of irrigation water are based on energy or water district bills, records are kept on paper copies, and calculations are made by hand. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface.

Before Situation:

A sub-acre mixed or intercropped area is irrigated with a sprinkler or microirrigation system. The irrigator decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent

After Situation:

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

Feature Measure: Number

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,572.71

Total Cost per Unit: $1,572.71

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 460 - Land Clearing

Scenario: #49 - Non-Heavy Equipment

Scenario Description:

Site preparation of a field with a labor crew, chainsaws, chippers or similar equipment removing trees and shrubs to achieve a conservation objective. Typical scenario is approximately 1 acre of trees and shrubs to be cleared. The resource concern is determined by the conservation objective met with the final practice applied to the field.

Before Situation:

Forested field of approximately 1 acre, with moderate density evenly spaced tree canopy.

After Situation:

Labor crew uses chainsaws, chippers, or similar equipment to clear trees and prepare the field for a conservation objective, includes on-site disposal as necessary. Associated practices, like plantings, other structures, or irrigation/drainage water management practices, would be contracted separately as needed.

Feature Measure: Area Cleared

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $1,277.62

Total Cost per Unit: $1,277.62

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 460 - Land Clearing

Scenario: #50 - Heavy Equipment

Scenario Description:

Site preparation of a field with dozer or equivalent heavy equipment to achieve a conservation objective. Typical scenario is approximately 10 acres of trees and shrubs to be cleared. The resource concern is determined by the conservation objective met with the final practice applied to the field.

Before Situation:

Forested field of approximately 10 acres, with moderate density evenly spaced tree canopy.

After Situation:

Crew uses 200 HP dozer to clear trees and prepare field for conservation objective, includes on-site debris disposal as necessary. Associated practices, like plantings, other structures, or irrigation/drainage water management practices, would be contracted separately as needed.

Feature Measure: Area Cleared

Scenario Unit: Acre

Scenario Typical Size: 10.0

Scenario Total Cost: $12,256.75

Total Cost per Unit: $1,225.67

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 462 - Precision Land Forming and Smoothing

Scenario: #28 - Minor Shaping

Scenario Description:
The land surface is shaped or leveled to a specific elevation and grade for various land uses. Cuts and fills are small. The resource concerns are EXCESS / INSUFFICIENT WATER -(Ponding, Flooding) and SOIL EROSION -(Sheet, Rill)

Before Situation:
The field has minor topographic issues or problems with surface drainage or erosion which can be corrected without land leveling or land smoothing. Site conditions require attention to elevation and grade. Typical situation is a 5 acre field. Material to

After Situation:
Land has been shaped to the required elevations and grades. Resource concerns have been treated. Associated practices, like plantings or drainage water management practices, would be contracted separately as needed.

Feature Measure: Acres of land treated

Scenario Unit: Acre

Scenario Typical Size: 5.0

Scenario Total Cost: $3,992.80

Total Cost per Unit: $798.56

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 462 - Precision Land Forming and Smoothing

Scenario: #29 - Site Stabilization

Scenario Description:

The site contains a gully or other site specific topographic problem. Site conditions require attention to elevation and grade. Resource concerns are EXCESS / INSUFFICIENT WATER -(Ponding, Flooding) and SOIL EROSION -(Sheet, Rill)

Before Situation:

The site, commonly a crop field or CAFO, has localized gully or topographic issues causing drainage or erosion problems. Typical situation is a gully 10 feet wide and 5 feet deep.

After Situation:

Land has been shaped to the required elevations and grades. Resource concerns have been treated. Associated practices, like plantings or drainage water management practices, would be contracted separately as needed.

Feature Measure: Cubic yards of material plac

Scenario Unit: Cubic Yard

Scenario Typical Size: 6,000.0

Scenario Total Cost: $15,407.94

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $2.57

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 464 - Irrigation Land Leveling

Scenario: #19 - Small Scale Irrigation Land Leveling

Scenario Description:

This is scenario will level a typical 10 acres of irrigated crop land surface to enhance uniform flow of surface water to improve irrigation efficiency using dirtpans/carry-all/pan-scraper equipment. The typical volume of earth moved is 100 to 500 cubic yards per acre. Resource Concern: Excess/Insufficient - Inefficient Use of Irrigation Water Associated Conservation Practices: 433 - Irrigation System, Surface and Subsurface; 607 - Surface Drain, Field Ditch; 388 - Irrigation Field Ditch; 449 - Irrigation Water Management; or 587 - Structure for Water Control.

Before Situation:

Irregular field surface reduces uniformity of surface application and thus irrigation efficiency by localized ponding and/or excess runoff/run-on.

After Situation:

Cropland will be reshaped to provide uniform distribution of irrigation water in order to promote irrigation efficiencies.

Feature Measure: Acres of Area

Scenario Unit: Acre

Scenario Typical Size: 10.0

Scenario Total Cost: $11,646.39

Total Cost per Unit: $1,164.64

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 464 - Irrigation Land Leveling

Scenario: #33 - Irrigation Land Leveling

Scenario Description:

This is scenario will level a typical 80 acres of irrigated crop land surface to enhance uniform flow of surface water to improve irrigation efficiency using dirtpans/carry-all/pan-scraper equipment. The typical volume of earth moved is 100 to 500 cubic yards per acre. Resource Concern: Excess/Insufficient - Inefficient Use of Irrigation Water Associated Conservation Practices: 433 - Irrigation System, Surface and Subsurface; 607 - Surface Drain, Field Ditch; 388 - Irrigation Field Ditch; 449 - Irrigation Water Management; or 587 - Structure for Water Control.

Before Situation:

Irregular field surface reduces uniformity of surface application and thus irrigation efficiency by localized ponding and/or excess runoff/runon.

After Situation:

Cropland will be reshaped to provide uniform distribution of irrigation water in order to promote irrigation efficiencies.

Feature Measure: Volume of Earth Moved

Scenario Unit: Cubic Yard

Scenario Typical Size: 28,000.0

Scenario Total Cost: $68,851.23

Total Cost per Unit: $2.46

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 468 - Lined Waterway or Outlet

Scenario: #1 - Turf Reinforced Matting, Moderate Stress

Scenario Description:

Install approximately 46' long trapezoidal (or similar parabolic shape) waterway, with 20' wide bottom, 1.1' depth, and 4:1 side slopes, lined with Turf Reinforced Matting (TRM). The profile includes a 4' long level approach apron, a 32' long section at 12.5% grade (4' drop), and a 10' long level exit apron depressed 1' below outlet channel grade. Ideally, all TRM is placed on an excavated surface, typically immediately upstream of a headcut. Excess excavation is spread in the immediate area. TRM is installed on the bottom and side slopes of the waterway to prevent scour and aid in waterway establishment. Costs include excavation to channel grade, earthfill in transverse approach berm and side berms, earthwork to blend aprons to existing ground, spreading of excess material, and furnishing and installing TRM. TRM is installed by laborers. Required TRM has a moderate allowable stress of less than 12 pounds per square foot in the fully vegetated condition. Unit cost for TRM is assumed to include a surcharge for anchorage and overlap, typically 1' at upstream end, 0.5' at downstream end, side terminations, and 0.5' overlaps; such associated additional quantities are generally not part of the measured quantity for payment.

Before Situation:

Excessive soil erosion and sedimentation are a result of ephemeral or classic gully erosion. Velocities are generally too high or saturated soil conditions make it difficult to establish a grassed waterway without a lining material.

After Situation:

The TRM lined waterway provides a surface capable of withstanding moderate flow velocity and stress to maintain a stable channel configuration. The measured quantity for payment excludes amounts necessary for terminal anchorage and overlap. Associated practices are Grassed Waterway (412), Subsurface Drain (606), Underground Outlet (620), Structure for Water Control (587), and Critical Area Seeding (342).

Feature Measure: Square Foot of Waterway

Scenario Unit: Square Foot

Scenario Typical Size: 1,340.0

Scenario Total Cost: $4,126.46

Total Cost per Unit: $3.08

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 468 - Lined Waterway or Outlet

Scenario: #4 - Rock Lined, 24 in

Scenario Description:

Install 300 ' long by 15' wide by 1.5' deep with 2:1 side slopes trapezoidal or parabolic shaped waterway lined with 24" thick riprap (D100 = 18", Velocity ~ 11 ft/sec). 1/2 the channel is excavated, before excavation for riprap. Excess excavation is spoiled in the immediate area. Riprap is installed over 100% of the width of the waterway to prevent scour. Cost include excavation, spoiling of excess material, geotextile underlayment and installing 18" Rock Riprap. Lined waterway width is measured from top of bank to top of bank. (9'+3.35'+3.35') x 300' = 4710 Square Feet

Before Situation:

Excessive sedimentation and soil erosion as a result of ephemeral or classic gully erosion. Velocities are generally too high or saturated soil conditions make it difficult to establish a grassed waterway.

After Situation:

Rock lined waterway is 300 ' long by 15' wide by 1.5' deep with 2:1 side slopes. Waterway is excavated and rock is placed using a hydraulic excavator. Geotextile underlayment is installed by laborers. Associated practices are Subsurface Drain (606), Underground Outlet (620), Structure for Water Control (587), and Critical Area Seeding (342).

Feature Measure: Square Foot of Waterway

Scenario Unit: Square Foot

Scenario Typical Size: 4,710.0

Scenario Total Cost: $73,196.57

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $15.54

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 468 - Lined Waterway or Outlet

Scenario: #5 - Concrete - NP Reg 1

Scenario Description:

Install 300 ' long by 15' wide by 1.5' deep with 2:1 sides slopes trapezoidal or parabolic shaped waterway lined with concrete. 1/2 the channel is excavated, before excavation for concrete and subgrade material. Excess excavation is spoiled in the immediate area. Concrete is installed over 100% of the width of the waterway to prevent scour. Cost include excavation, spoiling of excess material, 6" of clean sand or gravel subgrade, and 5" reinforced concrete slab. Lined waterway width is measured from top of bank to top of bank. (9'+3.35'+3.35') x 300' = 4710 Square Feet

Before Situation:

Excessive sedimentation and soil erosion as a result of ephemeral or classic gully erosion. Velocities are generally too high or saturated soil conditions make it difficult to establish a grassed waterway. Usually installed in locations where rock or othe

After Situation:

Concrete lined waterway is 300 ' long by 15' wide by 1.5' deep with 2:1 side slopes. Waterway is excavated using a hydraulic excavator. Concrete slab is placed on 6" of clean sand or #57 stone. Concrete is placed, graded and screeded by laborers. Associated practices are Subsurface Drain (606), Underground Outlet (620), Structure for Water Control (587), and Critical Area Seeding (342).

Feature Measure: Square Foot of Waterway

Scenario Unit: Square Foot

Scenario Typical Size: 4,710.0

Scenario Total Cost: $47,140.71

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $10.01

Practice: 468 - Lined Waterway or Outlet

Scenario: #6 - Articulated Concrete Block

Scenario Description:

Install 300 ' long by 15' wide (at top) by 1.5' deep with 2:1 sides slopes trapezoidal or parabolic shaped waterway lined with articulated concrete block (ACB). 1/2 the channel is excavated, before excavation for ACB and subgrade material. Excess excavation is spoiled in the immediate area. Articulated concrete block is installed over 100% of the width of the waterway to prevent scour. Cost include excavation, spoiling of excess material, 3" of clean sand or gravel subgrade, and 6" height articulated concrete block. Lined waterway width is measured from top of bank to top of bank. (9'+3.35'+3.35') x 300' = 4710 Square Feet

Before Situation:

Excessive sedimentation and soil erosion as a result of ephemeral or classic gully erosion. Velocities are generally too high or saturated soil conditions make it difficult to establish a grassed waterway. Usually installed in locations where rock or othe

After Situation:

Articulated Concrete Block lined waterway is 300 ' long by 15' wide by 1.5' deep with 2:1 side slopes. Waterway is excavated using a hydraulic excavator. Articulated concrete block is placed on 3" of clean sand or gravel subgrade and installed with a hydraulic excavator, loader and laborers. Associated practices are Subsurface Drain (606), Underground Outlet (620), Structure for Water Control (587), and Critical Area Seeding (342).

Feature Measure: Square Foot of Waterway

Scenario Unit: Square Foot

Scenario Typical Size: 4,710.0

Scenario Total Cost: $56,805.75

Total Cost per Unit: $12.06

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 468 - Lined Waterway or Outlet

Scenario: #7 - Splash Pad

Scenario Description:

Install a 10'x10', 1' thick rock riprap pad at outlet into streams. Excess excavation is spoiled in the immediate area. Costs include 12" and smaller rock riprap installed. It does not include the cost of the required vegetation. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of concentrated water flow. Velocities are generally too high or saturated soil conditions make it difficult to maintain a stable outlet.

After Situation:

Runoff water is released through a stable outlet into streams or water courses without erosion or sedimentation. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Area of Splash Pad

Scenario Unit: Square Foot

Scenario Typical Size: 100.0

Scenario Total Cost: $1,237.90

Total Cost per Unit: $12.38

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 468 - Lined Waterway or Outlet

Scenario: #57 - Rock Lined, 12 inch

Scenario Description:

Install 300 ' long by 15' wide by 1.5' deep trapezoidal or parabolic shaped waterway lined with riprap (D100 = 9", Velocity ~ 8 ft/sec). 1/2 the channel is excavated, before excavation for riprap. Excess excavation is spoiled in the immediate area. Riprap is installed over 100% of the width of the waterway to prevent scour. Cost include excavation, spoiling of excess material, geotextile underlayment and installing 9" Rock Riprap. Lined waterway width is measured from top of bank to top of bank.

Before Situation:

Excessive sedimentation and soil erosion as a result of ephemeral or classic gully erosion. Velocities are generally too high or saturated soil conditions make it difficult to establish a grassed waterway.

After Situation:

Rock lined waterway is 300 ' long by 15' wide by 1.5' deep. Waterway is excavated and rock is placed using a hydraulic excavator. Geotextile underlayment is installed by laborers. Associated practices are Subsurface Drain (606), Underground Outlet (620), Structure for Water Control (587), and Critical Area Seeding (342).

Feature Measure: Square Foot of Waterway

Scenario Unit: Square Foot

Scenario Typical Size: 4,500.0

Scenario Total Cost: $32,904.79

Total Cost per Unit: $7.31

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 472 - Access Control

Scenario: #1 - Animal exclusion from sensitive areas (FI)

Scenario Description:

Exclude animals from an area in order to address identified resource concerns. This is for facilitating exclusion of animals to protect or enhance natural resource values and/or to allow for fuel loads to accumulate to address other resource issues. Control will be by permanent or temporary electric fencing. Any need for permanent fencing will be planned and installed using the Fence practice (382). Clearing of brush and trees is not necessary. Resource concerns include wildlife habitat degradation, undesirable plant productivity and health, and/or excessive sediment in surface waters.

Before Situation:

Sensitive areas are threatened by the adverse actions of domestic and/or wild animals. The importance of the sensitive areas can include (but are not limited to): wildlife habitat, plant species composition, newly established trees and/or plants, stream b

After Situation:

Adequate fuel loads are permitted to accumulate so that other conservation practices may be implemented and/or sensitive areas are protected from adverse actions of domestic and/or wild animals by excluding them from the area.

Feature Measure: Acres of Treatment

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $986.62

Total Cost per Unit: $24.67

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 472 - Access Control

Scenario: #15 - Trails/Roads Access Control

Scenario Description:
Restricting access to the use of forest/farm roads and trails by the use of a gate and limited fencing. Resource concerns include Undesirable plant productivity and health, Concentrated flow erosion, Soil compaction, Excessive sediment in surface waters, and Wildlife habitat degradation.

Before Situation:
Roads are damaged or misused, illegal activities occur and/or forest resources are at risk. Extensive amount of fencing (other than that needed to restrict access at the site of ingress) is not included in this scenario, but instead will be planned and in

After Situation:
Roads are protected, illegal activities are stopped and/or forest resources are secure.

Feature Measure: Number

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $885.95

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $885.95

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 484 - Mulching

Scenario: #2 - Erosion Control Blanket

Scenario Description:

Installation of erosion control blanket on critical areas with steep slopes, grassed waterways or diversions. Blanket is typically made of coconut coir, wood fiber, or straw, and is typically covered on both sides with polypropylene netting. Used to help control erosion and establish vegetative cover.

Before Situation:

There are areas of concentrated flow and a grassed waterway is being installed and seeded to permanent cover. Soil erosion is a concern and there is little to no vegetation.

After Situation:

The erosion control blanket is placed on concentrated flow areas and secured with ground staples. Soil erosion is minimized and vegetative cover is established.

Feature Measure: Total Area Mulched

Scenario Unit: Square Foot

Scenario Typical Size: 5,000.0

Scenario Total Cost: $1,667.18

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $0.33

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 484 - Mulching

Scenario: #3 - Woven Material, Square

Scenario Description:

Barrier fabric or other suitable natural or synthetic mulch is installed with a new tree and shrub planting. Typically used to retain moisture during the installation of conservation practices. Rate is per tree/shrub and assumes 1 square yard of barrier fabric and 5 staples/tree.

Before Situation:

Site conditions vary and erosion and wildlife habitat have been identified as concerns. Fabric squares (as mulch) are added to address soil moisture and temperature issues. Sites are often remote and trees may not be planted in rows, requiring each tree t

After Situation:

Barrier fabric squares are installed with 5 sod staples each, around individual trees and shrubs to retain moisture and regulate soil temperature.

Feature Measure: Number of Trees Mulched

Scenario Unit: Each

Scenario Typical Size: 100.0

Scenario Total Cost: $142.93

Total Cost per Unit: $1.43

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 484 - Mulching

Scenario: #4 - Woven Material, Roll

Scenario Description:

Barrier fabric or other suitable natural or synthetic mulch is installed with a new tree and shrub planting. Typically used to retain soil moisture, control soil temperature, and minimize erosion by providing cover during the installation of conservation practices. Two 300 foot tree rows will use barrier fabric to conserve moisture. Rate is per linear foot (300' roll x 2= 600') and 3 staples/pins per tree.

Before Situation:

Site conditions vary, and erosion and wildlife habitat have been identified as concerns. Barrier fabric (as mulch) is added to address soil moisture loss. Sites are typically on field edges, each tree row to be mulched individually.

After Situation:

Barrier fabric rolls are installed with 3 metal pins/staples per tree. Moisture is retained, temperature controlled, and erosion is minimized.

Feature Measure: Number of Trees Installed

Scenario Unit: Foot

Scenario Typical Size: 600.0

Scenario Total Cost: $550.20

Total Cost per Unit: $0.92

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 484 - Mulching

Scenario: #5 - Hydromulch

Scenario Description:

Installation of mulch through hydraulic methods on critical areas with steep slopes, grassed waterways or diversions. The mulch is comprised of wood cellulose fiber pulp and may include seed, fertilizer, and other approved materials. Mulch is typically applied at a rate of 1500 pounds per acre as a slurry by using hydroseeding methods. Used to help control erosion and establish vegetative cover.

Before Situation:

Areas being seeded to permanent cover. Soil erosion is a concern and there is little to no vegetation.

After Situation:

The hydro-mulch is applied to appropriate areas as needed for vegetation establishment. Soil erosion is minimized and vegetative cover is established.

Feature Measure: Area Covered by Mulch

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $1,190.95

Total Cost per Unit: $1,190.95

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 484 - Mulching

Scenario: #58 - Natural Material, Temporary

Scenario Description:

Application of straw mulch or other state approved natural material to reduce erosion and facilitate the establishment of vegetative cover. Mulch provides full coverage and is typically used with critical area planting. Assumes 2 tons of straw mulch per acre

Before Situation:

Typical scenario ranges from a 0.1 to 1.0 acre disturbed site around a newly constructed structural practice. The potential for soil erosion is high and mulch is needed to stabilize the soil and facilitate the establishment of vegetative cover.

After Situation:

Implementation Requirements are prepared according to the 484 Mulching Standard and implemented. Straw mulch has been applied to areas needing mulch. Erosion and sedimentation is reduced, water and soil quality is protected, and vegetative cover is established.

Feature Measure: Area Covered by Mulch

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $609.95

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $609.95

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 484 - Mulching

Scenario: #77 - Natural Material, Small Bale

Scenario Description:

Application of straw mulch or other state approved natural material to reduce erosion and facilitate the establishment of vegetative cover. Mulch provides full coverage over the row, shaped bed or raised bed. Typical row length is 2000 ft. Mulch is hand applied/spread minimum of 2 inches thick.

Before Situation:

Current crop production does not manage natural precipitation and soil moisture efficiently. Weed competition for soil moisture degrades plant productivity. Pesticides applied for full area coverage.

After Situation:

Implementation Requirements are prepared according to the 484 Mulching Standard. Straw mulch has been applied to areas needing mulch. Rows or beds received natural mulch to improve efficiency of naturally available water use. Pesticide use is reduced because the mulch prevents weeds in the crop rows.

Feature Measure: Area Covered by Mulch

Scenario Unit: Square Foot

Scenario Typical Size: 2,000.0

Scenario Total Cost: $847.28

Total Cost per Unit: $0.42

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 490 - Tree/Shrub Site Preparation

Scenario: #33 - Windbreak - Site Preparation

Scenario Description:

This practice involves the use of various chemical/tillage methods to allow for the planting of a windbreak. Site preparation includes chemically killing vegetation prior to mechanical site preparation that includes appropriate methods to allow for planting of the site which may include one or all of the following, ripping, disking, and harrowing. This practice may be applied on all lands needing treatment to facilitate establishment of trees and/or shrubs to facilitate establishment of a windbreak. Typical sites include open land such as old fields, pastures, rangelands and agricultural fields. Resource concerns: Soil erosion--Wind erosion, .

Before Situation:

Undesirable vegetation, including woody and herbaceous plants, is present on the site. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of tr

After Situation:

Undesirable vegetation has been treated using appropriate herbicides, reducing competition for target trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size is 1.5 acres.

Feature Measure: area of treatment

Scenario Unit: Acre

Scenario Typical Size: 1.5

Scenario Total Cost: $927.51

Total Cost per Unit: $618.34

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 490 - Tree/Shrub Site Preparation

Scenario: #64 - Tree-Shrub Site Prep - small acreage

Scenario Description:

This practice involves the use of various chemical and tillage methods to allow for the planting of agroforestry practices and hedgerows. Site preparation includes chemically killing vegetation prior to mechanical site preparation that includes appropriate methods to allow for planting of the site which may include one or all of the following: ripping, disking, and harrowing. This practice may be applied on all lands needing treatment to facilitate establishment of trees and shrubs to facilitate establishment of agroforestry practices (alley cropping, forest farming, riparian forest buffer, silvopasture, and windbreak) and hedgerows. Resource concern: Soil erosion - wind erosion.

Before Situation:

Undesirable vegetation, including woody and herbaceous plants, is present on the site. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of tr

After Situation:

Undesirable vegetation has been treated using appropriate herbicides, reducing competition for target trees and shrubs. Site conditions are favorable for successful establishment of trees and shrubs. The typical size is 0.5 acre.

Feature Measure: Area of treatment

Scenario Unit: 1,000 Square Feet

Scenario Typical Size: 22.0

Scenario Total Cost: $451.65

Total Cost per Unit: $20.53

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 490 - Tree/Shrub Site Preparation

Scenario: #73 - Windbreak/Shelterbelt Renovation - Heavy

Scenario Description:

Windbreak/shelterbelt renovation to remove deteriorated, damaged, diseased, or unsuitable trees or shrubs. The treatment may include removal of entire rows, or removal of selected trees/shrubs in order to prepare for the necessary planting of replacement trees and shrubs within the footprint of an existing windbreak, to improve the health and function of the windbreak. The treatment uses mechanized equipment to remove trees and/or shrubs with average DBH > 8 inches. Trees and shrubs are cleared with a Dozer, Excavator, and Skid Steer. All slash material from cutting and pruning is either scattered and crushed, piled and crushed, chipped, or removed from the treatment area. Windbreak width of 60' and length of 726' are used in calculations; this is equivalent to an area of 1 acre. Replanting of trees will use practice (380). Resource concerns include: Plant pest pressure, Plant productivity and health, Inadequate livestock shelter, Wind erosion.

Before Situation:

The health of trees and/or shrubs in a windbreak/shelterbelt has degraded as plants age, or plants may have been damaged by weather events or pests, decreasing the effectiveness of the original windbreak design. Plants lack leaf cover, have dead branches,

After Situation:

The integrity of 726 linear feet (one acre) of windbreak/ shelterbelt will be restored and is functioning properly to reduce wind impacts to plants, animals, humans, and structures.

Feature Measure: Length of removal

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $11,609.48

Total Cost per Unit: $11,609.48

Based on North Dakota average costs. Individual county costs may vary.

Practice: 500 - Obstruction Removal

Scenario: #1 - Removal and Disposal of Fence, Feedlot

Scenario Description:

Remove and disposal of all existing fences around a livestock feeding/waste facility by demolition, excavation or other means required for removal. Dispose of all fence materials from the site so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all materials by removal to an approved landfill, wood chipping and land distribution, or recycling center, burial at an approved location or burning. If burning is used, implement appropriate smoke management to protect public health and safety. Fence removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

Before Situation:

On headquarters or any land where existing feedlot fence interferes with planned land use development, public safety, or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natu

After Situation:

The typical feedlot fence will be 300 in linear feet. The removal of the fence will be performed with the use of equipment and hand labor. Dispose of all debris from the fence removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape such as Upland Wildlife Habitat Management (645).

Feature Measure: Length of Fence

Scenario Unit: Foot

Scenario Typical Size: 300.0

Scenario Total Cost: $1,977.23

Total Cost per Unit: $6.59

Based on North Dakota average costs. Individual county costs may vary.

Practice: 500 - Obstruction Removal

Scenario: #2 - Removal and Disposal of Fence, landscape

Scenario Description:

Remove and disposal of all existing fences by demolition, excavation or other means required for removal. Dispose of all fence materials from the site so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all materials by removal to an approved landfill, wood chipping and land distribution, or recycling center, burial at an approved location or burning. If burning is used, implement appropriate smoke management to protect public health and safety. Remove and dispose of the unwanted fence obstruction in order to apply conservation practices such as Upland Wildlife Habitat Management (645) or facilitate the planned land use. Fence removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment and reduce hazards to wildlife.

Before Situation:

On any land where existing fence interferes with planned land use development, public safety, wildlife movement and habitat, or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected

After Situation:

The typical fence will be 2640 in linear feet. The removal of the fence will be performed with the use of equipment and hand labor. Dispose of all debris from the fence removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape such as Upland Wildlife Habitat Management (645).

Feature Measure: Length of Fence

Scenario Unit: Foot

Scenario Typical Size: 2,640.0

Scenario Total Cost: $4,319.80

Total Cost per Unit: $1.64

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 500 - Obstruction Removal

Scenario: #3 - Removal and Disposal of Power Lines and Poles

Scenario Description:

Remove and disposal of power lines and poles thru demolition, excavation or other means required for removal. Dispose of all power lines and poles so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all power lines and poles by removal to an approved location, or reuse location. Remove and dispose all power lines and poles in order to apply conservation practices or facilitate the planned land use. Rocks and or boulders will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

Before Situation:

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This

After Situation:

The typical length is 2640 linear feet of an impaired area. The removal of power lines and poles will be performed by using means required for removal with the use of heavy equipment and hand labor. Dispose of all lines and poles from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

Feature Measure: Length of Power Lines

Scenario Unit: Foot

Scenario Typical Size: 2,640.0

Scenario Total Cost: $12,763.80

Total Cost per Unit: $4.83

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 500 - Obstruction Removal

Scenario: #4 - Removal and Disposal of Steel and or Concrete Structures

Scenario Description:

Remove and disposal of large steel and or concrete structures by demolition, excavation or other means required for removal. Dispose of all steel and or concrete structures so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all steel and or concrete structures by removal to an approved location, or reuse location. Remove and dispose all steel and or concrete structures in order to apply conservation practices or facilitate the planned land use. Steel and or concrete structure removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

Before Situation:

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This

After Situation:

The typical area will be a 2000 square feet of impaired land. The removal of steel and or concrete structures will be performed by demolition, excavation or other means required for removal with the use of heavy equipment and hand labor. Dispose of all steel and or concrete structures from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

Feature Measure: Land Area

Scenario Unit: Square Foot

Scenario Typical Size: 2,000.0

Scenario Total Cost: $32,341.92

Total Cost per Unit: $16.17

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 500 - Obstruction Removal

Scenario: #5 - Removal and Disposal of Wood Structures

Scenario Description:

Remove and disposal of wood structures (including large isolated trees) by demolition, excavation or other similar means required for removal. Dispose of all wood structures so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all wood structures by removal to an approved location, landfill, or reuse location. Remove and dispose all wood structures in order to apply conservation practices or facilitate the planned land use. Wood structure removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

Before Situation:

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This

After Situation:

The typical area will be a 2000 square feet of impaired land. The removal of wood structures will be performed by demolition, excavation or other similar means required for removal with the use of heavy equipment and hand labor. Dispose of all wood structures from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

Feature Measure: Land Area

Scenario Unit: Square Foot

Scenario Typical Size: 2,000.0

Scenario Total Cost: $17,535.55

Total Cost per Unit: $8.77

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 500 - Obstruction Removal

Scenario: #6 - Removal and disposal of individual landscape structures

Scenario Description:

Remove and disposal of individual landscape structures (windmills, large trees, etc.) by demolition, excavation or other means required for removal. Dispose of all landscape structures so that it does not impede wildlife movement and/or subsequent work or cause onsite or offsite damage. Dispose of all associated materials by removal to an approved location, or reuse location. Remove and dispose all materials in order to apply conservation practices or facilitate the planned land use. Landscape structure removal will address the resource concerns of wildlife collision or avoidance at the landscape level.

Before Situation:

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be recreation areas, farms, ranches, and areas. This is not intended for the removal of obstructions from aquatic environmen

After Situation:

The typical area will be an area of 15 feet by 15 feet (225 square feet) of impaired land. The removal of landscape structures will be performed by demolition, excavation or other means required for removal with the use of heavy equipment and hand labor. Dispose of all materials from the obstruction removal so that it does not impede wildlife movement or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

Feature Measure: Land Area

Scenario Unit: Square Foot

Scenario Typical Size: 225.0

Scenario Total Cost: $3,157.10

Total Cost per Unit: $14.03

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 500 - Obstruction Removal

Scenario: #7 - Removal and Disposal of Brush and Trees <= 6 inch Diameter

Scenario Description:

Remove and dispose of brush and trees predominantly <= 6 inches in diameter by demolition, excavation or other means required for removal. Dispose of all brush and trees so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all brush and trees by removal to an approved landfill, wood chipping and or land distribution, or recycling center, burial at an approved location or burning. If burning is used, implement appropriate smoke management to protect public health and safety. Remove and dispose of brush and trees in order to apply conservation practices or facilitate the planned land use. Brush and tree removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

Before Situation:

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This

After Situation:

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

Feature Measure: Land Area

Scenario Unit: Acre

Scenario Typical Size: 2.0

Scenario Total Cost: $3,321.32

Total Cost per Unit: $1,660.66

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 500 - Obstruction Removal

Scenario: #8 - Removal and Disposal of Brush and Trees > 6 inch Diameter

Scenario Description:

Remove and dispose of brush and trees predominantly > 6 inches in diameter by demolition, excavation or other means required for removal. Dispose of all brush and trees so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all brush and trees by removal to an approved landfill, wood chipping and or land distribution, or recycling center, burial at an approved location or burning. If burning is used, implement appropriate smoke management to protect public health and safety. Remove and dispose of brush and trees in order to apply conservation practices or facilitate the planned land use. Brush and tree removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

Before Situation:

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This

After Situation:

The typical area will be a 2.0 acre impaired area. The removal of brush and trees > 6 inch diameter will be performed with the use of equipment and hand labor. Dispose of all brush and trees from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

Feature Measure: Land Area

Scenario Unit: Acre

Scenario Typical Size: 2.0

Scenario Total Cost: $5,883.73

Total Cost per Unit: $2,941.87

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 511 - Forage Harvest Management

Scenario: #1 - Improved Forage Quality

Scenario Description:
Improved cultural practices and recordkeeping result in better forage quality and better livestock performance.

Before Situation:
Forage cutting heights are as close to the ground as equipment will allow resulting in very low stubble height. Plant regrowth is very slow. Forage quality tests are not regularly done. Records of forage quality components, cutting heights, moisture conte

After Situation:
Forage cutting heights are raised to leave at least 3-4" stubble height for cool season grasses and 6" for warm season grasses. Increased residual forage results in much faster plant regrowth. Forage quality tests are submitted to an accredited lab for analysis. Records of forage quality components, cutting heights, moisture content, and harvest schedule are regularly kept to track increased forage quality and improved livestock performance.

Feature Measure: Improved Relative Feed Val

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $223.44

Total Cost per Unit: $5.59

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 512 - Pasture and Hay Planting

Scenario: #5 - Introduced Perennial Grasses-Legume

Scenario Description:

Establish or reseed adapted perennial introduced grasses and legumes to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of perennial introduced grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario includes seed, equipment and labor for seedbed prep, tillage, and seeding.

Before Situation:

Poor or nonexistent stand of grass species. Resource concerns may include undesirable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

After Situation:

Suitable species are established to improve forage quality and quantity and reduce soil erosion on cropland, hayland, pasture, and/or biomass production.

Feature Measure: Acres of Forage and Biomas

Scenario Unit: Acre

Scenario Typical Size: 60.0

Scenario Total Cost: $5,530.99

Total Cost per Unit: $92.18

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 512 - Pasture and Hay Planting

Scenario: #6 - Introduced Perennial Grasses-Legume, foregone income

Scenario Description:

Establish or reseed adapted perennial introduced grasses and legumes to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of perennial introduced grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario includes seed, equipment and labor for seedbed prep, tillage, and seeding. The land being seeded was previously cropland with a typical rotation of wheat and corn.

Before Situation:

Cropland being converted to grass. Resource concerns may include undesirable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

After Situation:

Suitable species are established to improve forage quality and quantity and reduce soil erosion on cropland, hayland, pasture, and/or biomass production.

Feature Measure: Acres of Forage and Biomas

Scenario Unit: Acre

Scenario Typical Size: 60.0

Scenario Total Cost: $21,287.22

Total Cost per Unit: $354.79

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 512 - Pasture and Hay Planting

Scenario: #7 - Introduced Perennial & Native Grass Mix

Scenario Description:

Establish or reseed adapted introduced grasses and at least one native species to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of grasses for pasture, hayland, and wildlife openings. Native grass species, which have a significantly greater cost than introduced species, comprise one third of the grass mixture. This practice may be utilized for organic or regular production. This scenario includes seed, equipment and labor for seedbed prep, tillage, and seeding.

Before Situation:

Existing stand of perennial grasses, a monoculture, or no grasses present. Resource concerns may include undesirable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

After Situation:

Suitable species are established to improve forage quality and quantity and reduce soil erosion on cropland, hayland, pasture, and/or biomass production.

Feature Measure: Acres of Forage and Biomas

Scenario Unit: Acre

Scenario Typical Size: 80.0

Scenario Total Cost: $11,385.05

Total Cost per Unit: $142.31

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 512 - Pasture and Hay Planting

Scenario: #8 - Introduced Perennial & Native Grass Mix, foregone income

Scenario Description:

Establish or reseed adapted introduced grasses and at least one native species to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of grasses for pasture, hayland, and wildlife openings. Native grass species, which have a significantly greater cost than introduced species, comprise one third of the grass mixture. This practice may be utilized for organic or regular production. This scenario includes seed, equipment and labor for seedbed prep, tillage, and seeding. The land being seeded was previously cropland with a typical rotation of wheat and corn.

Before Situation:

Land currently being cropped. Resource concerns may include undesirable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

After Situation:

Suitable species are established to improve forage quality and quantity and reduce soil erosion on cropland, hayland, pasture, and/or biomass production.

Feature Measure: Acres of Forage and Biomas

Scenario Unit: Acre

Scenario Typical Size: 80.0

Scenario Total Cost: $32,393.36

Total Cost per Unit: $404.92

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 516 - Livestock Pipeline

Scenario: #3 - Standard Installation, 2 inch dia. or less (ND-SD)

Scenario Description:

Description: The 2,640 foot 1 1/2" PVC pipeline installed at a depth of 72" will meet the needs of domestic animals. This type of installation is only appropriate in the colder climate of the northern plains region (ND & SD). This item includes installation, all materials, appurtenances, and labor required to construct and install the pipeline. Appurtenances include: couplings, fittings, anchors, thrust blocks, gate valves, air release valves, drain valve, and pressure relief valve, and are included in the cost of pipe material. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636), Spring Development (574), and Prescribed Grazing (528).

Before Situation:

Inadequate water supply for domestic animals located on grazed range, pasture, or grazed forest in the colder climate of the northern plains region (ND & SD).

After Situation:

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife. Pipeline will supply adequate water for domestic animals on grazed range, pasture, or grazed forest in the northern plains region (ND & SD). The 2,640 feet of 1 1/2" diameter PVC pipe will be installed below ground at a depth of greater than 60" to meet the water quantity requirements of domestic animals.

Feature Measure: Length of Pipe Installed

Scenario Unit: Foot

Scenario Typical Size: 2,640.0

Scenario Total Cost: $11,374.48

Total Cost per Unit: $4.31

Based on North Dakota average costs. Individual county costs may vary.

Practice: 516 - Livestock Pipeline

Scenario: #5 - Backhoe, 2 inch dia. or less

Scenario Description:

Description: The 2,640 feet 2" PVC pipeline installed at a depth of 60" in rocky conditions to meet the needs of domestic animals. Trencher installation is not possible due to site conditions. This item includes installation, all materials, appurtenances, and labor required to construct and install the pipeline. Appurtenances include: couplings, fittings, expansion joints, anchors, thrust blocks, gate valves, air release valves, drain valve, and pressure relief valve, and are included in the cost of pipe material. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636), Spring Development (574), and Prescribed Grazing (528).

Before Situation:

Water supplies need to be conveyed through pipelines for use by livestock or wildlife. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use.

After Situation:

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife. Pipeline will supply adequate water for domestic animals on grazed range, pasture, or grazed forest in the northern plains. The 2,640 feet of 2" diameter PVC pipe will be installed in rocky conditions at a depth of 60" or more to meet the water quantity requirements of domestic animals.

Feature Measure: Length of Pipe Installed

Scenario Unit: Foot

Scenario Typical Size: 2,640.0

Scenario Total Cost: $20,317.42

Total Cost per Unit: $7.70

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 516 - Livestock Pipeline

Scenario: #7 - Boring, any diameter

Scenario Description:

Description: 200 feet of 2" PVC pipeline installed by boring through road bed or under streams to meet the needs of domestic animals. Typical trencher or plowing installation is not possible due to site disturbance or environmental concerns. This item includes installation, all materials, appurtenances, and labor required to construct and install the pipeline. Appurtenances include: couplings, fittings, expansion joints, anchors, thrust blocks, gate valves, air release valves, drain valve, and pressure relief valve, and are included in the cost of pipe material. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636), Spring Development (574), and Prescribed Grazing (528).

Before Situation:

Water supplies need to be conveyed through pipelines for use by livestock or wildlife. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use.

After Situation:

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife. Pipeline will supply adequate water for domestic animals on grazed range, pasture, or grazed forest in the northern plains. The 200 feet of 2" diameter PVC pipe will be installed under roads or streams at a depth of 60" or more to avoid unnecessary disturbance and to meet the water quantity requirements of domestic animals.

Feature Measure: Length of Pipe Installed

Scenario Unit: Foot

Scenario Typical Size: 200.0

Scenario Total Cost: $17,501.55

Total Cost per Unit: $87.51

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 516 - Livestock Pipeline

Scenario: #8 - Rural Water Connection Equipment

Scenario Description:

The rural water connection includes the 4' manhole, meter, 500' of pipe, valves, and necessary installation for connecting from a rural water pipeline to a livestock distribution pipeline. This item includes installation, all materials, appurtenances, and labor required to construct and install the meter pit. This item does not include the hook-up fees to the rural water system. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636), Spring Development (574), and Prescribed Grazing (528).

Before Situation:

Inadequate water supply for domestic animals located on grazed range, pasture, or grazed forest in the northern plains region.

After Situation:

A rural water connection which provides access to a reliable, high quality water supply for meeting the needs of domestic animals on grazed range, pasture, or grazed forest in the northern plains region. The 4' manhole, meter, pipe and appurtenances will enable the pipeline to meet the quantity requirements of domestic animals.

Feature Measure: Rural Water Connection

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $5,790.03

Total Cost per Unit: $5,790.03

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 516 - Livestock Pipeline

Scenario: #106 - HDPE (Iron Pipe Size and Tubing), Small Scale

Scenario Description:

Below ground installation of HDPE (Iron Pipe Size &Tubing) pipeline. HDPE (IPS &Tubing) is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; and typical scenario size is 1-inch. Construct 260 feet of 1-inch, Class 130 (SDR 13.5), HDPE pipeline with appurtenances, installed below ground with a minimum 2 feet of ground cover. The unit is weight of pipe material in pounds. 260 feet of 1-inch, Class 130 (SDR-13.5), HDPE weighs 0.16 lb./ft, or a total of 42 pounds. Appurtenances include: fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

Before Situation:

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

After Situation:

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

Feature Measure: Weight of Pipe

Scenario Unit: Pound

Scenario Typical Size: 42.0

Scenario Total Cost: $2,917.41

Total Cost per Unit: $69.46

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 520 - Pond Sealing or Lining, Compacted Soil Treatment

Scenario: #61 - Soil Dispersant - Covered

Scenario Description:

Construction of a compacted soil liner, treated with a soil dispersant, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the dispersant with the soil liner under proper moisture conditions, compaction to the designed liner thickness, and placement of soil cover over the treated liner. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with dispersants.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Feature Measure: Volume of Liner Material in

Scenario Unit: Cubic Yard

Scenario Typical Size: 2,420.0

Scenario Total Cost: $18,441.91

Total Cost per Unit: $7.62

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 520 - Pond Sealing or Lining, Compacted Soil Treatment

Scenario: #62 - Bentonite Treatment - Uncovered

Scenario Description:

Construction of a compacted soil liner, treated with bentonite, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the bentonite with the soil under proper moisture conditions, compaction to the designed liner thickness. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with dispersants.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Feature Measure: Volume of Liner Material

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,613.0

Scenario Total Cost: $280,509.31

Total Cost per Unit: $173.91

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 520 - Pond Sealing or Lining, Compacted Soil Treatment

Scenario: #64 - Material haul > 1 mile

Scenario Description:

Construction of a compacted soil liner, treated with compacted clay, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes compaction of the soil liner under proper moisture conditions to the designed liner thickness, and protection of the finished liner. Material haul > 1 mile. Associated practices include PS378, PS313, & other waste water impoundments.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits. An adequate quantity of soil suitable for constructing a clay liner without amendments is available at an economical haul distance.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Feature Measure: Volume of Liner Material (in

Scenario Unit: Cubic Yard

Scenario Typical Size: 2,420.0

Scenario Total Cost: $34,707.69

Total Cost per Unit: $14.34

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 520 - Pond Sealing or Lining, Compacted Soil Treatment

Scenario: #66 - Bentonite Treatment - Covered

Scenario Description:

Construction of a compacted soil liner, treated with bentonite, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the bentonite with the soil under proper moisture conditions, compaction to the designed liner thickness, and placement of soil cover over the treated liner. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with bentonite.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Feature Measure: Volume of Liner Material (in

Scenario Unit: Cubic Yard

Scenario Typical Size: 3,227.0

Scenario Total Cost: $286,991.18

Total Cost per Unit: $88.93

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 520 - Pond Sealing or Lining, Compacted Soil Treatment

Scenario: #83 - Use On-Site Material

Scenario Description:

Construction of a compacted soil liner, using materials available on-site, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes compaction of the subgrade and soil line under proper moisture conditions to the designed liner thickness using materials available at the construction site. Associated practices include PS378, PS313, and other waste water impoundments.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits without proper moisture and density control. An adequate quantity of soil suitable for constructing a clay liner without amendments is available on-site.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Feature Measure: Volume of Liner Material (in

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,613.0

Scenario Total Cost: $13,195.13

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $8.18

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 520 - Pond Sealing or Lining, Compacted Soil Treatment

Scenario: #84 - Use On-Site Material with Soil Cover

Scenario Description:

Construction of a compacted soil liner, treated with compacted clay, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes compaction of the soil liner under proper moisture conditions to the designed liner thickness, and soil cover to protect the finished liner using materials available at the construction site. Associated practices include PS378, PS313, and other waste water impoundments.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits. An adequate quantity of soil suitable for constructing a clay liner without amendments is available on-site.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Feature Measure: Volume of Liner Material (in

Scenario Unit: Cubic Yard

Scenario Typical Size: 2,420.0

Scenario Total Cost: $15,976.26

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $6.60

Practice: 521 - Pond Sealing or Lining, Geomembrane or Geosynthetic Clay Liner

Scenario: #2 - Flexible Membrane - Uncovered with liner drainage or venting

Scenario Description:
Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes a geotextile or soil cushion to protect the liner from subgrade damage, and liner drainage or venting. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

Before Situation:
In-place soils at site exhibit seepage rates in excess of acceptable limits.

After Situation:
Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Feature Measure: Surface area of Liner Materi

Scenario Unit: Square Yard

Scenario Typical Size: 2,420.0

Scenario Total Cost: $48,655.66

Total Cost per Unit: $20.11

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 521 - Pond Sealing or Lining, Geomembrane or Geosynthetic Clay Liner

Scenario: #4 - Flexible Membrane - Covered with liner drainage or venting

Scenario Description:

Installation of a flexible geosynthetic membrane liner to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes 1 foot of soil cover for liner protection, a geotextile or soil cushion to protect liner from subgrade damage, and liner drainage or venting. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Feature Measure: Surface area of Liner Materi

Scenario Unit: Square Yard

Scenario Typical Size: 2,420.0

Scenario Total Cost: $52,227.31

Total Cost per Unit: $21.58

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 528 - Prescribed Grazing

Scenario: #10 - Cover Crop/Aftermath

Scenario Description:

Design and implementation of a grazing system using multiple fields of cover crops or cover crops in combination with crop aftermath. Use of these crop fields will provide additional forage and relieve pressure on rangeland fields, thereby enhancing rangeland health and ecosystem function as well as optimizing efficiency and economic return through monitoring (ex: trend, composition, production, etc.), and record keeping. This grazing will typically occur in the fall. If the grazing occurs on cover crop that is being used as part of pollinator system the field can not be grazed until after the honey bees are moved from the area which is usually early September.

Before Situation:

Current grazing system exhibits undesirable and inefficient use of forage plants as well as soil and water resources. Stocking rates are likely higher than the current level of production and efficiency of use can support without management changes. There

After Situation:

Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place, as well as utilizing the cover crops to a level that will continue to improve the soil health of the cropland. Livestock are managed in rotation in a way that enhances soil health and function through proper use and distribution, and efficient harvest of forage resources. Grazing system success will be evaluated through monitoring.

Feature Measure: Acres of Treatment

Scenario Unit: Acre

Scenario Typical Size: 320.0

Scenario Total Cost: $3,494.18

Total Cost per Unit: $10.92

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 528 - Prescribed Grazing

Scenario: #55 - Prescribed Grazing Management, 5 acres or less

Scenario Description:

Plan, implement and monitor a rotational grazing system that will enhance and maintain ecosystem function as well as optimize efficiency and economic return on small farm (5 acres or less) grazing lands.

Before Situation:

Area is degraded due to inappropriate timing, duration, frequency and intensity of animal utilization resulting in impaired ecosystem functions. Overuse and degradation of the soil and plant resources are occurring and animal health is compromised.

After Situation:

Planned rotational movement of animals meet ecosystem functions due to proper timing, duration, frequency and intensity of animal utilization. Monitoring is showing that animals are in balance with available forage resources and ecological function and processes for soil, water and plant resources are being improved.

Feature Measure: acres

Scenario Unit: Acre

Scenario Typical Size: 5.0

Scenario Total Cost: $1,542.01

Total Cost per Unit: $308.40

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 528 - Prescribed Grazing

Scenario: #72 - Virtual Fence Adaptive Management, Years 2-5

Scenario Description:

Design and implementation of a grazing system with multiple subunits that will enhance rangeland health and ecosystem function as well as optimize efficiency and economic return through short-term and long-term monitoring (Ex: photo points, stubble height after grazing, etc.) & record keeping. This scenario will involve utilizing virtual fencing to manage cattle distribution, frequency, and duration according to objectives in CPS 528 (Prescribed Grazing). This scenario is for operations that have already acquired a virtual fence system.

Before Situation:

Current grazing management exhibits undesirable and inefficient use of forage plants, and such use may have a negative impact on rangeland health, as well as soil and water resources. Stocking rates are likely higher than the current level of production a

After Situation:

Grazing management is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in a way that enhances rangeland health and function through protection of sensitive areas, and efficient harvest of forage resources. Grazing Management objectives and VF grazing system success will be evaluated through short-term and long-term monitoring.

Feature Measure: Number of Animals

Scenario Unit: Number

Scenario Typical Size: 100.0

Scenario Total Cost: $8,285.22

Total Cost per Unit: $82.85

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 528 - Prescribed Grazing

Scenario: #73 - Grazing Management, Basic

Scenario Description:

Implementing a basic forage-animal balance that is foundational to enhancing plant community health and ecosystem function. Monitoring (as outlined in the grazing plan) will evaluate plant health and/or utilization parameters to make adjustments in livestock demand. Adjustments in the intensity and/or duration of the grazing event are likely to occur as part of implementation.

Before Situation:

Current grazing is not balanced with the forage supply of the land unit (livestock demand exceeds carrying capacity). Grazing is negatively impacting desirable plant species resulting in a negative impact to plants, as well as soil and water resources. Th

After Situation:

Grazing is being implemented to protect the health and vigor of the plant communities that are in place. A forage-animal balance allows livestock to be managed in a way that enhances plant community health and function through protection of sensitive areas, and proper utilization of forage resources. Adjustments in grazing intensity and duration will be evaluated through monitoring (as outlined in the grazing plan).

Feature Measure: Acres

Scenario Unit: Acre

Scenario Typical Size: 480.0

Scenario Total Cost: $6,211.66

Total Cost per Unit: $12.94

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 528 - Prescribed Grazing

Scenario: #74 - Grazing Management, Adaptive + Monitoring

Scenario Description:

Implementing adaptive grazing management (that includes a forage-animal balance) to enhance plant community health and ecosystem function in conjunction with long-term monitoring. Monitoring (as outlined in the grazing plan) will be designed so data inventory is repeatable and results comparable. Monitoring data is used to make adjustments in the grazing intensity, frequency, timing and/or duration to meet resource objectives.

Before Situation:

Current grazing may or may not be balanced with the forage supply of the land unit. Significant adjustments to the intensity, frequency, timing and/or duration of grazing are needed to meet objectives for plant, soil, animal (including wildlife), and/or w

After Situation:

Grazing is being adaptively implemented to enhance/recover the health, vigor, structure, and/or composition of desired plant communities. Implementation allows plant, soil, animal (including wildlife), and/or water resources resource concerns to be addressed and outcomes recorded via monitoring protocols. A grazing schedule is utilized to assist in the proper seasonal timing and frequency of grazing events. On-site measurements and observations are utilized to adjust the intensity and duration of individual grazing events. Monitoring (as outlined in the grazing plan) is performed with repeatable methodology and comparable results. Records of adaptive decision-making and monitoring are utilized for future adjustments in grazing.

Feature Measure: Acres

Scenario Unit: Acre

Scenario Typical Size: 480.0

Scenario Total Cost: $14,229.38

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $29.64

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 528 - Prescribed Grazing

Scenario: #75 - Grazing Management, Adaptive

Scenario Description:

Implementing adaptive grazing management (that includes a forage-animal balance) to enhance plant community health and ecosystem function. Monitoring (as outlined in the grazing plan) will evaluate plant health and/or utilization parameters to make adjustments in the grazing intensity, frequency, timing and/or duration to meet resource objectives.

Before Situation:

Current grazing may or may not be balanced with the forage supply of the land unit. Significant adjustments to the intensity, frequency, timing and/or duration of grazing are needed to meet objectives for plant, soil, animal (including wildlife), and/or w

After Situation:

Grazing is being adaptively implemented to enhance/recover the health, vigor, structure, and/or composition of desired plant communities. Implementation allows plant, soil, animal (including wildlife), and/or water resources resource concerns to be addressed. A grazing schedule is utilized to assist in the proper seasonal timing and frequency of grazing events. On-site measurements and observations are utilized to adjust the intensity and duration of individual grazing events. Monitoring (as outlined in the grazing plan) and records of adaptive decision-making are utilized for future adjustments in grazing.

Feature Measure: Acres

Scenario Unit: Acre

Scenario Typical Size: 480.0

Scenario Total Cost: $10,548.86

Total Cost per Unit: $21.98

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 533 - Pumping Plant

Scenario: #1 - Irrigation, Modify Pump

Scenario Description:

This scenario includes the modification and/or replacement of vertical turbine pumps in conjunction with an irrigation conversion practice to ensure energy and water savings are realized. This includes an inventory or evaluation of existing pump performance data. This scenario includes all materials, equipment and labor to test and repair the inner column of the pump assembly and rebowling. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; 436 - Irrigation Reservoir; and 447 - Irrigation System, Tailwater Recovery; and 614 - Watering Facility.

Before Situation:

160 acres of cropland is being irrigated with a less efficient system than a properly designed low pressure center pivot or linear move system.

After Situation:

Irrigation system on 160 acres of cropland has been converted to use a more efficient method of irrigation. The new pump and irrigation delivery are designed as a system that maximizes efficiency in energy and water use.

Feature Measure: Number of pumps

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $42,812.71

Total Cost per Unit: $42,812.71

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 533 - Pumping Plant

Scenario: #2 - Irrigation, Submersible or Booster

Scenario Description:

This scenario includes the installation of a submersible pump and motor in a new or existing active well, or from surface water source, when done in conjunction with an irrigation conversion practice to ensure energy and water savings are realized. This scenario also includes the installation of an electric-powered centrifugal pump serving multiple pump systems for pressurizing a medium-sized (600 gpm and 50 psi) sprinkler system. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management

Before Situation:

160 acres of cropland is being irrigated with a less efficient system than a center pivot or linear move system with low pressure nozzles and is being supplied by a pump designed for the existing system.

After Situation:

160 acres of cropland are irrigated with an irrigation system converted to a system with more efficient distribution, and the pump modified to maximize water and energy savings.

Feature Measure: Number of Pumps

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $16,312.52

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $16,312.52

Practice: 533 - Pumping Plant

Scenario: #3 - Irrigation, Variable Frequency Drive

Scenario Description:

Description: This is an installation of electrical and electronic components designed to vary the frequency of the voltage to vary the speed of an electric motor in an irrigation system. This directly affects pressure and flowrate. This would give the operator the flexibility to operate several systems separately or at the same time. Resource concerns: Insufficient water - Inefficient use of irrigation water; Inefficient energy use - Equipment and facilities and Farming/ranching practices and field operations. Associated Practices: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management.

Before Situation:

Standard electrical connection from electrical utility to pump motor. No capability to match pump output pressure and/or flowrate to field(s) need(s). Result is over/under pressure(s) and/or flow rate(s), possible hydraulic anomalies, energy loss, and or

After Situation:

VFD Modifications are implemented at the pump site to allow for varying the speed of electric motor to match the pressure and flow requirements for a center pivot irrigation system.

Feature Measure: Number of Pumps

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $7,505.89

Total Cost per Unit: $7,505.89

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 533 - Pumping Plant

Scenario: #4 - irrigation, Surface Water

Scenario Description:

This scenario includes the installation of an electric motor and pump with surface water (such as an irrigation canal) as the water source. This is done in conjunction with an irrigation conversion practice to ensure energy and water savings are realized. This scenario includes all materials, equipment and labor to install the pump and motor, including intake screens. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; 436 - Irrigation Reservoir; and 447 - Irrigation System, Tailwater Recovery; and 614 - Watering Facility.

Before Situation:

Irrigation: 160 acres of cropland that is being irrigated under a less efficient system than a center pivot or linear move system with low pressure nozzles which is being serviced by a pump set up for the existing system. The existing irrigation system em

After Situation:

Irrigation: 160 acres of cropland that has undergone an irrigation conversion practice to use a more efficient method of irrigation, including installation of a pumping plant with an irrigation canal as the water source. The properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency.

Feature Measure: Number of Pumps

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $23,089.30

Total Cost per Unit: $23,089.30

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 533 - Pumping Plant

Scenario: #5 - Livestock, Manure Transfer

Scenario Description:

Description: Pump and accessories to move manure from storage location to manure distribution site/equipment. Part of a animal waste management system. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters. Associated Practices include: 313 - Waste Storage Facility; 634 - Waste Transfer

Before Situation:

Livestock facility that is not in compliance with federal and/or state regulations for animal feeding operations for handling livestock manure.

After Situation:

A manure transfer pump is installed as part of animal manure handling system. The typical installation includes a 15 hp chopper/screw pump installed at the facility with all necessary appurtenances and controls. Other pump types may be substituted as needed to transfer manure. Waste is properly managed in accordance federal and/or state regulations for animal feeding operations to address water quality concerns.

Feature Measure: Number of Pumps

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $27,540.21

Total Cost per Unit: $27,540.21

Based on North Dakota average costs. Individual county costs may vary.

Practice: 533 - Pumping Plant

Scenario: #7 - Livestock, w/ Pressure Tank, Low HP

Scenario Description:

Descriptions: A submersible electric-powered pump (typically less than or equal to 1.5 HP) is installed in a well or structure. It is used to provide water for livestock as part of a prescribed grazing system. Submersible pump installed to deliver stockwater from a well or waterbody to a watering facility. Installation includes drop pipe, pump, and all necessary appurtenances and includes a pressure tank. Resource Concerns: Livestock Production Limitation - Inadequate livestock water. Associated Practices include: 374 - Farmstead Energy Improvement; 516 - Livestock Pipeline.

Before Situation:

Grazing system has an inadequate water supply for livestock that prevents efficient use of pasture.

After Situation:

Properly designed water supply system including pump, pipeline, and watering facilities are in place. Water is delivered at a sufficient rate to meet the requirements of a prescribed grazing system.

Feature Measure: No. of Pumps Installed

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $6,807.82

Total Cost per Unit: $6,807.82

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 533 - Pumping Plant

Scenario: #14 - Livestock, Variable Frequency Drive

Scenario Description:

Description: This is an installation of electrical and electronic components designed to vary the frequency of the voltage to vary the speed of an electric motor in a livestock watering system to provide a constant pressure and flow rate. This would give the operator the flexibility to operate several systems separately or at the same time. Resource concerns: Livestock Production Limitation - Inadequate livestock water and distribution. Associated Practices: 374 - Farmstead Energy Improvement; 516 - Livestock Pipeline; 614 - Watering Facility.

Before Situation:

Standard electrical connection from electrical utility to pump motor. No capability to match pump output pressure and/or flowrate to livestock needs. Result is over/under pressure(s) and/or flow rate(s), possible hydraulic anomalies, energy loss, and or i

After Situation:

A VFD is installed at the pump site to vary the speed of a submersible electric motor to match the pressure and flow requirements for a livestock watering system.

Feature Measure: Number of Pumps

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $7,210.43

Total Cost per Unit: $7,210.43

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 533 - Pumping Plant

Scenario: #86 - Irrigation, Surface Water with Fish Screen

Scenario Description:

This scenario includes the installation of an electric motor and pump with surface water (such as an irrigation canal or a river) as the water source. This is done in conjunction with an irrigation conversion practice to ensure energy and water savings are realized. This scenario includes all materials, equipment and labor to install the pump and motor, including intake screens to meet T&E requirements. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; 436 - Irrigation Reservoir; and 447 - Irrigation System, Tailwater Recovery; and 614 - Watering Facility.

Before Situation:

Irrigation: 220 acres of cropland (multiple pivots) that is being irrigated under a less efficient system than a center pivot or linear move system with low pressure nozzles which is being serviced by a pump set up for the existing system. The existing ir

After Situation:

Irrigation: 220 acres of cropland(multiple pivots) that has undergone an irrigation conversion practice to use a more efficient method of irrigation, including installation of a pumping plant with an irrigation canal or river as the water source. The properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency and will meet T&E requirements.

Feature Measure: Number of Pumps

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $33,202.22

Total Cost per Unit: $33,202.22

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 533 - Pumping Plant

Scenario: #95 - Photovoltaic-Powered Pump, <4 kW

Scenario Description:

The typical scenario assumes installation of a submersible solar-powered pump in a well or a live stream. The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Note: It is generally not advisable to use a storage battery for a number of reasons. A storage tank is generally the most efficient method to store energy. Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Irrigation - energy consumption will be reduced and the increased pressure and flow rates will improve irrigation efficiency. Resource Concerns: Insufficient stockwater. Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 430 - Irrigation Pipeline; 436 - Irrigation Reservoir; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

Before Situation:

Livestock: Inadequate supply or location of water for a prescribed grazing system. Eroded stream banks and degraded water quality due to livestock access to stream. Cattle are not well-distributed because of remote water location. Irrigation: Pressure and

After Situation:

The typical scenario assumes installation of 1 kilowatt of photovoltaic (PV) panels, capable of operating a 1 horsepower solar-powered submersible pump in a well or other water source (Notes: 1) A PV panel is rated under standard and ideal conditions which will most likely not be replicated in the field; 2) 1 Horsepower is defined as 0.746 kilowatts.. The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, controller, and all appurtenances. Water will be pumped to an existing storage tank at a higher elevation from which it will be used to pressurize the Livestock Pipeline (516) or Irrigation Pipeline (430). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Grazing has potential to be well distributed. Irrigation: Improved pressure and flow rate will improve irrigation efficiency.

Feature Measure: Pumping plant photovoltaic

Scenario Unit: Kilowatt

Scenario Typical Size: 1.0

Scenario Total Cost: $9,171.72

Total Cost per Unit: $9,171.72

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 533 - Pumping Plant

Scenario: #197 - Windmill-Powered Pump

Scenario Description:

A windmill is installed in order to supply a reliable water source for livestock and/or wildlife. The windmill includes the tower, concrete footings, wheel blade unit, sucker rod, down pipe, gear box, pump, plumbing, and well head protection concrete pad. The typical scenario will be a windmill system with a 10 ft diameter mill and 27-foot tower which is pumping from a 150-foot well. As a result of installing this windmill, resource concerns of inadequate stock water, plant establishment, growth, productivity, health, and vigor, and water quantity can be addressed. Resource Concerns: Insufficient stockwater.

Before Situation:

In a rangeland or pasture setting, a reliable source of water for livestock is not available, or the spacing between water sources is such that grazing distribution and plant health are adversely impacted.

After Situation:

A windmill, with a wheel ranging from 6' to 16' in diameter, will be installed over a well that is located to provide a reliable source of livestock water at the rate of at least 2 gpm, to facilitate proper grazing distribution and improved plant health. To increase reliability, water is pumped into a storage tank to provide a given number of days of supply. Installation includes the footings, wellhead protection concrete pad, tower, gear box, sail, sucker rod, down hole accessories, and a short outlet pipe to a storage tank.

Feature Measure: Diameter of Mill Wheel

Scenario Unit: Foot

Scenario Typical Size: 10.0

Scenario Total Cost: $14,476.25

Total Cost per Unit: $1,447.63

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 533 - Pumping Plant

Scenario: #283 - Livestock, w/ Pressure Tank, No Vault, Low HP

Scenario Description:

A submersible electric-powered pump (typically less than 2 HP) is installed in a well or structure. It is used to provide water for livestock as part of a prescribed grazing system. Submersible pump installed to deliver stockwater from a well or waterbody to a watering facility. Installation includes drop pipe, pump, and all necessary appurtenances and includes a pressure tank, without a vault. Resource Concerns: Livestock Production Limitation - Inadequate livestock water. Associated Practices include: 374 - Farmstead Energy Improvement; 516 - Livestock Pipeline.

Before Situation:

Grazing system has an inadequate water supply for livestock that prevents efficient use of pasture.

After Situation:

Properly designed water supply system including pump, pipeline, and watering facilities are in place. Water is delivered at a sufficient rate to meet the requirements of a prescribed grazing system.

Feature Measure: No of Pumps Installed

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $3,860.95

Total Cost per Unit: $3,860.95

Based on North Dakota average costs. Individual county costs may vary.

Practice: 550 - Range Planting

Scenario: #74 - Native Perennial, Conversion from Dryland Cropland, with FI

Scenario Description:

Establishment of a mixture of PREDOMINANTLY NATIVE adapted perennial species on a rangeland unit to improve forage condition, improve wildlife habitat and/or reduce erosion. Seed mix of predominantly Native species is chosen based on range conditions and availability of seed. Planting by preparing a seedbed with LIGHT TO MODERATE TILLAGE and seeding with a no-till drill, range drill, or by broadcasting. This scenario includes foregone income when land is converted from DRYLAND cropland.

Before Situation:

A monoculture of DRYLAND crops are grown on cropland. The resource concerns include soil erosion, soil quality degradation, inadequate feed and forage for livestock, and undesirable plant productivity and health.

After Situation:

Establishment of PREDOMINANTLY NATIVE adapted perennial vegetation such as grasses, forbs, and legumes improve forage quality and quantity and reduce soil erosion.

Feature Measure: Acres of Range Planting

Scenario Unit: Acre

Scenario Typical Size: 80.0

Scenario Total Cost: $38,714.64

Total Cost per Unit: $483.93

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 554 - Drainage Water Management

Scenario: #1 - Drainage Water Management (DWM)

Scenario Description:

This scenario is the process of managing water discharges from surface and/or subsurface agricultural drainage systems by reducing nutrient loading into surface waters. Typical systems consist of a 80 acre field with existing drainage tile lines and installed water control structures. The operator goes to the field in order to adjust water control structures (riser boards). While on site the date and adjustment information is recorded/logged. The number of yearly adjustments is based on 6 trips to a field 5 miles from headquarters. The field time to make and record each adjustment is 0.5 hours per structure (including travel time). The typical field will contain 3 structures to control field water levels. Resource Concern: Water Quality - Excess Nutrients in surface and ground waters. Associated Practices: 606-Subsurface Drain; 607-Surface Drain, Field Ditch; 608-Surface Drain, Main or Lateral; 587-Structure for Water Control; 590-Nutrient Management .

Before Situation:

Existing drainage systems are in place and water flows uncontrolled.

After Situation:

Existing drainage systems are managed to reduce flow of field drainage waters from the site and reduce nitrate loading.

Feature Measure: Number of Control Structur

Scenario Unit: Each

Scenario Typical Size: 3.0

Scenario Total Cost: $404.69

Total Cost per Unit: $134.90

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 554 - Drainage Water Management

Scenario: #22 - Automated Drainage Water Management

Scenario Description:

This scenario is the process of managing the drainage water discharge volume and water table elevation by regulating the flow from surface and/or subsurface agricultural drainage systems utilizing automation. Typical systems consist of a field with a fairly flat slope (less than 2% and preferably less than 1%) with existing drainage tile lines and installed water control structures which are operated with automated slide gates, and telemetry data systems coupled with cloud data management. Typical affected area for an automated drainage water management structure is 10 to 20 acres. The operator, from handheld device, adjusts water control structures (gate elevation) and logs data. Educational meeting is conducted between consultant and operator(s) annually for essential knowledge transfer Resource Concern: Water Quality - Excess Nutrients in surface and ground waters. Associated Practices: 606-Subsurface Drain; 607-Surface Drain, Field Ditch; 608-Surface Drain, Main or Lateral; 587-Structure for Water Control; 590-Nutrient Management.

Before Situation:

Existing inefficient drainage systems are in place and water flows uncontrolled, resulting in sediment and nutrient laden outflow entering ditches or streams.

After Situation:

Existing drainage systems are managed utilizing telemetry and real-time data to retain moisture in the soil for plant uptake and to allow for enhanced nutrient utilization.

Feature Measure: Acres of Managed Drainage

Scenario Unit: Acre

Scenario Typical Size: 50.0

Scenario Total Cost: $489.31

Total Cost per Unit: $9.79

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 558 - Roof Runoff Structure

Scenario: #1 - Roof Gutter

Scenario Description:

A roof runoff structure, consisting of gutter(s), downspout(s), and appropriate outlet facilities on a 200 feet long building by 10 feet tall side walls. Used to keep roof clean water runoff uncontaminated and provide a stable outlet to ground surface. Facilitates waste management and protects environment by minimizing clean water additions to waste systems and addresses water quality concerns. Associated practices include Waste Storage Facility (313), Composting Facility (317), Heavy Use Area Protection (561), Watering Facility (614), Underground Outlet (620), Diversion (362), Roofs and Covers (367), and any relevant irrigation practices.

Before Situation:

Applicable where: (1) a roof runoff management facility is included in an overall plan for an overall plan for a waste management system; (2) roof runoff needs to be diverted away from structures or contaminated areas; (3) there is a need to collect, cont

After Situation:

A gutter, downspout, and outlet system servicing the portion of the building roof that would otherwise drain into a waste management system or create erosion. Roof line of 200 feet serviced with gutter, downspouts, and appurtenances.

Feature Measure: Linear Length of Roof to be

Scenario Unit: Foot

Scenario Typical Size: 200.0

Scenario Total Cost: $1,225.20

Total Cost per Unit: $6.13

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 558 - Roof Runoff Structure

Scenario: #49 - Trench Drain

Scenario Description:

A roof runoff structure, consisting of a trench filled with rock, with a polyethylene, corrugated, perforated drain tile installed in trench bottom. Used to keep roof clean water runoff uncontaminated and provide a stable outlet to ground surface. Environmental/design considerations, for example – snow loads, or a building without proper structural support needed for gutters dictate the use of a trench drain. Facilitates waste management and protects the environment by minimizing clean water additions to waste systems and addresses water quality concerns. Associated practices include Waste Storage Facility (313), Composting Facility (317), Heavy Use Area Protection (561), Underground Outlet (620), and Diversion (362).

Before Situation:

Applicable where: (1) a roof runoff management facility is included in an overall plan for an overall plan for a waste management system; (2) roof runoff needs to be diverted away from structures or contaminated areas; (3) there is a need to collect, cont

After Situation:

A 2' deep by 3' wide by 200 long deep rock filled, tile drained trench and outlet system servicing the portion of the building roof that would otherwise drain into a waste management system or create erosion.

Feature Measure: Linear Length of Roof to be

Scenario Unit: Foot

Scenario Typical Size: 200.0

Scenario Total Cost: $2,602.11

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $13.01

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 560 - Access Road

Scenario: #2 - New 6 inch gravel road with Geotextile, less than 2.5 Ft.

Scenario Description:

Newly Constructed gravel road with min. 6 inch thick compacted gravel surface over woven geotextile fabric on relatively level ground and weak bearing capacity soils. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

An agricultural enterprise which requires, but does not have, a fixed travel way for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compact

After Situation:

The road will be 16 feet wide with 6 inch gravel surfacing at the top over woven geotextile fabric. It is mostly in embankment less than 2.5 feet in height, (average 1.5 ft) typical side slopes 3:1. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). When seeding or revegetation is required, use Critical Area Planting (342). Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

Feature Measure: Length of Roadway

Scenario Unit: Foot

Scenario Typical Size: 1,000.0

Scenario Total Cost: $16,679.90

Total Cost per Unit: $16.68

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 561 - Heavy Use Area Protection

Scenario: #1 - Reinforced Concrete with sand or gravel foundation - cubic yard - NP Region

Scenario Description:

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with reinforced concrete on a sand or gravel foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns soil erosion and water quality degradation.

Before Situation:

This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

After Situation:

The stabilized area is surfaced with approximately 600 square feet of approximately 11 cubic yards of welded wire mesh reinforced concrete with 11 cubic yards of sand or gravel foundation material for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

Feature Measure: Volume of Concrete

Scenario Unit: Cubic Yard

Scenario Typical Size: 11.0

Scenario Total Cost: $7,087.97

Total Cost per Unit: $644.36

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 561 - Heavy Use Area Protection

Scenario: #3 - Rock/Gravel

Scenario Description:

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with rock and or gravel to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice. The stabilized area will address the resource concerns of soil erosion and water quality degradation.

Before Situation:

This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

After Situation:

The stabilized area is surfaced with approximately 270 cubic yards of rock and or gravel for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

Feature Measure: Volume of Rock and/or Gra

Scenario Unit: Cubic Yard

Scenario Typical Size: 270.0

Scenario Total Cost: $7,170.62

Total Cost per Unit: $26.56

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 570 - Stormwater Runoff Control

Scenario: #35 - Rain Garden, 750 sqft or less

Scenario Description:
Typical Size: Drainage area 3750sqft. Garden size 20' x 30' area, 4-8" deep. Additional Considerations from the practice standard that would be addressed by the practice are: Design stormwater control practices to fit into the visual landscape as well as to function for runoff control. If properly designed, stormwater control practices can be beneficial to wildlife.

Before Situation:
Stormwater from farmstead impervious surfaces causes erosion and flooding

After Situation:
Stormwater is managed to prevent erosion, reduce quantity of runoff, enhance visual impact and increase wildlife habitat and/or food.

Feature Measure: sqft of rain garden

Scenario Unit: Square Foot

Scenario Typical Size: 600.0

Scenario Total Cost: $1,281.94

Total Cost per Unit: $2.14

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 574 - Spring Development

Scenario: #16 - Spring Development

Scenario Description:

Develop a water source from a natural spring or seep (i.e., spring development) to provide water for livestock and/or wildlife needs. This typical scenario includes excavating and exposing the water source at the spring/seep (typically on a hillside), constructing a water collection structure by installing a 50 ft long, 4 inch diameter HDPE perforated pipe enclosed in a sand/gravel envelope overlaid by 2 ft wide filter fabric (50 ft long) and behind a concrete cutoff wall (6 inch x 4 ft height x 25 ft long) to retain water. Water is directed (via 20 ft long, 4 inch PVC) to a spring box (48 inch diameter x 6 ft long CMP) that is located at the cutoff wall or below the wall, equipped with a watertight lid and two outlets. One outlet serves as overflow pipe to account for occasions where inflow exceeds outflow. The collection system is commonly composed of a single or a network of perforated 4 inch diameter drainage pipe placed in an excavated collection trench that runs across the slope. The outflow pipe from the spring box can be directed to buried large storage (not included), and to a watering facility (not included) for use Resource Concern: Livestock production limitation - Inadequate livestock water. Associated Practices: 516-Livestock Pipeline; 614-Watering Facility; 382-Fence; Critical Area Planting (342).

Before Situation:

Livestock operation with inadequate fresh water for livestock and an on-site undeveloped spring/seep.

After Situation:

Spring development system provides adequate water for the intended use. The system typically runs all year long in most zones.

Feature Measure: Number of Developments

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $6,712.68

Total Cost per Unit: $6,712.68

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 575 - Trails and Walkways

Scenario: #1 - Earthfill Walkway, 4 Ft high or less

Scenario Description:

Layout and construct a lane or travel way of earthfill four feet high or less. Walkway will facilitate animal movement, to provide or improve access to forage, water, working/handling facilities, and/or shelter, Improve grazing efficiency and distribution, and/or protect ecologically sensitive, erosive and/or potentially erosive sites and address soil erosion and water quality resource concerns. Costs include Earthfill, shaping, grading, and all equipment, labor and incidental materials necessary to install the practices.

Before Situation:

On farmstead area and pastureland and rangeland areas where control of animal movement is needed to address soil erosion, forage availability, and water quality resource concerns.

After Situation:

The typical trail or walkway will be a 12 foot wide 200 foot long, with an average fill height of 3 feet. All excavation, earthfill, grading and shaping necessary to provide a smooth permanent travel surface for livestock. No surface materials are included with this practice. If the lane is vegetated and requires planting, the vegetation shall be planted according to Critical Area Planting, Code 342. Where vegetation is not practical, Heavy Use Area Protection, Code 561,shall be used to provide adequate surface protection. Structure for Water Control, Code 587, will be used when the trail or lane crosses water areas. Consider the use of water bars or culverts to control and direct water flow. Fencing, Code 382, will be used when needed to control animal movement.

Feature Measure: Length of Walkway created

Scenario Unit: Foot

Scenario Typical Size: 200.0

Scenario Total Cost: $3,151.81

Total Cost per Unit: $15.76

Based on North Dakota average costs. Individual county costs may vary.

Practice: 575 - Trails and Walkways

Scenario: #2 - Earthfill Walkway, Higher than 4 Ft.

Scenario Description:

Layout and construct a lane or travel way of earthfill greater than four feet high. Walkway will facilitate animal movement, to provide or improve access to forage, water, working/handling facilities, and/or shelter, Improve grazing efficiency and distribution, and/or protect ecologically sensitive, erosive and/or potentially erosive sites and address soil erosion and water quality resource concerns. Costs include Earthfill, shaping, grading, and all equipment, labor and incidental materials necessary to install the practices.

Before Situation:

On farmstead area and pastureland and rangeland areas where control of animal movement is needed to address soil erosion, forage availability, and water quality resource concerns.

After Situation:

The typical trail or walkway will be a 12 foot wide 300 foot long, with an average fill height of 6 feet. All excavation, earthfill, grading and shaping necessary to provide a smooth permanent travel surface for livestock. No surface materials are included with this practice. If the lane is vegetated and requires planting, the vegetation shall be planted according to Critical Area Planting, Code 342. Where vegetation is not practical, Heavy Use Area Protection, Code 561,shall be used to provide adequate surface protection. Structure for Water Control, Code 587, will be used when the trail or lane crosses water areas. Consider the use of water bars or culverts to control and direct water flow. Fencing, Code 382, will be used when needed to control animal movement.

Feature Measure: Length of walkway

Scenario Unit: Foot

Scenario Typical Size: 300.0

Scenario Total Cost: $9,234.07

Total Cost per Unit: $30.78

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 575 - Trails and Walkways

Scenario: #52 - Wood Chips, Walkway, 1000 sqft or less

Scenario Description:

Layout and construct a wood chip surface treatment on a earthen foundation walkway to facilitate the movement of animals, people, or small off-road vehicles to provide or improve access to forage, water, working/handling facilities, and/or shelter, Improve grazing efficiency and distribution, and/or protect ecologically sensitive, erosive and/or potentially erosive sites, pedestrian or off-road vehicle access to agricultural, construction, or maintenance operations, provide walkways for recreational activities or access to recreation sites and address the resource concerns of soil erosion and water quality degradation. Costs include excavation, shaping, grading, wood chip surfacing, vegetation of disturbed areas, all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

This practice applies on all lands where management of animal or human movement is needed to address soil erosion and water quality resource concerns. This practice applies to a trails or walkways constructed for use by small off-road vehicles, such as Al

After Situation:

The typical walkway will be a 6 foot widex100 foot longx4" thick , 600 square foot of wood chip surface treatment on earthen foundation. All excavation, grading and shaping necessary to provide a smooth permanent travel surface for livestock or people is included. Included is wood chips of 600 square foot for surfacing.

Feature Measure: sqft of walkway

Scenario Unit: Square Foot

Scenario Typical Size: 600.0

Scenario Total Cost: $1,364.40

Total Cost per Unit: $2.27

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 576 - Livestock Shelter Structure

Scenario: #21 - Permanent Fabricated Wind Shelter, equal to or greater than 8 foot

Scenario Description:

Permanent Livestock Fabricated Wind Shelter is installed to provide protection for livestock.

Before Situation:

Herds are held and fed in fragile riparian areas in order to reduce stress on domestic animals from harsh winter conditions and provide protection from wind. The concentration of animals in these areas degrade streambanks, cause excessive sedimentation, d

After Situation:

Permanent fabricated wind shelters are installed in order to provide shelter for livestock in upland grazing areas away from the riparian zones. As a result, animals can be held in an area away from the riparian zone thereby eliminating the impacts to water quality and riparian health. A typical scenario is a Fabricated Wind Shelter installed in association with an animal feeding operation (AFO). The AFO has been moved out of the riparian zone where shelter was previously provided by the surrounding riparian woody vegetation. The AFO has been moved to a location where shelter is not naturally provided and needs to be fabricated. The typical fabrication involves a permanent, wood framed, metal or wood faced, 8.5 - foot high, 200 - foot long, fabricated wind shelter, 80% solid face, secured to the ground with wood posts.

Feature Measure: Length of Wind Shelter

Scenario Unit: Foot

Scenario Typical Size: 200.0

Scenario Total Cost: $9,429.15

Total Cost per Unit: $47.15

Based on North Dakota average costs. Individual county costs may vary.

Practice: 576 - Livestock Shelter Structure

Scenario: #22 - Portable Fabricated Wind Shelter, equal to or greater than 8 foot

Scenario Description:

Portable Livestock Fabricated Wind Shelter is installed to provide protection for livestock. The shelter can be moved around the grazing unit in order to prevent heavy use resource concerns at any one location.

Before Situation:

Herds are held and fed in fragile riparian areas in order to reduce stress on domestic animals from harsh winter conditions and provide protection from wind. The concentration of animals in these areas degrade streambanks, cause excessive sedimentation, d

After Situation:

Portable fabricated wind shelters are utilized to provide shelter for livestock in upland grazing areas from the riparian zones. The portable shelters are moved in rotation with feeding areas thereby limiting soil disturbance and reducing the impacts of heavy use at any one location. As a result of implementing this practice, the herd can be moved out of the impacted area and water quality and vegetation health resource concerns will be addressed. A typical portable wind shelter involves a series of steel framed panels faced with corrugated metal. Each unit is approximately 9.5 feet tall and 24 feet long. Four panels (96 - feet) would be utilized to provide shelter to a herd size of 125 animals.

Feature Measure: Length of Wind Shelter

Scenario Unit: Foot

Scenario Typical Size: 96.0

Scenario Total Cost: $4,847.59

Total Cost per Unit: $50.50

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 578 - Stream Crossing

Scenario: #1 - Bridge

Scenario Description:

Install a bridge to allow stream flows to cross under access road or animal trail. Bridge opening determined by sizing for storm event dictated in standard. Scenario includes dewatering, abutments, girders, decking. Work consists of site preparation, dewatering, acquiring and installing abutments, girders, decking with necessary hardware, backfilling abutments, and armoring with geotextile and riprap. Riprap and geotextile are used to stabilize and protect abutments as needed. Scenario based on cast in place concrete abutments, steel girders, and timber deck. Travel surface shall be wooden deck surface. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Span is less than 14 feet. Load is H-20. Width is 14 feet including curbs. Abutments are <= 6 feet. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

Before Situation:

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

After Situation:

Access and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

Feature Measure: square footage of bridge de

Scenario Unit: Square Foot

Scenario Typical Size: 252.0

Scenario Total Cost: $22,102.66

Total Cost per Unit: $87.71

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 578 - Stream Crossing

Scenario: #2 - Culvert installation

Scenario Description:

Install a new culvert. Work includes dewatering, site preparation and removing any old crossing, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and building headwalls. If a different travel surface is needed, refer to another appropriate standard for the surfacing. 48 inch Culvert installation with > 75 cy of fill needed and > 2 yds rock riprap for headwalls. Pipe is 50 feet long. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Use (587) Structure for Water Control instead, for ditch cross culverts and other intermittent flows.

Before Situation:

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

After Situation:

Access road and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways.

Feature Measure: Culvert

Scenario Unit: Diameter Inch Foot

Scenario Typical Size: 2,400.0

Scenario Total Cost: $10,521.85

Total Cost per Unit: $4.38

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 578 - Stream Crossing

Scenario: #3 - Low water crossing, rock armor

Scenario Description:

Stabilize the bottom and slope of a stream channel using rock riprap. This scenario includes site preparation, dewatering, acquiring and installing gravel or geotextile with rock riprap on channel bottom and approaches. Final travel surface shall be rock. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 75 foot bottom width and approaches. Width is 12 feet for a total area as 900 square feet. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

Before Situation:

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

After Situation:

Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

Feature Measure: Crossing dimensions

Scenario Unit: Square Foot

Scenario Typical Size: 900.0

Scenario Total Cost: $8,751.84

Total Cost per Unit: $9.72

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 578 - Stream Crossing

Scenario: #4 - Low water crossing, concrete slab

Scenario Description:

Stabilize the bottom and slope of a stream channel using concrete in place. This scenario includes site preparation, dewatering, acquiring and installing cast in place concrete on channel bottom and approaches. Final travel surface shall be concrete. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 50 foot bottom width and 8 foot approach on each side. Width is 12 feet for a total area of 792 square feet. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

Before Situation:

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

After Situation:

Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

Feature Measure: Crossing dimensions

Scenario Unit: Square Foot

Scenario Typical Size: 792.0

Scenario Total Cost: $12,428.56

Total Cost per Unit: $15.69

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 578 - Stream Crossing

Scenario: #6 - Low water crossing, geocell

Scenario Description:

Stabilize the bottom and slope of a stream channel using geocell mats filled with rock, typically suited for a "low energy" channel. This scenario includes site preparation, dewatering, acquiring and installing geocell mats on channel bottom and approaches. Final travel surface shall be a rock aggregate covering above the geocell. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 50 foot bottom width and 8 foot approach on each side. Width is 12 feet for a total area of 792 square feet. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

Before Situation:

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

After Situation:

Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

Feature Measure: Crossing dimensions

Scenario Unit: Square Foot

Scenario Typical Size: 792.0

Scenario Total Cost: $5,059.86

Total Cost per Unit: $6.39

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 580 - Streambank and Shoreline Protection

Scenario: #1 - Shaping

Scenario Description:

Protection of streambanks consisting of conventional plantings of vegetation to stabilize and protect against scour and erosion. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank; a 6-foot high bank at 3(H):1(V) slope for 1000 linear feet (0.46 acres) is used for estimation purposes. In order to ensure plant community establishment and integrity, a vegetative management plan shall be prepared in accordance with Conservation Practice Standard (CPS) 342, Critical Area Planting.” Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484 - Mulching; 570 - Stormwater Runoff Control.

Before Situation:

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has marginally degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The strea

After Situation:

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Feature Measure: Linear Feet of Streambank/

Scenario Unit: Foot

Scenario Typical Size: 1,000.0

Scenario Total Cost: $10,946.23

Total Cost per Unit: $10.95

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 580 - Streambank and Shoreline Protection

Scenario: #2 - Bioengineered

Scenario Description:

Protection of streambanks consisting of a bioengineered technique comprised of non-structural measures such as earth revetments and benches with vegetative measures to stabilize and protect the streambank against scour and erosion. Soil bioengineering is a system of living plant materials used as structural components. Adapted types of woody vegetation (shrubs and trees) are initially installed in specified configurations that offer immediate soil protection and reinforcement. In addition, soil bioengineering systems create resistance to sliding or shear displacement in a streambank as they develop roots or fibrous inclusions. Environmental benefits derived from woody vegetation include diverse and productive riparian habitats, shade, organic additions to the stream, cover for fish, and improvements in aesthetic value and water quality. Under certain conditions, soil bioengineering installations work well in conjunction with structures to provide more permanent protection and healthy function, enhance aesthetics, and create a more environmentally acceptable product. Soil bioengineering systems normally use unrooted plant parts in the form of cut branches and rooted plants. For streambanks, living systems include brush mattresses, live stakes, joint plantings, vegetated geogrids, branchpacking, and live fascines. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, livestake, rootwads and revetments: a 6-foot high bank at 3(H):1(V) slope for 1000 linear feet (0.46 acres) is used for estimation purposes. In order to ensure plant community establishment and integrity, a vegetative management plan shall be prepared and paid in accordance with Conservation Practice Standard (CPS) 342, Critical Area Planting. Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484 - Mulching; 570 - Storm Runoff Control.

Before Situation:

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has moderately degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The strea

After Situation:

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Feature Measure: Lineal Feet of Bioengineeri

Scenario Unit: Foot

Scenario Typical Size: 1,000.0

Scenario Total Cost: $40,881.03

Total Cost per Unit: $40.88

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 580 - Streambank and Shoreline Protection

Scenario: #3 - Rock Riprap

Scenario Description:

Protection of streambanks using riprap to stabilize and protect banks of streams or excavated channels against scour and erosion. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, geotextile, and rock rip rap; a 6-foot high bank at 3(H):1(V) slope for 1000 linear feet (0.46 acres) is used for estimation purposes. The rock toe will be 3' thick and 5' high. The bank above the riprap will be graded to a stable slope and revegetated. In order to ensure plant community establishment and integrity, a vegetative management plan shall be prepared and paid in accordance with Conservation Practice Standard (CPS) 342, Critical Area Planting. Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484 - Mulching; 570 - Storm Runoff Control.

Before Situation:

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streamb

After Situation:

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Feature Measure: Volume of Riprap Installed

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,117.0

Scenario Total Cost: $181,414.16

Total Cost per Unit: $162.41

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 580 - Streambank and Shoreline Protection

Scenario: #4 - Gabion

Scenario Description:

Protection of streambanks using gabions to stabilize and protect banks of streams or excavated channels against scour and erosion. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, geotextile, and rock gabions; a 12-foot high bank for 48 linear feet is used for estimation purposes. The gabions will be 3' thick and 3' long stacked 12' high. The bank around the gabion will be graded to a stable slope and revegetated. In order to ensure plant community establishment and integrity, a vegetative management plan shall be prepared and paid in accordance with Conservation Practice Standard (CPS) 342, Critical Area Planting. Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484 - Mulching; 570 - Storm Runoff Control.

Before Situation:

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streamb

After Situation:

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Feature Measure: Length of Shoreline protect

Scenario Unit: Foot

Scenario Typical Size: 48.0

Scenario Total Cost: $31,808.15

Total Cost per Unit: $662.67

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 580 - Streambank and Shoreline Protection

Scenario: #21 - Structural, Toewood w/VESL

Scenario Description:

Protection of streambanks using toewood (large wood members with root wads) as a structural measure in conjunction with bioengineering techniques involving Vegetated Engineered Soil Lifts (VESL's) to stabilize and protect the streambank against scour and erosion. Environmental benefits derived from woody vegetation include diverse and productive riparian habitats, shade, organic additions to the stream, cover for fish, and improvements in aesthetic value and water quality. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include protection by use of large wood members with root wads, willow cuttings, bankfull bench construction using Vegetated Engineered Soil Lifts (VESL), bank shaping, riparian-corridor revegetation, geotextile, and rock riprap to establish grade/fill void spaces. Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility

Before Situation:

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has moderately degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The strea

After Situation:

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Feature Measure: Linear Feet of Streambank/

Scenario Unit: Linear Foot

Scenario Typical Size: 1,000.0

Scenario Total Cost: $150,329.33

Total Cost per Unit: $150.33

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 580 - Streambank and Shoreline Protection

Scenario: #27 - Bioengineering with High Earthwork Volume

Scenario Description:

Protection of deeply incised streambanks consisting of plantings of rhizomatous vegetation and establishment/re-establishment of a bankfull bench to stabilize and protect against scour and erosion. Environmental benefits derived from woody vegetation include diverse and productive riparian habitats, shade, organic additions to the stream, cover for fish, and improvements in aesthetic value and water quality. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include protection by re-establishing riparian-corridor vegetation through use of annual grasses/ fescue (upland/terrace), shrubs (seedlings or t+B1ransplants) willows cuttings/willow revetments, vertical willow bundles, and bankfull bench construction, bank shaping, and erosion control fabric. Establishment of bankfull bench 10- to 20-foot width; excavation also includes 15-foot high bank at 3:1 slope for 1000 linear feet; 1.1 acres is used for typical scenario. Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation.

Before Situation:

A stream bisects the agricultural property and much of the woody vegetation is gone due to channel instability, overgrazing, or human manipulation; the stream has marginally degraded streambanks that are unstable and show signs of active erosion. Soil Er

After Situation:

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Feature Measure: Length of installed bioengin

Scenario Unit: Linear Foot

Scenario Typical Size: 1,000.0

Scenario Total Cost: $132,782.64

Total Cost per Unit: $132.78

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 582 - Open Channel

Scenario: #1 - Excavate & Fill

Scenario Description:

This scenario is the construction or improvement of a channel in which water flows with a free surface. Typical construction dimensions are 3-4' deep x 30' wide bottom x 2000' length with a side slope of 6:1. The practice is used for the restoration of a natural or artificial channel to improve the process and ecological function in a degraded and eroding stream. Excavation and earth fill is required. Conditions are difficult. Difficult conditions include: a location that requires a significant drive off the main road, soils with large rock or difficult clay to excavate, and/or other aspects that create difficulty in excavation compared to similar work in the area. Construction may include vegetation and/or a lightly armored bank toe. This scenario assists in addressing the resource concerns: streambank erosion, sediment deposition, excessive flooding or ponding. Conservation practices that may be associated are: 356-Dike, 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

Before Situation:

A stream or channel with active streambank erosion or headcuts and inadequate capacity to handle the flow needed for flood prevention, drainage or erosion prevention.

After Situation:

An earthen channel was excavated to allow unrestricted flow of water and to stabilize the bottom and side slopes. Flooding and erosion is no longer a resource concern.

Feature Measure: Volume of earth excavated i

Scenario Unit: Cubic Yard

Scenario Typical Size: 9,920.0

Scenario Total Cost: $34,987.53

Total Cost per Unit: $3.53

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 584 - Channel Bed Stabilization

Scenario: #1 - Bio-engineering

Scenario Description:

Stabilize the bottom and slope of a stream channel using bioengineering methods. Bio-engineering methods include live stakes, fascines, plantings, bare root stock, willow waddles, and live stakes. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Typical stream has 50 foot bottom width and 6 foot banks. Length of area 100 feet. Planting bank area at a 2x2 grid with live stakes, potted plants, and bare root mix

Before Situation:

Bed of an existing or newly constructed alluvial or threshold channel is undergoing damaging aggradation or degradation. Stream cannot be feasibly controlled with clearing and snagging, vegetation, bank protection or upstream water control. Soil Erosion:

After Situation:

Stream channel is stable and vegetated. Other associated practices could be (326) Clearing and Snagging, (396) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Feature Measure: Area of planting

Scenario Unit: Square Foot

Scenario Typical Size: 2,500.0

Scenario Total Cost: $13,077.78

Total Cost per Unit: $5.23

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 584 - Channel Bed Stabilization

Scenario: #3 - Wood structures

Scenario Description:

Stabilize the bottom and slope of a stream channel using engineered structures consisting primarily of wood. This includes but not limited to toe wood, log weirs, log vanes, root wads, log step pools, etc. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Typical stream has 50 foot bottom width and 6 foot banks. Length of area 100 feet. Structures spaced at 50 foot intervals.

Before Situation:

Bed of an existing or newly constructed alluvial or threshold channel is undergoing damaging aggradation or degradation. Changes cannot be controlled feasibly with clearing and snagging, vegetation, bank protection or upstream water control. Soil Erosion:

After Situation:

Stream channel is stable. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Other associated practices could be (326) Clearing and Snagging, (396) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Feature Measure: Number of structures

Scenario Unit: Each

Scenario Typical Size: 3.0

Scenario Total Cost: $15,236.40

Total Cost per Unit: $5,078.80

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 584 - Channel Bed Stabilization

Scenario: #15 - Log and Boulder Check Dam

Scenario Description:

Typical project involves a series of check dams, to raise the bottom elevation of an incised stream channel. Cost estimate is based upon a typical scenario involving a 35 ft wide bankfull channel, incised to a 12 ft maximum depth and restored to a 2.5 ft max depth. These structures are utilized on the downstream end of a proposed restoration reach, to raise the channel up to it's stable, natural elevation. The upstream reach may be restored via 580- Open Channel, or left to aggrade naturally. Structures are intended as a temporary (<20 years) measure, to encourage natural beaver activity to re-establish in the reach. Many times beaver transplants to the area are done in conjunction with channel stabilization work. The cost to construct these structures (quantity of materials), is variable by their height. To develop a "typical" structure for the cost list and intermediate depth was used. A combination of boulders, and excavator driving "piling" logs, are used to counteract buoyancy and overturning/sliding forces. Boulders, and smaller graded riprap, are used to construct both bed and bank keys to prevent flanking and failure due to scour. The unit of payment measurement is bankfull channel width. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

Bed of an existing alluvial channel is undergoing degradation. Changes cannot be controlled feasibly with clearing and snagging, vegetation, bank protection or upstream water control.

After Situation:

Stream channel is stable. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Other associated practices could be (582) Open Channel.

Feature Measure: Bankfull Channel Width

Scenario Unit: Linear Foot

Scenario Typical Size: 35.0

Scenario Total Cost: $51,569.60

Total Cost per Unit: $1,473.42

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 587 - Structure for Water Control

Scenario: #3 - Commercial Inline Flashboard Riser - NP Reg 1

Scenario Description:

An Inline Water Control Structure (WCS) composed of plastic that maintains a desired water surface elevation, controls the direction or rate of flow, or conveys water to address the resource concern: Inadequate habitat for Fish and Wildlife. The water surface elevation is controlled by addition or removal of slats or "stoplogs". This scenario is applicable to variable crest weir structures where the elevation is controlled at point along a pipe extending through an embankment, providing ease of access to the structure and provide better protection against beaver activity. There are commercially available models composed of plastic that are commonly used when the width of the weir is 24" or less. Payment rate is based upon the Flashboard Weir Length in inches multiplied by the outlet length in feet (Inch-Foot). Cost estimate is based on a using such a commercial product. The typical scenario is an inline structure with a width of 24" and height of six feet. The pipe is 70' of 18" PVC (inlet and outlet combined). Earthwork is included in the associated practice.

Before Situation:

The landowner wishes to provide for a way to control the water surface elevation in a wetland area. The landowner wishes to enhance and enlarge the area to provide habitat for fish and wildlife.

After Situation:

A WCS is installed in a flow line allowing shallow water impoundments. A wetland area is enhanced and water levels can be varied to better accommodate wildlife needs. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Wetland Creation (658), Wetland Enhancement (659) Wetland Wildlife Habitat Management (644), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

Feature Measure: Flashboard Weir Length (in)

Scenario Unit: Diameter Inch Foot

Scenario Typical Size: 1,680.0

Scenario Total Cost: $9,098.15

Total Cost per Unit: $5.42

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 587 - Structure for Water Control

Scenario: #5 - Culvert <30 inches CMP - NP Reg 1

Scenario Description:

Install a new Corrugated Metal Pipe (CMP) culvert under 30 inches in diameter to convey water under roads or other barriers. A typical scenario would be an 24 inch diameter pipe, 40 feet in length. Work includes site preparation, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and riprap protection of side slopes. Use (396) Aquatic Organism Passage when the primary intent is biological concerns, not hydrologic. Use (578) Stream Crossing instead for culverts = 30 inches or perennial flow. Earthwork is included in the associated practice.

Before Situation:

Water flow needs to be conveyed under an access road, ditch or other barrier. Water must be conveyed in a controlled fashion.

After Situation:

Water is conveyed in a controlled manner. Associated practices could be Access Road (560), Animal Trails and Walkways (575), Critical Area Planting (342), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Pipeline (430), Irrigation Reservoir (436), Irrigation System, Surface and Subsurface (443), Irrigation System, Tailwater Recovery (447), Irrigation Water Management (449), Lined Waterway or Outlet (468), Obstruction Removal (500), Pond (378), Stormwater Runoff Control (570), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), and Trails and Walkways (568).

Feature Measure: Pipe Diameter (In) x Pipe Le

Scenario Unit: Diameter Inch Foot

Scenario Typical Size: 960.0

Scenario Total Cost: $7,663.85

Total Cost per Unit: $7.98

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 587 - Structure for Water Control

Scenario: #6 - Slide Gate - Flood Dike

Scenario Description:
This scenario includes installation of 15" CMP with a 15" slide gate (screw activated) through a flood control dike. Pipe is typically 48 feet long. During normal conditions the pipe provides un-restricted drainage from areas protected by the dike. During high water events on the downstream side of the dike, the gate can be closed to prevent flood water from backing into the protected area above the dike.

Before Situation:
A dike to protect an area from flooding is either in place or planned. Adequate drainage is required during normal operating periods to prevent saturating the area being protected, and flood waters need to be prevented from entering during periods of floo

After Situation:
Tide or flood inundation is controlled. Associated practices could be Dike (356), Field Ditch (607), Surface Drain, Main or Lateral (608). After installation of the Dike and Water Control Structure, the area protected by the dike will have proper drainage and protection during high water conditions downstream.

Feature Measure: Length of Pipe

Scenario Unit: Foot

Scenario Typical Size: 48.0

Scenario Total Cost: $4,139.99

Total Cost per Unit: $86.25

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 587 - Structure for Water Control

Scenario: #10 - Rock Check

Scenario Description:

This is a structure constructed with rock placed in existing, recently formed and active minor gullies located near the upper end of a watershed. Multiple structures are generally required, with downstream structures placed to force tail water at an upstream structure. The furthest upstream structure is located to control existing head cutting. Resource concerns addressed included gully erosion and water quality.

Before Situation:

Small gullies are actively forming in locations with relatively small drainage areas that result in increased downstream sedimentation and decreased water quality.

After Situation:

Construction of the structures will result in preventing further head cutting in the channel and improved downstream water quality due to a decrease of sediment in the runoff. Construction will consist of minor site shaping, excavation to tie rock into the embankment, and placement of rock rip rap. Typical dimensions used are 2:1 upstream slope, 5:1 downstream slope with a 3' top width, approximately 4' wide within the channel. The rock will be placed in a key way 1' deep with 1:1 side slopes located below the level top section. The typical height is 3' above the existing channel elevation.

Feature Measure: Number of Structures

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $2,050.50

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $2,050.50

Practice: 587 - Structure for Water Control

Scenario: #11 - Earth Check

Scenario Description:

This is a structure constructed with compacted earth placed in existing, recently formed and active, minor gullies located near the upper end of a watershed. Multiple structures are generally required, with downstream structures placed to force tail water at an upstream structure. The furthest upstream structure is located to control existing head cutting. Resource concerns addressed included gully erosion and water quality.

Before Situation:

Small gullies are actively forming in locations with relatively small drainage areas that result in increased downstream sedimentation and decreased water quality.

After Situation:

Construction of the structures will result in preventing further head cutting in the channel and improved downstream water quality due to a decrease of sediment in the runoff. Construction will consist of minor site shaping, and placement of earthfill. Typical dimensions used are 3:1 upstream slope, 5:1 downstream slope with a 3' top width, approximately 4' wide within the channel. The typical height is 3' above the existing channel elevation.

Feature Measure: Number of Structures

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,355.53

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $1,355.53

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 587 - Structure for Water Control

Scenario: #484 - Flow Meter with Electronic Index & Telemetry

Scenario Description:

Permanently installed water flow meter with an electronic flow rate and volume index and data telemetry transmission system. Meters can be any flow measurement device that meets CPS 433, (i.e. meters: turbine, propeller, acoustic, magnetic, venturi, orifice, etc.) with or without straightening vanes. Meter nominal diameter for insert type turbine meters will be installation pipe size. Typical installation would include installation of a 10 inch magnetic flow meter, with electronic index output and telemetry data transfer system for monitoring irrigation system flow rate. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, and Inefficient Energy Use - Equipment and facilities Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 441-Irrigation System, Microirrigation, 443-Irrigation System Surface and Subsurface, 442-Irrigation System, Sprinkler, 328-Conservation Crop Rotation, 634-Waste Transfer, and 590-Nutrient Management.

Before Situation:

Producer estimates seasonal and individual irrigation application flow rate and volumes based on energy costs, system operating pressure, or other means.

After Situation:

Producer is able to access instantaneous rate and cumulative flow volume data from a personal computer or cell phone at any time. The information gained will enable the irrigator to improve irrigation water management, recognize system performance issues before they become critical, and reduce energy use.

Feature Measure: Nominal Diameter of Meter

Scenario Unit: Inch

Scenario Typical Size: 10.0

Scenario Total Cost: $5,880.76

Total Cost per Unit: $588.08

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 590 - Nutrient Management

Scenario: #297 - Small Scale Basic Nutrient Management

Scenario Description:

This scenario applies to small farms with diversified cropping systems which will improve the current level of management in applying nutrients. Improved level of management will be such to prevent nonpoint source pollution of surface and ground waters. Typical size is less than 1.0 acre. This scenario includes hand-labor as well as equipment.

Before Situation:

Little to no soil or manure testing is being conducted and typically lacks a nutrient budget. Application of fertilizers, including manures and amendments, are conducted based upon traditional fertilizer recommendations from LGU or based on historic use r

After Situation:

Implementation Requirements have been developed to manage nutrients according to the criteria found in Nutrient Management (590) Conservation Practice Standard for either organic or non-organic operations as appropriate. A nutrient budget has been developed for each field or management zone. Nutrients are applied according to the 4 R's. (Right rate, Right time, Right place and Right source). Records needed to complete the nutrient budget are provided which may include variety of pre-season, in-season, and post-season soil nutrient and plant tissue tests and analysis; compost or manure tests; application timing, method and rate; nutrient sources; and yield data for each field or management zone. Nutrient runoff into adjacent streams is minimized improving water quality and preventing leaching into shallow ground water sources.

Feature Measure: planted area

Scenario Unit: 1,000 Square Feet

Scenario Typical Size: 43.0

Scenario Total Cost: $1,798.34

Total Cost per Unit: $41.82

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 590 - Nutrient Management

Scenario: #304 - Precision Nutrient Application

Scenario Description:

The planned Precision Nutrient Application system will meet the current Nutrient Management (590) CPS General and Additional Criteria. The Application system will include soil sampling methodology for variable rate application and systems. Use of additional nutrient/soil tests including chlorophyll meters, and/or spectral analysis may be used to further refine nutrient applications. Management of nutrients is based on the 4Rs of Nutrient Stewardship & SMART Nutrient Management (apply the right nutrient source at the right rate, time and place) including activities to reduce nutrient loss by Assessment of comprehensive, site-specific conditions within the field. Nutrient management intensity must be sufficient to address site-specific risk for nutrient loss. Payment for implementation is to defray the costs of Precision Nutrient Application system, equipment to implement the practice, implementation of the NMP and recordkeeping. Typical treatment area is 40 acres.

Before Situation:

Currently, a nutrient management system for the farm operation accounting for all know measurable nutrient sources does not exist or does not meet the Nutrient Management (590) CPS requirements for General and Additional Criteria. Management of nutrients

After Situation:

A Precision Nutrient Application system will be developed to meet the current Nutrient Management (590) CPS General and Additional Criteria with nutrient management intensity sufficient to address site-specific risks for nutrient loss. Development and implementation of the NM system is based on site-specific risk assessment of comprehensive, site-specific conditions for the application of nutrients for each nutrient loss pathway that can negatively impact soil, water and air quality with excess nutrient loss. The NM system utilizes the 4Rs of nutrient stewardship and SMART Nutrient Management – the right Source, right Method, right Rate, and right Timing to meet both plant productivity and natural resource conservation goals. Utilizing GIS and GPS technologies, nutrients are applied based on soil test results for each grid or management zone using automated variable rate application equipment. Records provided annually include, the current soil test reports, planned nutrient application rates for each grid or management zone (prescription maps) and/or as applied maps, source, timing, and placement of all nutrients applied, actual crop yields and/or generated yield maps.

Feature Measure: acres treated

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $3,584.60

Total Cost per Unit: $89.62

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 590 - Nutrient Management

Scenario: #350 - Nutrient Management

Scenario Description:

The scenario describes the development and implementation of a Nutrient Management (NM) system which will meet the current Nutrient Management (590) CPS General as well as Additional Criteria and utilizes synthetic fertilizer as well as animal manure as nutrient sources for crop production. The system provides crop nutrient recommendations which accounts for the removal of nitrogen (N), phosphorus (P), and potassium (K). Management of nutrients is based on the 4Rs of Nutrient Stewardship & SMART Nutrient Management (apply the right nutrient source at the right rate, time and place) including activities to reduce nutrient loss by Assessment of comprehensive, site-specific conditions within the field. Nutrient management intensity must be sufficient to address site-specific risk for nutrient loss. Payment is to defray the costs of implementation of the NM system and recordkeeping. Typical treatment area is 40 acres.

Before Situation:

Currently, a nutrient management system for the farm operation accounting for all know measurable nutrient sources does not exist or does not meet the Nutrient Management (590) CPS requirements for General and Additional Criteria. Management of nutrients

After Situation:

A Nutrient Management (NM) system is developed and implemented to meet the current Nutrient Management (590) CPS for General and Additional Criteria, with nutrient management intensity sufficient to address site-specific risks for nutrient loss. Development and implementation of the NM system is based on site-specific risk assessment of comprehensive, site-specific conditions for the application of nutrients for each nutrient loss pathway that can negatively impact soil, water and air quality with excess nutrient loss. The NM system utilizes the 4Rs of nutrient stewardship and SMART Nutrient Management – the right Source, right Method, right Rate, and right Timing to meet both plant productivity and natural resource conservation goals.

Feature Measure: Ac.

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $1,689.45

Total Cost per Unit: $42.24

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 595 - Pest Management Conservation System

Scenario: #194 - Plant Health PAMS (acs) Low labor only

Scenario Description:
PAMS activities with low labor costs will be implemented on a large scale crop production area.

Before Situation:
Before practice conditions vary widely. Conditions range from the client is not using any PAMS techniques to the client is using many different PAMS techniques for many different pests. In all cases at least one planned PAMS technique has risk to an ident

After Situation:
Planned Prevention (resistant cultivar selection, pest habitat removal, etc.), Avoidance (IWM for disease avoidance, change in rotation to avoid problem spots, etc.), and Monitoring (field scouting, etc.) activities have been implemented to help meet the minimum criteria for the identified resource concerns (i.e. Plant Pest Pressure).

Feature Measure: Acres of management appli

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $728.18

Total Cost per Unit: $18.20

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 595 - Pest Management Conservation System

Scenario: #195 - Pest Management Precision Ag

Scenario Description:

This scenario takes a conventional cropping system where either no pest management or only a basic level of pest management is being practiced and improves it to address air quality and/or minimize agricultural nonpoint sources pollution of surface and groundwater. The planned Pest Management system will meet the current Pest Management Conservation System (595) CPS general and additional criteria. Precision pest management system includes such items as pest monitoring, targeted applications, eliminates overlap, tissue testing, specialized nozzles etc. to further refine pesticide applications. Payment for implementation is to defray the costs of tissue testing, additional testing and analysis, equipment implementation of the PMCS and recordkeeping. Typical treatment area is 40 acres.

Before Situation:

Conventional pest management programs involve little or no monitoring and testing. Application of pesticides are completed annually based upon product salesmen recommendations that do not specifically consider the detrimental affects of inexact applicatio

After Situation:

A precision pest management system will be developed to meet the current Pest Management Conservation System (595) CPS general and additional criteria, when applicable the system will also meet NOP regulations. Development and implementation of a PMCS will benefit plant productivity while reducing potential of off-site movement of pesticides. PMCS may include practices such as use of spot applications, proper timing of applications, more appropriate formulations etc. Additional monitoring and tissue testing may also be used to further refine pesticide applications. Smart sprayer and advanced nozzle technology may also be employed. Records will be provided annually of the current monitoring, test analysis, application rates, formulations for each field including crop yields.

Feature Measure: Acres of management appli

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $2,909.55

Total Cost per Unit: $72.74

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 595 - Pest Management Conservation System

Scenario: #198 - Water Quality Pesticide Mitigation > 30 Point AND/OR Beneficial Insect Pesticide Mitigation - Small Farm

Scenario Description:

The minimum amount of planned IPM mitigation techniques needed to reduce water quality pesticide-related resource concerns is > 30 mitigation index score. An IPM plan will be developed in accordance with this standard and the CPS 595 Implementation Requirement will document how specific pesticide hazards will be prevented or mitigated AND/OR impacts to wildlife-beneficial insects including pollinators.

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many differe

After Situation:

An IPM system with planned. Mitigation techniques (>30 points) have been implemented to meet the minimum criteria for the identified resource concerns (i.e. Water Quality - Impacts to Human Drinking Water or Fish) AND 10 points of mitigation for Wildlife (beneficial insects including pollinators) with either risk prevention (i.e. planned pesticides have no risk to the identified resource concern) or risk mitigation (i.e. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 AND Agronomy Technical Note 9).

Feature Measure: Small Farm, typically <= 5 ac

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $2,193.83

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $2,193.83

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 595 - Pest Management Conservation System

Scenario: #200 - Water Quality Pesticide Mitigation > 30 Point AND/OR Beneficial Insect Pesticide Mitigation

Scenario Description:

The minimum amount of planned IPM mitigation techniques needed to reduce water quality pesticide-related resource concerns is > 30 mitigation index score. An IPM plan will be developed in accordance with this standard and the CPS 595 Implementation Requirement will document how specific pesticide hazards will be prevented or mitigated AND/OR impacts to wildlife-beneficial insects including pollinators.

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many differe

After Situation:

An IPM system with planned. Mitigation techniques (>30 points) have been implemented to meet the minimum criteria for the identified resource concerns (i.e. Water Quality - Impacts to Human Drinking Water or Fish) AND/OR 10 points of mitigation for Wildlife (beneficial insects including pollinators) with either risk prevention (i.e. planned pesticides have no risk to the identified resource concern) or risk mitigation (i.e. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 AND/OR Agronomy Technical Note 9).

Feature Measure: Acres of Management Appli

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $3,121.66

Total Cost per Unit: $78.04

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 595 - Pest Management Conservation System

Scenario: #202 - Plant health PAMS (Small Farm - each) labor only

Scenario Description:
PAMS activities with labor costs will be implemented on a small scale crop production area.

Before Situation:
Before practice conditions vary widely. Conditions range from the client is not using any PAMS techniques to the client is using many different PAMS techniques for many different pests. In all cases at least one planned PAMS technique has risk to an ident

After Situation:
Planned Prevention (resistant cultivar selection, pest habitat removal, etc.), Avoidance (IWM for disease avoidance, change in rotation to avoid problem spots, etc.), and Monitoring (field scouting, etc.) activities have been implemented to help meet the minimum criteria for the identified resource concerns (i.e. Plant Pest Pressure).

Feature Measure: Small farm, typically <= 5 ac

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $687.60

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $687.60

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 603 - Herbaceous Wind Barriers

Scenario: #10 - Cool Season

Scenario Description:

This scenario describes the implementation of herbaceous barriers to reduce wind velocities and wind-borne particulate matter. In this scenario barriers are composed of cool season annual or perennial vegetation. Plant materials shall be selected for local adaptation and climatic conditions and are resistant to lodging and are non-spreading in their habit. Barriers will be designed as close to perpendicular to prevailing winds as practical. Barrier direction, spacing, and composition needed to achieve the desired purpose shall be designed using the currently approved wind erosion technology.

Before Situation:

Typically cropland has excessive soil disturbance and unsheltered distance that results in excessive wind erosion that affect soil resources. Seedling development and wildlife habitat are negatively affected by wind-borne sediment and sediment-borne conta

After Situation:

Implementation Requirements will be prepared and implemented for the site according to the Herbaceous Wind Barrier (603) standard. Implementation of herbaceous wind barriers will modify the flow and velocity of air dependent upon barrier height, porosity, spacing and wind speed. Orientation is generally placed across an entire field perpendicular to applicable prevailing wind direction. Implementation will reduce soil loss, protect growing plants from damage by wind-blown soil particles, and provide food and cover for wildlife. The scenario includes the design and implementation of annual barriers and required reestablishment.

Feature Measure: linear feet of barrier plante

Scenario Unit: Linear Foot

Scenario Typical Size: 1,320.0

Scenario Total Cost: $161.69

Total Cost per Unit: $0.12

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 604 - Saturated Buffer

Scenario: #7 - Saturated Buffer

Scenario Description:

Water discharging from a subsurface drainage system is dispersed along a buffer strip (often a riparian buffer). The water flows underground through the buffer area where nutrients and sediment can be removed before the water reaches the stream. Resource Concerns: Water Quality Degradation (Nutrients) Associated Practices: 606 - Subsurface Drain; 554 - Drainage Water Management; 587 - Structure for Water Control

Before Situation:

Water from a subsurface drainage system flows directly into a stream, carrying sediment and nutrients.

After Situation:

Water from a subsurface drainage system is dispersed through at 400 feet of 5" HDPE single wall perforated pipe tile drain along an established vegetated buffer strip at least 30 feet from the receiving stream. Drainage pipe is trenched in at 4 feet depth. The water is detained by passing underground where the nitrogen is removed by bacteria and natural processes.

Feature Measure: Length of Dispersal conduit

Scenario Unit: Foot

Scenario Typical Size: 400.0

Scenario Total Cost: $4,347.93

Total Cost per Unit: $10.87

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 605 - Denitrifying Bioreactor

Scenario: #11 - Denitrifying Bioreactor

Scenario Description:

Scenario describes a structure containing a carbon source installed to intercept subsurface drain (tile) flow or ground water, and reduce the concentration of nitrate-nitrogen. Woodchips serve as the carbon source necessary to the denitrification process. This bioreactor has geotextile fabric (or polyethylene - PE) between the wood chips and the surrounding soil plus the following components: woodchip filled pit, two water control structures (to allow management of the flow rate and free water elevation within the bioreactor), and piping to convey water to and from the bioreactor. Woodchips serve as the carbon source necessary to the denitrification process. Associated practices: Subsurface Drain (606), Structure for Water Control (587), Drainage Water Management (554). Resource concern: Water Quality Degradation - Excess nutrients in surface and ground waters. Management and maintenance of the bioreactor (including chip replenishment), as well as monitoring and reporting to demonstrate the performance of the practice are not included in this scenario.

Before Situation:

Before the installation, the subsurface drainage system is contributing nitrates to a surface water source (ditch or stream), high nitrates are a resource concern to the receiving water, and it is feasible to install a bioreactor to reduce the nitrate loa

After Situation:

Bioreactor has geotextile fabric (or polyethylene - PE) between the wood chips and the surrounding soil plus the following components: woodchip filled pit, two water control structures (to allow management of the flow rate and free water elevation within the bioreactor), and piping to convey water to and from the bioreactor. The approximate bioreactor excavated pit volume is 333 cubic yards (e.g. 6 feet deep, 15 feet wide and 100 feet long). Woodchips occupy the 6 feet of the pit plus 10% crowned (366 cu. yd.) and will be mounded above ground level to shed precipitation. A geotextile fabric (or PE material) surrounds the chips to prevent migration of soil into the pit. Water control structures should be installed using practice standard (587) Structure for Water Control. Two inline water control structures are in place. Upper WCS connected to the upper 6" diameter single-wall CPT manifold pipe (15' each, note that 6' HDPE dual wall is the only type available and used in the scenario components) by 6" diameter dual wall pipe (20' each). 20' of 6" dual wall pipe connects the downstream manifold to the lower WCS which is connected back to the main with additional 20' of 6" dual wall pipe. Flow rates are dependent upon the availability of drainage water from the 10' drainage mainline. 40' of mainline is replaced with non-perforated 10' above and below the upper WCS. The soil excavated from the pit is spoiled onto the nearby field. Associated practices: Subsurface Drain (606), Structure for Water Control (587), Drainage Water Management (554).

Feature Measure: Volume of Pit excavation

Scenario Unit: Cubic Yard

Scenario Typical Size: 333.0

Scenario Total Cost: $29,285.03

Total Cost per Unit: $87.94

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 606 - Subsurface Drain

Scenario: #1 - Corrugated Plastic Pipe (CPP), Single-Wall, <= 6 inch

Scenario Description:

Description: Below ground installation of perforated HDPE (Corrugated Plastic Pipe) pipeline, using a drainage plow. HDPE (CPP) Single-Wall is manufactured in sizes (nominal diameter) from 3-inch to 24-inch; typical practice sizes range from 3-inch to 12-inch; and typical scenario size is 5-inch. Construct 2,000 feet of 5-inch, Single-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth 5 feet. The typical number of mainline connections for 2,000 feet of subsurface drainline is a total of 3 each. Consideration must be given to Section 404 of Clean Water Act and Food Security Act regarding wetlands. Resource Concerns: Excess Water (Seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). Associated Practices: 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; and 554 - Drainage Water Management,412-Grassed Waterway, 410- Grade Stabilization Structure, 313- Waste Storage Facility, 412-Grassed Waterway, 410-Grade Stabilization Structure, 313- Waste Storage Facility.

Before Situation:

Before installation soil conditions are excessively wet in the spring due to poor internal soil drainage. Excess soil water is causing crop stress and delay of field operations (seed bed preparation, planting, etc.).

After Situation:

The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management.

Feature Measure: Length of Pipe

Scenario Unit: Foot

Scenario Typical Size: 2,000.0

Scenario Total Cost: $8,471.94

Total Cost per Unit: $4.24

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 606 - Subsurface Drain

Scenario: #2 - Enveloped Corrugated Plastic Pipe (CPP), Single-Wall, <= 6 inch

Scenario Description:

Description: Below ground installation of perforated HDPE (Corrugated Plastic Pipe) pipeline with Sand-Gravel envelope, using a drainage trencher. HDPE (CPP) Single-Wall is manufactured in sizes (nominal diameter) from 3-inch to 24-inch; typical practice sizes range from 3-inch to 12-inch; and typical scenario size is 5-inch. Construct 2,000 feet of 5-inch, Single-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth of 5 feet, and surrounded with a sand-gravel envelope. The typical volume sand-gravel for 2,000 feet of 12"wide x 12" high envelope is 64 cubic yards. The typical number of mainline connections for 2,000 feet of subsurface drainline is a total of 3 each. Consideration must be given to Section 404 of Clean Water Act and Food Security Act regarding wetlands. Resource Concerns: Excess Water (seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). Associated Practices: 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; and 554 - Drainage Water Management, 412-Grassed Waterway, 410- Grade Stabilization Structure, 313- Waste Storage Facility.

Before Situation:

Before installation soil conditions are excessively wet in the spring due to poor internal soil drainage. Excess soil water is causing crop stress and delay of field operations (seed bed preparation, planting, etc.).

After Situation:

The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management.

Feature Measure: Length of Pipe

Scenario Unit: Foot

Scenario Typical Size: 2,000.0

Scenario Total Cost: $10,364.17

Total Cost per Unit: $5.18

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 606 - Subsurface Drain

Scenario: #5 - Secondary Main Retrofit for DWM

Scenario Description:

An agricultural field has existing patterned tile system installed at 75 foot spacings. The field is 75 acres in size: 2475' x 1320', with a single main line at the low end of the field (2475'). The laterals are installed perpendicular to the topographic contours. The field has 3.5 feet of fall in the 1/4 mile length of the laterals, so a secondary main will be needed to allow drainage water management to be implemented on the higher half of the field.

Before Situation:

The patterned tile drainage system allows free flow of drainage water to a receiving ditch. Drainage water carries nitrogen and phosphorus out of the soil and these nutrients pollute the receiving waters.

After Situation:

A 12 inch diameter secondary mainline is retrofitted to the drainage system, located halfway up the field and relatively parallel to the topographic contours. This new mainline is hooked to each individual lateral and continued to a stable outlet. A Drainage Water practice must be completed along with the mainline; typically Structures for Water Control (587) installed at two foot vertical intervals so that water can be retained in the field. This scenario also applies to systems where the secondary main is used to connect drain lines that formerly each exited separately to the ditch, with a structure that distributes the drainage water into the subsurface soil at a vegetated buffer (772) OR a Denitrifying Bioreactor (747) might be installed at the outlet. In combination or singly, one of these practices must be installed with the secondary main.

Feature Measure: Length of Pipe

Scenario Unit: Foot

Scenario Typical Size: 3,135.0

Scenario Total Cost: $26,430.79

Total Cost per Unit: $8.43

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 610 - Salinity and Sodic Soil Management

Scenario: #1 - Soil Management (non-Irrigated)

Scenario Description:

The producer secures training in Salinity and Sodic Soil Management, analyzes subsurface conditions in areas in and around a saline seep and using information gained from training and field observations carries out a Salinity and Sodic Soil Management Plan employing as applicable changes in Conservation Cropping Systems, Critical Area Planting, Nutrient Management and use of soil amendments. Scenario includes cost of attending a 6 hr. University, NRCS, or commodity group sponsored training session and 40 hours of mgt labor a year to analyze available data and field situation, then review, and modify as necessary the Salinity and Sodic Soil Management Plan and continue to carry it out. Resource Concerns: Soil Quality Degradation - Concentration of salts or other chemicals, and Water Quality Degradation- Excessive salts in surface and ground waters. Associated Practices: 328 -Conservation Cropping System; 342- Critical Area Planting; and 590 - Nutrient Management.

Before Situation:

A crop-fallow system on sodic and saline soils has resulted in saline seeps. The recharge area of the seep must be determined before the extents of the treatment can be planned. An analyses of the subsurface conditions in areas in and around a saline is c

After Situation:

A determination of extent of recharge area has been made. The area to be treated has been identified. The producer has developed and is carrying out a Salinity and Sodic Soil Management Plan. Deep percolation in the recharge area is eliminated and salts no longer leach into the ground or surface water.

Feature Measure: Acres included in Salinity an

Scenario Unit: Acre

Scenario Typical Size: 100.0

Scenario Total Cost: $2,740.54

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $27.41

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 610 - Salinity and Sodic Soil Management

Scenario: #3 - Soil Management (Irrigated)

Scenario Description:

The producer secures training in Salinity and Sodic Soil Management and develops and carries out a Salinity and Sodic Soil Management Plan. Scenario includes cost of attending a 6 hr. University, NRCS, or commodity group sponsored training session and 12 hours of mgt labor a year to analyze available data and field situation, develop (or review and modify as necessary) plan and carry it out. Sampling on a 3-5 year interval is recommended if conditional soils are irrigated or marginal irrigation water is used.. Monitor (sample) one site per 40 acres of each major soil. Monitoring procedures include; GPS reference all sites, duplicate (2 samples) all sites of each major soil, sample after harvest, sampled to a depth of 6 feet and examined to 10 feet noting water table depth. Also sample each genetic soil horizon or portion no greater than 12 inches. Monitoring should be done by or under the supervision of an experienced soil scientist. Resource Concerns: Soil Quality Degradation - Concentration of salts or other chemicals, and Water Quality Degradation- Excessive salts in surface and ground waters. Associated Practices: 328-Conservation Crop Rotation; 449-Irrigation Water Management; and 590-Nutrient Management.

Before Situation:

Salinity and or Sodic conditions have developed in the root zone of a 100 acre irrigated cropland field resulting in decreased soil quality, plant health problems, and yield reductions.

After Situation:

Producer conducts soil conductivity and salinity test to determine the root zone depth of water application necessary for flushing accumulated salts and maintaining a proper salt balance. Producer conducts irrigation suitability test of water supply results to determine suitability of applied water for irrigation and additional irrigation volumes needed for leaching. Routine periodic checks of water EC will be conducted by producer to monitor for water salinity which might require changes to Salinity and Sodic Soil Management Plan. The Salinity and Sodic Soil Management Plan is carried out employing soil and water testing and as applicable changes in Irrigation Water Management (449), Conservation Crop Rotation (328), tillage, and use of soil amendments. The producer has developed and is carrying out a Salinity and Sodic Soil Management Plan resulting in improved soil quality and plant health.

Feature Measure: Acres included in Salinity an

Scenario Unit: Acre

Scenario Typical Size: 100.0

Scenario Total Cost: $4,202.06

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $42.02

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 610 - Salinity and Sodic Soil Management

Scenario: #16 - Prevent Dry Intense Cropping

Scenario Description:

After identification of the recharge area by the use of monitoring wells or EMI meter a salinity management plan will include treatment of the recharge area. In this scenario, a recharge area 60 acres is determined during the inventory process, a salinity management plan that includes an annual soil analysis is developed and carried out on a dryland field. Salinity Management Plan will include proper inventory of soil and water resources in the recharge and seep areas including an annual soil moisture with water supply analysis. Forgone income is based on the recharge area being a dry land corn field, converted to an alfalfa. Forgone income is loss of corn income less income from alfalfa sold. The alfalfa will be harvested, and sold, and removed from the recharge area once a year. Resource Concerns: Soil Quality Degradation - Concentration of salts or other chemicals, and Water Quality Degradation-Excessive salts in surface and ground waters. Associated Practices: 328 - Conservation Cropping System; 342- Critical Area Planting.

Before Situation:

A Cropping system prior to mitigation typically included a corn/bean rotation was grown for the entire season. Either conventional tillage or chemical fallow was used to control weeds. The rotation was followed regardless of subsoil moisture conditions, r

After Situation:

After saline seep recharge area is determined in a inventory process a salinity management plan will address the salinity issues with an intensive cropping system that utilizes excess subsoil moisture is implemented and maintained to reduce, remove, and prevent recurrence of a saline seep. Intensive cropping systems for this practice are those that prevent subsoil moisture from building up and leaving the root zone. Alfalfa must be removed as part of proper management plan and generally can be sold. After the seep has been reclaimed, an intensive cropping system must be maintained to ensure the seep does not reappear.

Feature Measure: Acres planned

Scenario Unit: Acre

Scenario Typical Size: 60.0

Scenario Total Cost: $18,445.24

Total Cost per Unit: $307.42

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 612 - Tree/Shrub Establishment

Scenario: #4 - Trees, Machine planted - no tubes

Scenario Description:

This practice involves planting tree seedlings after the site has been prepared for seedling growth and establishment. The productivity of the site is good and will handle a medium density planting rate. Typical scenario will consist of 1000 feet of trees. The resource concerns addressed are degraded plant condition: undesirable plant productivity and health, inadequate structure and composition, and degraded wildlife habitat. Terrain is moderately sloping and will be planted with a mechanical tree planter. Smaller size seedlings (1-0) are planted.

Before Situation:

The land has little or no tree cover, or is stocked with the wrong tree species. Competing vegetation is a concern before and after planting. Soil condition is degraded due to the loss of the native forest ecosystem (organic matter in topsoil depleted). N

After Situation:

Land is established with permanent tree cover that will improve degraded plant condition, reduce soil erosion, establish wildlife habitat, sequester carbon and reduce invasive species presence. Establishing forest vegetation also creates corridors for wildlife movement.

Feature Measure: Number of Trees

Scenario Unit: Each

Scenario Typical Size: 100.0

Scenario Total Cost: $457.42

Total Cost per Unit: $4.57

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 612 - Tree/Shrub Establishment

Scenario: #109 - Tree-Shrub Establishment - Small Acreage 5 acres or less

Scenario Description:

Seedling (potted) to be planted for conservation purposes other than reforestation. Planting will be by hand. The resource setting is an area that historically was an upland forest. Resource concerns are degraded plant condition - undesirable productivity and health, and inadequate structure and composition; inadequate habitat for fish and wildlife.

Before Situation:

The native forest has been removed and the land is either row cropped, farmstead, or associated agricultural land. If any upland trees exist, they are poor quality or undesirable species. Terrain is gently to moderately sloping with soil erosion-sheet and

After Situation:

Typical treatment area can range from less than 1 acre to 5 acres; typical scenario based on 1 ac, 150 TPA. Potted/containerized hardwood seedlings are planted by hand. Post vegetation control should be evaluated and conducted, if necessary.

Feature Measure: Planted Seedling

Scenario Unit: Each

Scenario Typical Size: 150.0

Scenario Total Cost: $4,404.50

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $29.36

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 614 - Watering Facility

Scenario: #4 - Fiberglass Tank on Earth

Scenario Description:

A permanent watering facility for livestock constructed using a fiberglass tank with 1,200 gallon capacity placed on a gravel or compacted earth foundation that stores adequate quantity and quality of water for storage and or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock, habitat degradation, water quality, and undesirable plant productivity and health.

Before Situation:

This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife during the entire year in the Northern Plains Region, where water is not available in sufficient quantities at specific loca

After Situation:

A permanent watering facility with a capacity of greater than 1,200 gallons constructed using a fiberglass tank is installed on a gravel or compacted earth foundation with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

Feature Measure: Capacity in Gallons

Scenario Unit: Gallon

Scenario Typical Size: 1,200.0

Scenario Total Cost: $3,973.02

Total Cost per Unit: $3.31

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 614 - Watering Facility

Scenario: #9 - Water Fountain

Scenario Description:

A permanent watering facility consisting of a commercially available water fountain for livestock set on a concrete base to be installed with all tank materials, and plumbing, to provide adequate water supply capacity to ensure an adequate quality of water for livestock and direct drinking access and provide improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

Before Situation:

This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity

After Situation:

A permanent watering facility consisting of a commercially available water fountain for livestock set on a concrete base is installed with tank plumbing to ensure an adequate supply and quality of water for livestock or wildlife for direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

Feature Measure: Number of Tanks Installed

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $3,215.47

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $3,215.47

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 614 - Watering Facility

Scenario: #11 - Insulated Tank with Cover

Scenario Description:

A permanent watering facility for livestock constructed using a rubber equipment tire with concrete plug or fiberglass tank with 1,200 gallon capacity placed on a gravel or compacted earth foundation that stores adequate quantity and quality of water for storage and or direct drinking access. This scenario includes an insulated cover for the watering facility. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock, habitat degradation, water quality, and undesirable plant productivity and health.

Before Situation:

This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity

After Situation:

A permanent insulated watering facility with a capacity of greater than 1,200 gallons constructed using a rubber equipment tire with concrete plug or fiberglass tank is installed on a gravel or compacted earth foundation to provide livestock water year-round with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

Feature Measure: Capacity in Gallons

Scenario Unit: Gallon

Scenario Typical Size: 1,200.0

Scenario Total Cost: $6,863.40

Total Cost per Unit: $5.72

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 614 - Watering Facility

Scenario: #12 - Enclosed Storage Tank

Scenario Description:

A permanent below ground storage facility to provide water for a watering facility for livestock, wildlife and/or other conservation practices. All water storage facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

Before Situation:

This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife; where water is not available in sufficient quantities at specific locations; and habitat, water quality, plant productivity

After Situation:

A permanent water storage facility using a below ground concrete tank is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock, wildlife or other conservation practices for storage and/or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All water storage facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

Feature Measure: Capacity in Gallons

Scenario Unit: Gallon

Scenario Typical Size: 5,000.0

Scenario Total Cost: $9,486.35

Total Cost per Unit: $1.90

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 620 - Underground Outlet

Scenario: #4 - 4 inch - 6 inch PVC or DW Pipe, Multi-Inlet System

Scenario Description:

Install 400 feet of 4" & 6" approved plastic pipe (PVC or Dual Wall HDPE) to convey stormwater from one location to a suitable and stable outlet in high pressure flow conditions, situations needing greater capacity or where rodent damage may be a concern. Trench excavation is 48" deep and 12" wide for 4" pipe, and 18-24" wide for 6" pipe. Costs include 6" PVC pipe, 6" Perforated PVC Riser Inlet, labor to install pipe, trench excavation, trench backfill, and rodent guard. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contribu

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Foot

Scenario Typical Size: 400.0

Scenario Total Cost: $4,444.81

Total Cost per Unit: $11.11

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 620 - Underground Outlet

Scenario: #6 - 6 inch or smaller Single Wall PE Pipe(non-perf or perf), Multi-Inlet System

Scenario Description:

Install 400 feet of 4" & 6" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet in non-pressure flow conditions. Trench excavation is 48" deep and 12" wide. Costs include 4" and 6" HDPE corrugated single wall plastic tubing, 6" Perforated PVC Riser Inlet, labor to install pipe, trench excavation, trench backfill, and rodent guard. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contribu

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Foot

Scenario Typical Size: 400.0

Scenario Total Cost: $3,204.28

Total Cost per Unit: $8.01

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 620 - Underground Outlet

Scenario: #7 - 8 inch - 10 inch PVC or DW Pipe, Multi-Inlet System

Scenario Description:

Install 400 feet of 8" and 10" approved plastic pipe (PVC or Dual Wall HDPE) to convey stormwater from one location to a suitable and stable outlet in non-pressure flow conditions and when multiple practices drain into it. Trench Excavation is 48" deep and 24" wide. Typical costs include 8" and 10" PVC pipe, 10" riser inlet , labor to install pipe, trench excavation, trench backfill, and rodent guard. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contribu

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Foot

Scenario Typical Size: 400.0

Scenario Total Cost: $9,439.79

Total Cost per Unit: $23.60

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 620 - Underground Outlet

Scenario: #9 - 12 inch - 18 inch PVC or DW Pipe, Multi-Inlet System

Scenario Description:

Install 400 feet of 12" and 18" approved plastic pipe (PVC or Dual Wall HDPE) to convey stormwater from one location to a suitable and stable outlet in non-pressure flow conditions and when multiple practices drain into it. Trench Excavation is 58" deep and 28" wide. Costs include 12" and 18" HDPE pipe, 10" Perforated PVC Riser Inlet, labor to install pipe, trench excavation, trench backfill, and rodent guard. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contribu

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Foot

Scenario Typical Size: 400.0

Scenario Total Cost: $19,460.95

Total Cost per Unit: $48.65

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 620 - Underground Outlet

Scenario: #11 - Over 18 inch PVC or DW Pipe, Single- or Multi-Inlet System

Scenario Description:

Install 60 feet of greater than 18" approved plastic (PVC or Dual Wall HDPE) or CMP pipe to convey stormwater from one location to a suitable and stable outlet in non-pressure flow conditions and when multiple practices drain into it. Trench Excavation is 58" deep and 28" wide. Costs include 24" HDPE dual wall pipe, 36" dual wall HDPE pipe riser inlet , labor to install pipe, trench excavation, trench backfill, and rodent guard. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contribu

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Foot

Scenario Typical Size: 60.0

Scenario Total Cost: $4,368.21

Total Cost per Unit: $72.80

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 620 - Underground Outlet

Scenario: #70 - 8 inch Single Wall PE Pipe (non-perf or perf), Multi-Inlet System

Scenario Description:

Scenario is for the Installation of a 8" diameter approved plastic pipe to convey storm water from one location to a suitable and stable outlet. Payment includes pipe, perforated PVC riser inlet, trench excavation, and trench backfill. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations.

After Situation:

Excessive sedimentation and soil erosion is controlled after UGO is installed in association with terraces or water and sediment control basin. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Linear Foot

Scenario Typical Size: 500.0

Scenario Total Cost: $4,260.10

Total Cost per Unit: $8.52

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 620 - Underground Outlet

Scenario: #71 - 10 inch Single Wall PE Pipe (non-perf or perf), Multi-Inlet System

Scenario Description:

Scenario is for the Installation of a 10" diameter approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Payment includes pipe, perforated PVC riser inlet, trench excavation, and trench backfill. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations.

After Situation:

Excessive sedimentation and soil erosion is controlled after UGO is installed in association with terraces or water and sediment control basin. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Linear Foot

Scenario Typical Size: 500.0

Scenario Total Cost: $5,565.06

Total Cost per Unit: $11.13

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 620 - Underground Outlet

Scenario: #72 - >=12 inch Single Wall PE Pipe (non-perf or perf), Multi-Inlet System

Scenario Description:

Scenario is for the Installation of a 12" diameter approved plastic pipe to convey storm water from one location to a suitable and stable outlet. Payment includes pipe, perforated PVC riser inlet, trench excavation, and trench backfill. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations.

After Situation:

Excessive sedimentation and soil erosion is controlled after UGO is installed in association with terraces or water and sediment control basin. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Linear Foot

Scenario Typical Size: 500.0

Scenario Total Cost: $7,325.92

Total Cost per Unit: $14.65

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 632 - Waste Separation Facility

Scenario: #1 - Mechanical Separator

Scenario Description:

A small mechanical separation facility to partition solids, liquids, and/or associated nutrients from animal waste streams. The partitioning of the previously mentioned components facilitates the protection of air and water quality, protects animal health, and improves the management of an animal waste management system. Mechanical separators may include, but are not limited to: static inclined screens , vibratory screens, rotating screens, centrifuges, screw or roller presses, or other systems. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Amendments for the Treatment of Agricultural Waste (591), Pumping Plant (533), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).

Before Situation:

Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.

After Situation:

One small mechanical separation facility (a screw press) installed at livestock facility before storage or treatment or after treatment, for example, after an anaerobic digester. Part of an animal waste management system.

Feature Measure: Item

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $66,913.61

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $66,913.61

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 632 - Waste Separation Facility

Scenario: #2 - Earthen Settling Structure with picket screen outlet

Scenario Description:

An earthen structure, such as a basin or a terrace or dike like structure, used to capture and separate a portion of the solids from a liquid stream from a feedlot or confinement facility. A concrete pad should be installed on the bottom of the basin and around outlet structures to facilitate cleanout. Removes as portion of the solids to facilitate waste handling and to address water quality concerns. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).

Before Situation:

Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.

After Situation:

One earthen settling basin structure (60 ft wide by 200 ft long by 3 ft deep)(estimate 0.5' of freeboard above the design storage), with three screening outlet structures) constructed around or at a livestock feeding operation. Removes a portion of the solids that otherwise would leave with the runoff from an animal feeding operation. Part of an animal waste management system.

Feature Measure: Cubic Foot of Design Storag

Scenario Unit: Cubic Foot

Scenario Typical Size: 30,000.0

Scenario Total Cost: $13,591.77

Total Cost per Unit: $0.45

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 632 - Waste Separation Facility

Scenario: #4 - Concrete Settling Structure with pipe outlet

Scenario Description:

An earthen structure, such as a basin or a terrace or dike like structure, used to capture and separate a portion of the solids from a liquid stream from a feedlot or confinement facility. A concrete pad should be installed on the bottom of the basin and around outlet structures to facilitate cleanout. Removes as portion of the solids to facilitate waste handling and to address water quality concerns. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Vegetated Treatment Area (635), Pond Sealing or Lining - Compacted Soil (520), Pond Sealing or Lining - Concrete (522), and Waste Treatment (629).

Before Situation:

Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.

After Situation:

One earthen settling basin structure with a 30 ft wide by 200 ft long bottom area, 5 ft deep with 3:1 sideslopes. 4.0' depth is used for storage volume computation with 1.0' freeboard. One screening outlet structure is constructed around or at a livestock feeding operation. Removes a portion of the solids that otherwise would leave with the runoff from an animal feeding operation. The suspended solids and liquid is transferred to a Waste Storage Facility (313) using a Waste Transfer (634) pipe. Part of an animal waste management system.

Feature Measure: Cubic Foot of Design Storag

Scenario Unit: Cubic Foot

Scenario Typical Size: 35,800.0

Scenario Total Cost: $59,430.99

Total Cost per Unit: $1.66

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 632 - Waste Separation Facility

Scenario: #5 - Concrete Settling Structure with picket screen outlet

Scenario Description:

A concrete structure, such as a basin with concrete walls and floor, used to capture and separate a portion of the solids from a liquid stream from a feedlot or confinement facility. Removes as portion of the solids to facilitate waste handling and to address water quality concerns. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Pumping Plant (533), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment

Before Situation:

Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.

After Situation:

One concrete settling basin structure (20 ft wide by 40 ft long with 6 ft high walls and weeping wall/picket structure or outlet control) constructed around or at a livestock feeding operation. Removes a portion of the solids that otherwise would leave with the runoff from an animal feeding operation. Part of an animal waste management system.

Feature Measure: Cubic Foot of Design Storag

Scenario Unit: Cubic Foot

Scenario Typical Size: 4,000.0

Scenario Total Cost: $19,389.15

Total Cost per Unit: $4.85

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 632 - Waste Separation Facility

Scenario: #6 - Concrete Sand Settling Lane

Scenario Description:

A concrete structure, a concrete lane with curbs, used to capture and separate a portion of the solids, mainly sand, from a liquid stream from a confinement facility. Removes as portion of the solids to facilitate waste handling and to address water quality concerns. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Pumping Plant (533), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).

Before Situation:

Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.

After Situation:

One concrete settling lane structure (22 ft wide by 740 ft long by 5 in. thick) constructed around or at a livestock feeding operation. A 20' long opening in wall is allowed as an outlet for this lane. Removes a portion of the solids (sand) that otherwise would leave with the runoff from an animal feeding operation. Part of an animal waste management system.

Feature Measure: Square Foot of Settling Lane

Scenario Unit: Square Foot

Scenario Typical Size: 16,280.0

Scenario Total Cost: $214,888.73

Total Cost per Unit: $13.20

Based on North Dakota average costs. Individual county costs may vary.

Practice: 634 - Waste Transfer

Scenario: #1 - Concrete Channel

Scenario Description:

Installation of a concrete channel that consists of a slab with curb and footing on each side of the slab for the entire length of the channel to enable the facility manager to direct liquid waste to an existing collection basin and/or waste storage facility. Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

Before Situation:

Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.

After Situation:

Typical installation of a 12 foot wide 100' long concrete channel that consists of a 5" thick concrete slab with curbing on each side of the slab that is 2' high, 6" thick with footing for the entire length. The purpose is to transfer liquids or manure slurry from one area to an existing collection basin or waste storage facility. Includes safety chain for equipment. Alternative configurations can consist of the installation of a more narrow or wider channel that may or may not have curbs or a deeper shaped channel and may include a half pipe on the bottom.

Feature Measure: Bottom surface area of conc

Scenario Unit: Square Foot

Scenario Typical Size: 1,200.0

Scenario Total Cost: $23,871.64

Total Cost per Unit: $19.89

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 634 - Waste Transfer

Scenario: #2 - Gravity flow, less than or equal to 18 inch diameter conduit

Scenario Description:

Gravity flow conduit is typically a large diameter water tight sanitary sewer pipe used to transfer manure by gravity from one location to another. The gravity transfer system typically consists of an existing inlet structure or hopper with attachment to a smooth interior large diameter pipe. The pipe conveys the slurry waste liquid between the waste collection point and a manure storage or waste treatment structure. Adequate head on the pipe flow or change in elevation must be available for the gravity system to function and should be evaluated by the design engineer. This practice includes the pipe attachment to an existing inlet structure and all other fittings, trench excavation and backfill, labor and a equipment for installation. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

Before Situation:

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area an

After Situation:

Install a 150 foot long 18" diameter water tight pipe to transfer manure by gravity from one location to another. A gravity transfer system typically consists of a sealed inlet at an existing waste collection structure to a smooth interior 18" sewer grade pipe that will gravity flow to an outlet at a site of manure treatment or storage. This scenario includes the pipe, inlet, outlet, couplers and all other fittings, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure there is adequate elevation drop before contracting. If required an inlet structure may be contracted under another scenario. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

Feature Measure: Length of pipe installed

Scenario Unit: Foot

Scenario Typical Size: 150.0

Scenario Total Cost: $5,916.12

Total Cost per Unit: $39.44

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 634 - Waste Transfer

Scenario: #3 - Gravity flow, greater than 18 inch diameter conduit

Scenario Description:

Gravity flow conduit is typically a large diameter water tight sanitary sewer pipe used to transfer manure by gravity from one location to another. The gravity transfer system typically consists of an existing inlet structure or hopper with attachment to a smooth interior large diameter pipe. The pipe conveys the slurry waste liquid between the waste collection point and a manure storage or waste treatment structure. Adequate head on the pipe flow or change in elevation must be available for the gravity system to function and should be evaluated by the design engineer. This practice includes the pipe attachment to an existing inlet structure and all other fittings, trench excavation and backfill, labor and a equipment for installation. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

Before Situation:

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area an

After Situation:

Install a 150 foot long 30" diameter water tight pipe to transfer manure by gravity from one location to another. A gravity transfer system typically consists of a sealed inlet at an existing waste collection structure to a smooth interior 30" sewer grade pipe that will gravity flow to an outlet at a site of manure treatment or storage. This scenario includes the pipe, inlet, outlet, couplers and all other fittings, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure there is adequate elevation drop before contracting. If required an inlet structure may be contracted under another scenario. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

Feature Measure: Length of pipe installed

Scenario Unit: Foot

Scenario Typical Size: 150.0

Scenario Total Cost: $9,900.14

Total Cost per Unit: $66.00

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 634 - Waste Transfer

Scenario: #4 - Pressure flow, less than or equal to 6 inch diameter conduit

Scenario Description:

Pressure flow pipeline used to transfer manure wastewater by pumping from the waste storage pond to the field where it is to be applied according to the CNMP. These pipelines may also be utilized to transfer waste within the waste treatment system. Pressure flow transfer pipelines can be between 3" and 12" diameter but 6" diameter is a commonly used pipe size. Pressure pipe will handle an internal pumping pressure between 130 and 200 psi depending on the designed pumping system and must have gasketed joints to seal for the wastewater transfer. The pressure pipe moves the water by pumping from the intake riser location, through a buried mainline with outlet risers spaced at 300 ft intervals for a traveler applicator. This practice includes the pipe plus an inlet riser structure, clean-out risers and outlet risers plus all other valves and fittings, trench excavation and backfill, labor and a equipment for installation. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. This pipeline is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling; PS 635, Vegetated Treatment Area.

Before Situation:

The waste storage structure is separated from the application fields where wastewater nutrients are needed. Soil nutrients in the near fields have high phosphorus levels from over application near the waste storage facility. The current application operat

After Situation:

Install a 1000 foot long 6 inch diameter PVC gasketed IPS pipe that has an SDR of 21 and is water tight under pressure flow to transfer the manure wastewater. An inlet riser and is located near the pump site of the waste storage pond and designed for the desired pressure and flow for the application system. This scenario includes the pipe, inlet riser, couplers, air-vac vents, all other fittings, and risers placed as specified by the design, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure the design will function. The transfer pipeline will deliver the manure slurry to the fields for agronomic nutrient utilization according to the CNMP, thereby protecting water quality resources.

Feature Measure: Length of pipe installed

Scenario Unit: Foot

Scenario Typical Size: 1,000.0

Scenario Total Cost: $17,503.99

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $17.50

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 634 - Waste Transfer

Scenario: #5 - Pressure flow, 8 inch diameter conduit

Scenario Description:

Pressure flow pipeline used to transfer manure wastewater by pumping from the waste storage pond to the field where it is to be applied according to the CNMP. These pipelines may also be utilized to transfer waste within the waste treatment system. Pressure flow transfer pipelines can be between 3" and 12" diameter but 8" diameter is a commonly used pipe size. Pressure pipe will handle an internal pumping pressure between 130 and 200 psi depending on the designed pumping system and must have gasketed joints to seal for the wastewater transfer. The pressure pipe moves the water by pumping from the intake riser location, through a buried mainline with outlet risers spaced at 300 ft intervals for a traveler applicator. This practice includes the pipe plus an inlet riser structure, clean-out risers and outlet risers plus all other valves and fittings, trench excavation and backfill, labor and a equipment for installation. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. This pipeline is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling; PS 635, Vegetated Treatment Area.

Before Situation:

The waste storage structure is separated from the application fields where wastewater nutrients are needed. Soil nutrients in the near fields have high phosphorus levels from over application near the waste storage facility. The current application operat

After Situation:

Install a 1000 foot long 8 inch diameter PVC gasketed IPS pipe that has an SDR of 21 and is water tight under pressure flow to transfer the manure wastewater. An inlet riser and is located near the pump site of the waste storage pond and designed for the desired pressure and flow for the application system. This scenario includes the pipe, inlet riser, couplers, air-vac vents, all other fittings, and risers placed as specified by the design, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure the design will function.

Feature Measure: Length of pipe installed

Scenario Unit: Foot

Scenario Typical Size: 1,000.0

Scenario Total Cost: $25,102.45

Total Cost per Unit: $25.10

Based on North Dakota average costs. Individual county costs may vary.

Practice: 634 - Waste Transfer

Scenario: #6 - Pressure flow, 10 inch diameter conduit

Scenario Description:

PVC pipelines are used to transfer manure wastewater by a low pressure pump from the waste storage pond to the field where it is applied according to the CNMP. These pipelines may also be utilized to transfer waste within the waste treatment system. PVC transfer pipelines can be between 3" and 30" diameter. This practice includes the pipe plus an inlet riser structure, clean-out risers and outlet risers plus all other valves and fittings, trench excavation and backfill, labor and a equipment for installation. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. This pipeline is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling; PS 635, Vegetated Treatment Area.

Before Situation:

The waste storage structure is separated from the application fields where wastewater nutrients are needed or other components of the waste management system. Soil nutrients in the near fields have high phosphorus levels from over application near the was

After Situation:

Install a 1000 foot long 10 inch diameter PVC gasketed IPS pipe and is water tight to transfer the manure an/or wastewater. This scenario includes the pipe, inlet riser, couplers, air-vac vents, all other fittings, and risers placed as specified by the design, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure the design will function.

Feature Measure: Length of pipe installed

Scenario Unit: Foot

Scenario Typical Size: 1,000.0

Scenario Total Cost: $35,615.97

Total Cost per Unit: $35.62

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 634 - Waste Transfer

Scenario: #7 - Pressure flow, 12 inch or greater diameter conduit

Scenario Description:

PVC pipelines are used to transfer manure wastewater by a low pressure pump from the waste storage pond to the field where it is applied according to the CNMP. These pipelines may also be utilized to transfer waste within the waste treatment system. PVC transfer pipelines can be between 3" and 30" diameter. This practice includes the pipe plus an inlet riser structure, clean-out risers and outlet risers plus all other valves and fittings, trench excavation and backfill, labor and a equipment for installation. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. This pipeline is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling; PS 635, Vegetated Treatment Area.

Before Situation:

The waste storage structure is separated from the application fields where wastewater nutrients are needed or other components of the waste management system. Soil nutrients in the near fields have high phosphorus levels from over application near the was

After Situation:

Install a 300 foot long 12 inch diameter PVC gasketed IPS pipe and is water tight to transfer the manure an/or wastewater. This scenario includes the pipe, inlet riser, couplers, air-vac vents, all other fittings, and risers placed as specified by the design, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure the design will function.

Feature Measure: Length of pipe installed

Scenario Unit: Foot

Scenario Typical Size: 300.0

Scenario Total Cost: $16,163.80

Total Cost per Unit: $53.88

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 634 - Waste Transfer

Scenario: #9 - Agitator, Slurry Transfer

Scenario Description:

This scenario is for a manure and wastewater agitator, piping and reception pit associated with an agricultural production operation to transfer agricultural waste product from the storage facility to a site for proper utilization. This agitator is typically 30 HP and is used where the tank or pond is between 10 and 15 feet deep. This scenario does not include a pump. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling The waste transfer equipment is installed to address water quality concerns by facilitating timely land application of waste at agronomic rates according to the nutrient management plan. This scenario addresses the potential for surface water and groundwater quality degradation.

Before Situation:

In this typical setting, the operator has waste production from a confined animal feeding operation without an effective waste handling and transfer system to manage the waste stream departing from the facility.

After Situation:

A typical installation would be for a medium 30 HP manure agitator to put settled manure solids into suspension for removal from an animal waste storage structure and transfer to the next step of waste treatment, utilization or storage. Part of an animal waste management system to address water quality concerns. Wastewater reception pit, Concrete Pump installation pit and transfer conduit have been included in this scenario to support the operation of this waste transfer system equipment.

Feature Measure: Agitator for wastewater, ins

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $37,466.61

Total Cost per Unit: $37,466.61

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 634 - Waste Transfer

Scenario: #34 - Hard-hose Reel System with Booster incorporated into Traveler

Scenario Description:

Liquid manure is transferred from the waste storage pond to the field application site through the use of a hard hose reel system. The hard hose, which is drug across the field behind the tractor implement, allows the injection of manure directly into the soil. The traveler/reel allows handling and management of the stiff, non-collapsable, above ground, hard hose. Pressure requirements call for a traveler which incorporates a booster pump into its capability. This scenario does NOT account for labor and/or tractor/implement costs to apply the manure. It merely addresses equipment needed fulfill the CNMP and transfer the waste to its application site. The hard hose traveler assembly is part of a waste management system. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 632, Solid/Liquid Waste Separation Facility; PS 590 Nutrient Management for waste application.

Before Situation:

The current manure effluent application operation is high in the use of time, energy and inefficiency. Nutrients are lost via drift and vaporization. Water quality concerns exist when liquids are surface and over-applied. Odor concerns exist with surface

After Situation:

Liquid manure is transferred to injection equipment through the use of a hard hose reel/traveler. This piece of drag hose is required to utilize injection style equipment for manure application to the field. With injection style application the potential for surface runoff is nearly eliminated. Furthermore, odors and drift losses are significantly reduced. The hard hose traveler typically houses 1320 lineal feet of 4' dia hard hose. Pumps needed to deliver manure through the system are contracted using the Pumping Plant (533) practice. 150 ft of 160 psi HDPE pipe is used above ground to deliver manure from the pump (and/or riser) to the hard hose traveler.

Feature Measure: number of hard hose travel

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $70,231.81

Total Cost per Unit: $70,231.81

Based on North Dakota average costs. Individual county costs may vary.

Practice: 635 - Vegetated Treatment Area

Scenario: #1 - Concrete Curb, with or without flow spreaders

Scenario Description:

This is a permanent herbaceous vegetative area or channel installed down slope from a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected and released with a controlled gravity outflow into the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)

Before Situation:

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

After Situation:

Typical VTA is 2.0 ac in size, includes a concrete curb for distribution flow (sheet flow) into the VTA. Usually requires grading and shaping, gravel spreader trenches and perforated pipe to maintain sheet flow throughout the VTA. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632). For milkhouse waste, Waste Treatment (629) could be contracted to provide pre-treatment prior to being released into the VTA. The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

Feature Measure: Amount of VTA installed

Scenario Unit: Acre

Scenario Typical Size: 2.0

Scenario Total Cost: $12,442.84

Total Cost per Unit: $6,221.42

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 635 - Vegetated Treatment Area

Scenario: #2 - Concrete Curb with major shaping

Scenario Description:

This is a permanent herbaceous vegetative area or channel installed down slope from a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected and released with a controlled gravity outflow into the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)

Before Situation:

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

After Situation:

Typical VTA is 2.0 ac in size, includes a concrete curb for distribution flow (sheet flow) into the VTA. Typically requires considerable grading and shaping on a small area to maintain sheet flow throughout the VTA (at least 3000 cy/ac). A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632). For milkhouse waste, Waste Treatment (629) could be contracted to provide pre-treatment prior to being released into the VTA. The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

Feature Measure: Amount of VTA installed

Scenario Unit: Acre

Scenario Typical Size: 2.0

Scenario Total Cost: $27,501.07

Total Cost per Unit: $13,750.53

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 635 - Vegetated Treatment Area

Scenario: #3 - Gated Pipe, with or without flow spreaders

Scenario Description:

This is a permanent herbaceous vegetative area or channel installed down slope from a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected and released with a controlled outflow into the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)

Before Situation:

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

After Situation:

Typical VTA is 10.0 ac in size, includes a gated irrigation pipe to promote sheet flow through the VTA. Usually requires grading and shaping, gravel spreader trenches to maintain sheet flow throughout the VTA. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632). For milkhouse waste, Waste Treatment (629) could be contracted to provide pre-treatment prior to being released into the VTA. The establishment of the permanent vegetation within the VTA will be completed under the Critical Area Planting (342) Standard. The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

Feature Measure: Acres in the Treatment Area

Scenario Unit: Acre

Scenario Typical Size: 10.0

Scenario Total Cost: $27,784.63

Total Cost per Unit: $2,778.46

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 635 - Vegetated Treatment Area

Scenario: #4 - Gated Pipe with major shaping

Scenario Description:

This is a permanent herbaceous vegetative area or channel installed down slope from a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected and released with a controlled outflow into the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)

Before Situation:

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

After Situation:

Typical VTA is 2 ac in size, includes a gated irrigation pipe to promote sheet flow through the VTA. Typically requires considerable grading and shaping on a small area to maintain sheet flow throughout the VTA (at least 3000 cy/ac). A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632). For milkhouse waste, Waste Treatment (629) could be contracted to provide pre-treatment prior to being released into the VTA. The establishment of the permanent vegetation within the VTA will be completed under the Critical Area Planting (342) Standard. The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

Feature Measure: Acres in the Treatment Area

Scenario Unit: Acre

Scenario Typical Size: 2.0

Scenario Total Cost: $25,812.49

Total Cost per Unit: $12,906.25

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 635 - Vegetated Treatment Area

Scenario: #5 - Sprinkler, Solid Set Distribution

Scenario Description:

This is a permanent herbaceous vegetative area located adjacent to a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected at the production area and pumped to mechanically distribute wastewater onto the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Irrigation System, Sprinkler (442), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)

Before Situation:

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

After Situation:

Typical VTA is 8.0 ac in size. Typically does not require grading and shaping to maintain as uniform application onto the VTA is made through a solid set type sprinkler system. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632) and Pumping Plant (533) to get the wastewater to the VTA. For milkhouse waste, Waste Treatment (629) could be contracted to provide pretreatment prior to being pumped and distributed onto the VTA. The VTA practice will provide a controlled release of nutrient rich wastewater onto a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

Feature Measure: Amount of VTA installed

Scenario Unit: Acre

Scenario Typical Size: 8.0

Scenario Total Cost: $63,543.63

Total Cost per Unit: $7,942.95

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 635 - Vegetated Treatment Area

Scenario: #6 - Sprinkler, Mobile Pods

Scenario Description:

This is a permanent herbaceous vegetative area located adjacent to a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected at the production area and pumped to mechanically distribute wastewater onto the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Irrigation System, Sprinkler (442), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)

Before Situation:

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

After Situation:

Typical VTA is 3.0 ac in size. Typically does not require grading and shaping to maintain as uniform application onto the VTA is made through a mobile pod type sprinkler system. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632) and Pumping Plant (533) to get the wastewater to the VTA. For milkhouse waste, Waste Treatment (629) could be contracted to provide pretreatment prior to being pumped and distributed onto the VTA. The VTA practice will provide a controlled release of nutrient rich wastewater onto a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources. The system is sized such that the total number of Pods will distribute wastewater to about a quarter of 3 acre VTA. The pods will be relocated to distribute wastewater throughout the VTA. The VTA is 440 ft x 300 ft. Each Pod Line is 150 ft long with 5 pods spaced evenly. The total number of Pods is 20 (4 lines x 5 pods/line = 20 pods).

Feature Measure: Amount of VTA installed

Scenario Unit: Acre

Scenario Typical Size: 3.0

Scenario Total Cost: $15,081.06

Total Cost per Unit: $5,027.02

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 635 - Vegetated Treatment Area

Scenario: #7 - Sprinkler, Center Pivot

Scenario Description:

This is a permanent herbaceous vegetative area located adjacent to a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected at the production area and pumped to mechanically distribute wastewater onto the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Irrigation System, Sprinkler (442), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)

Before Situation:

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

After Situation:

Typical VTA is 8.0 ac in size. Typically does not require grading and shaping to maintain as uniform application onto the VTA is made through a center pivot type sprinkler system. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632) and Pumping Plant (533) to get the wastewater to the VTA. For milkhouse waste, Waste Treatment (629) could be contracted to provide pretreatment prior to being pumped and distributed onto the VTA. The VTA practice will provide a controlled release of nutrient rich wastewater onto a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

Feature Measure: Amount of VTA installed

Scenario Unit: Acre

Scenario Typical Size: 8.0

Scenario Total Cost: $44,710.24

Total Cost per Unit: $5,588.78

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 635 - Vegetated Treatment Area

Scenario: #8 - Minor Shaping

Scenario Description:

This is a permanent herbaceous vegetative area or channel installed down slope from a livestock production area or diversion. Wastewater (runoff or milking parlor wastewater) is properly collected and released with a controlled outflow into the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)

Before Situation:

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

After Situation:

Typical VTA is 2.0 ac in size, includes a shaped vegetated area to promote sheet flow through the VTA. Typically requires grading and shaping to maintain sheet flow throughout the VTA. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632). For milkhouse waste, Waste Treatment (629) could be contracted to provide pre-treatment prior to being released into the VTA. The establishment of the permanent vegetation within the VTA will be completed under the Critical Area Planting (342) Standard. The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

Feature Measure: Amount of VTA installed

Scenario Unit: Acre

Scenario Typical Size: 2.0

Scenario Total Cost: $4,308.95

Total Cost per Unit: $2,154.47

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 636 - Water Harvesting Catchment

Scenario: #27 - Plastic tank, less than or equal to 1,000 gallons

Scenario Description:

Install a small, typically 1,000 gallons or less, above-ground polyethylene tank to store rainwater from an impervious surface on 6" of well-compacted drain rock or a 4" thick reinforced concrete support pad. The typical dimensions of the tank are 72" in diameter and 66" tall. The scenario also assumes a 96" diameter gravel base or concrete pad to extend a minimum of 12" past the base of tank for adequate foundation support. Stored water can be used with watering facilities, irrigation systems, or other conservation practices. The tank shall be constructed of approved materials that stores adequate quantity and quality of water for storage and or direct drinking access. Additional components may be needed to channel water from the impervious surface to the storage tank. All components used will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. Resource concerns addressed include: Inadequate water quantity for livestock, wildlife or crops; habitat degradation, water quality, and undesirable plant productivity and health. Associated Practices: 614 - Watering Facility; 516 - Livestock Pipeline; 558 - Roof Runoff Structure; 620 - Underground Outlet; 430 - Irrigation Pipeline; 441 - Micro Irrigation; 533 - Pumping Plant; 342 - Critical Area Planting; 382 - Fencing

Before Situation:

Impervious surface currently exists, but there is no storage available. Water quantity is not available or supplemented to provide for wildlife, livestock watering, irrigation, or for other conservation practices.

After Situation:

A 1,000 gallon above-ground Poly tank with all tank materials, stabilized in place, with overflow protection, is installed to collect and store water from an impervious surface. Tank will provide or support adequate water storage capacity to ensure against inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, water quantity, crops, and undesirable plant productivity and health, and provide conservation benefit.

Feature Measure: Gallons of Tank Storage Cap

Scenario Unit: Gallon

Scenario Typical Size: 1,000.0

Scenario Total Cost: $2,572.80

Total Cost per Unit: $2.57

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 636 - Water Harvesting Catchment

Scenario: #28 - Surface Catchment

Scenario Description:

Construct an apron, approximately 50 feet wide by 90 feet long, utilizing: a plastic or rubber membrane laid on a prepared ground surface; or an asphalt or concrete surface with curbing; to collect rain water. Divert collected water from the surface catchment by gravity through an 8" diameter, PVC SDR-35 pipe to an existing tank or plastic-lined earthen reservoir. Exclusion of animals is required, so conservation practice 382 - Fencing, may be needed to protect the catchment. Resource Concern: Livestock production limitation - Inadequate livestock water. Associated Practices: 382 - Fencing; 614 - Watering Facility; 436 - Irrigation Reservoir; and 521A - Pond Sealing or Lining, Flexible Membrane.

Before Situation:

Inadequate water available to address resource concerns. Client hauls water to supply needs.

After Situation:

Design and construct an impervious surface as the primary collection component, and a pipe to convey the water to create a reliable water supply for livestock.

Feature Measure: Surface Area of Catchment

Scenario Unit: Square Yard

Scenario Typical Size: 500.0

Scenario Total Cost: $10,083.45

Total Cost per Unit: $20.17

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 636 - Water Harvesting Catchment

Scenario: #29 - Elevated Catchment

Scenario Description:

Build a wooden frame, "post-and-pier" structure, with a corrugated metal roof (dimensions are 24 feet wide by 20 feet long), to collect rain water. The structure is supported by 9-each, "poured-in-place", concrete footings (dimensions are 2'x2' square x1' thick), 8 feet on-center, with tie-down straps. Divert collected water from catchment area with guttering and downspout through a 4" diameter PVC Schedule 40 pipe, to a tank (not included)for a reliable storage and subsequent use. Resource concerns: Livestock production limitation - Inadequate livestock water; Insufficient water - Inefficient use of irrigation water. Associated practices: 382 - Fence; 614 - Watering Facility; or 436 - Irrigation Reservoir.

Before Situation:

Inadequate water available to address resource concerns. Client hauls water to supply needs.

After Situation:

The guttering and downspouts collects the roof runoff and the water is conveyed through a pipe, by gravity, to a storage tank for use by livestock or a very small irrigation system. This system is the primary collection component of a Water Harvesting Catchment (CPS 636) facility. Divert collected water from roof with guttering and downspout through a 4" diameter PVC Sch-40 pipe,

Feature Measure: Surface Area of Catchment

Scenario Unit: Square Yard

Scenario Typical Size: 53.0

Scenario Total Cost: $10,925.05

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $206.13

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 638 - Water and Sediment Control Basin

Scenario: #2 - WASCOB topsoil

Scenario Description:

Typical scenario for the construction of 700 CY earthen embankment. Prior to building the embankment, 6 inches of topsoil is removed and stockpiled. Outlet is typically an underground outlet. An earthen embankment or combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin. Topsoil is replaced following construction of the embankment. Costs include all equipment necessary to strip and stock pile topsoil, excavate, shape, grade and compact the Water and Sediment Control Basin, spread and replace topsoil after construction and mobilization of equipment. Seeding not included. This practice is utilized to reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff. Sheet and rill erosion will be controlled by other conservation practices. Work is done with dozer, scraper, or road grader.

Before Situation:

Site has shallow topsoil which if removed by earthwork for construction of embankment will significantly impact yields. Farming fields with excessive slope length has resulted in multiple rills and/or ephemeral gullies that will continue to worsen over ti

After Situation:

Water and Sediment Control Basis is constructed with 700 CY of excavation/earthfill with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. If riser and underground outlet are needed, then include Underground Outlet (620). Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.

Feature Measure: CY of WASCOB Embankmen

Scenario Unit: Cubic Yard

Scenario Typical Size: 700.0

Scenario Total Cost: $3,095.01

Total Cost per Unit: $4.42

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 640 - Waterspreading

Scenario: #1 - Dikes

Scenario Description:

A waterspreading system of dikes installed to uniformly distribute surface water to the field. Dikes are commonly installed on 2% slopes. Dikes are installed with gates to manage the release of the water.

Before Situation:

A field managed for forage with uncontrolled surface water that is not uniformly applied to the field for crop use.

After Situation:

A waterspreading system of dikes are installed to uniformly distribute surface water to the field. The dikes are typically built with a height of 3 feet and have a 4 foot top with 5:1 sideslopes to allow the dike to mowed or cut. The dikes are seeded with a sod forming grass. Each dike will retain water on the field and allow the water to be drained through a 18" CMP pipe with a slide gate (typically a Waterman C8E gate). The typical field size would be 20 acres and would have three dikes approximately 1000' long installed with 200-300 feet between dikes. The system would address the resource concern of Water Quantity - Inefficient water use on nonirrigated land. Associated practices with the system are 342 Critical Area Planting, 412 - Grassed Waterway, 587 - Structure for Water Control, 511 - Forage Harvest Management.

Feature Measure: Acres with supplemental wa

Scenario Unit: Acre

Scenario Typical Size: 20.0

Scenario Total Cost: $43,806.48

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $2,190.32

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 642 - Water Well

Scenario: #1 - Well Point

Scenario Description:

Typical construction is for a 2 in diameter well screen, 36 in long, with 2 in diameter pipe and couplings are driven or water jetted to a typical depth of 20 feet into a shallow water bearing formation. The purpose of the practice is to provide water for livestock. The area near the well point is sloped to direct surface water away from entering the well.

Before Situation:

Livestock have insufficient water or are fenced from their water source.

After Situation:

Sufficient water is available for livestock. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

Feature Measure: Depth of Well

Scenario Unit: Foot

Scenario Typical Size: 15.0

Scenario Total Cost: $5,525.87

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $368.39

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 642 - Water Well

Scenario: #3 - Shallow Well, 100 ft. deep or less

Scenario Description:

Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 100 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or irrigation. An average well depth is 75 feet. Well casings are 4-6 in diameter. Plastic casing is installed to a depth of 55 feet.

Before Situation:

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

After Situation:

Sufficient water is available for livestock or irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

Feature Measure: Depth of Well

Scenario Unit: Foot

Scenario Typical Size: 75.0

Scenario Total Cost: $10,536.98

Total Cost per Unit: $140.49

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 642 - Water Well

Scenario: #6 - Single PVC Casing with pitless unit, greater than 100 ft. deep

Scenario Description:

Typical construction is for the installation of a well with a pitless unit, in areas where sufficient water is known to occur 100 - 300 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. An average well depth is 200 feet. Well casings are 4-6 in diameter. Plastic casing and screen is installed to a depth of 200 feet.

Before Situation:

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

After Situation:

Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

Feature Measure: Depth of Well

Scenario Unit: Foot

Scenario Typical Size: 200.0

Scenario Total Cost: $16,766.13

Total Cost per Unit: $83.83

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 643 - Restoration of Rare or Declining Natural Communities

Scenario: #56 - Beaver Dam Analogues or Post-Assisted Log Structures

Scenario Description:

This scenario includes installation of low-tech woody structures (Beaver Dam Analogues (BDAs) or Post-Assisted Log Structures (PALS)) to facilitate process-based restoration in perennial, intermittent, or ephemeral streams and riparian areas. These simple structures are low, semi-permeable, and hand-built using native materials (wood, sod, etc.). Untreated wooden fence posts are added where necessary for extra stability. Structures are designed to be short-lived and used primarily as a temporary tool to promote natural process recovery. Structures mimic the function of natural beaver dams and wood accumulation in streams by reducing water velocities, raising water tables, enhancing floodplain connectivity, and inducing other dynamic ecological and hydrogeomorphic processes. Typically, complexes consisting of multiple structures within a reach are used to meet project objectives. Structures can be used on all land uses to address a variety of resource concerns and are strategically placed to meet specific purposes, such as, mesic and wetland vegetation expansion, floodplain development in incised channels, increased habitat complexity for fish and wildlife, and beaver re-establishment. Associated practices include: 528, 391, 644, 612, 382. Typical scenario includes 20 structures averaging 20 ft length each (total = 400 lin ft of structures). Crew of one biologist, one crew manager, and three laborers (one skilled).

Before Situation:

Degraded stream channel and associated riparian/mesic/wetland vegetation are impaired by lack of structural complexity, channel incision, reduced floodplain connectivity, or inadequate habitat features. Extent of potential riparian/mesic/wetland vegetatio

After Situation:

Low-tech structures mimic and promote ecological and physical processes that foster recovery of streams, riparian areas, wet meadows, or aquatic ecosystems. Channel complexity is increased and condition improved by promoting riparian/mesic/wetland vegetation expansion, reconnecting floodplains, and increasing habitat structure for fish and wildlife. Additional treatments may be needed through time until ecosystem is self-sustaining.

Feature Measure: Linear Feet

Scenario Unit: Linear Foot

Scenario Typical Size: 400.0

Scenario Total Cost: $21,643.64

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $54.11

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 644 - Wetland Wildlife Habitat Management

Scenario: #45 - Management and Monitoring on Idled Cropland for Wetland Wildlife, foregone income - Level 1 (Year 2-5)

Scenario Description:

This scenario addresses wildlife habitat management for wetter or more water saturated portions of cropland fields which are valuable source of forage and cover for many waterfowl, shorebird and wading bird species. The cession of cropping and maintenance of hydrology will provide adequate forage and cover in areas where normal cropland production restricts the growth of cover and forage sources. Where this occurs on cropped fields, annual crops will be lost for one growing season (foregone income is included).

Before Situation:

Setting is any prairie pothole. The wetlands must be wholly or partially in cropland. These wetlands are currently cropped, and hydrology has or could be diverted from the wetland by way of tiling, field or road ditching, diking or any other feature that

After Situation:

The planning unit is adequately covered with permanent and/or annual (non-persistent) vegetation. The cession of cropping and maintenance of hydrology provides adequate forage and cover in areas where normal cropland production restricts the growth of cover and forage sources. Monitoring assures hydrology is intact and provides wildlife water and habitat. Acres will be assessed and score 0.5 or greater as both Wetlands and Cropland on the Wildlife Habitat Evaluation Guide. Monitoring will be used to determine if the hydrology remains intact and cover is adequate and free of invasive weed species. Examples of monitoring include but are not limited to: photo points with comparisons to surrounding wetlands, use documentation by livestock, regeneration or breeding success, completing an annual management records log, documenting wildlife sightings, documenting location and species of invasive plants and condition of vegetative and structural treatments.

Feature Measure: Area idled from crop produ

Scenario Unit: Acre

Scenario Typical Size: 2.0

Scenario Total Cost: $561.71

Total Cost per Unit: $280.85

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 644 - Wetland Wildlife Habitat Management

Scenario: #46 - Idling Cropland for Wetland Wildlife - Level 2

Scenario Description:

This scenario addresses wildlife habitat management for wetter or more water saturated portions of cropland fields which are valuable source of forage and cover for many waterfowl, shorebird and wading bird species. The cession of cropping and maintenance of hydrology will provide adequate forage and cover in areas where normal cropland production restricts the growth of cover and forage sources. Where this occurs on cropped fields, annual crops will be lost for one growing season (foregone income is included).

Before Situation:

Setting is any wetland being 2 acres or less on the National Wetland Inventory with fully intact hydrology. The wetlands must be wholly or partially in cropland. These wetlands are currently cropped, and hydrology could be diverted from the wetland by way

After Situation:

The planning unit is adequately covered with annual (non-persistent) vegetation. The cession of cropping and maintenance of hydrology provides adequate forage and cover in areas where normal cropland production restricts the growth of cover and forage sources. Monitoring assures hydrology is intact and provides wildlife water and habitat. Acres will be assessed and score 0.5 or greater as both Wetlands and Cropland on the Wildlife Habitat Evaluation Guide. Monitoring will be used to determine if the hydrology remains intact and cover is adequate and free of invasive weed species. Examples of monitoring include but are not limited to: photo points with comparisons to surrounding wetlands, use documentation by livestock, regeneration or breeding success, completing an annual management records log, documenting wildlife sightings, documenting location and species of invasive plants and condition of vegetative and structural treatments.

Feature Measure: Area idled from crop produ

Scenario Unit: Acre

Scenario Typical Size: 2.0

Scenario Total Cost: $577.13

Total Cost per Unit: $288.57

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 644 - Wetland Wildlife Habitat Management

Scenario: #47 - Monitoring and Management - Level 3

Scenario Description:

This scenario applies to cropped wetlands, two acres or less in size identified on the National Wetland Inventory, with intact hydrology, currently cropped (typically in a corn-wheat-soybean rotation) and lacking adequate food and cover for migratory water fowl during critical periods. The inadequate wildlife habitat resource concern can be addressed by allowing EXISTING annual vegetation (crops or other annual vegetation) to establish and persist during critical nesting and brood rearing seasons. Annual crops may be lost for one growing season.

Before Situation:

Existing habitat is a cropped wetland, lacking wildlife food and cover during the cropping season. Normal seeding and/or harvest occurs about 30% of the time. Excess wetness during the early planting season in the remaining years often cause ag producers

After Situation:

Agricultural crop or annual vegetation will be allowed to persist providing food and cover essential for migratory birds. Crops and annual vegetation will not be harvested during the primary nesting season as identified by the habitat evaluation guide. This allows for successful nesting and brood rearing. The Wildlife Habitat Evaluation Guide documents an increase in planning criteria (and at a minimum meet planning criteria) for the inadequate wildlife habitat resource concern. Monitoring (with supporting photo documentation) demonstrates wildlife habitat has been improved to levels consistent with management goals/objectives, as well as observed use of the wetland habitat by wildlife.

Feature Measure: NWI for sizing

Scenario Unit: Acre

Scenario Typical Size: 2.0

Scenario Total Cost: $420.09

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $210.04

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 645 - Upland Wildlife Habitat Management

Scenario: #32 - Establishment of seasonal wildlife forage or cover on cropland, no FI

Scenario Description:

This typical scenario occurs on cropland. The habitat assessment identified the need to provide seasonal forage or cover for target wildlife species or guild. This habitat need will be met through the establishment of annual food plants or cover plants by planting of seed. The typical scenario for seasonal forage or cover will be established outside of crop season, thus FI is not needed. Seedbed preparation (light tillage) will be furthered by firming the seed bed by cultipacking the site. The only fertilizer need is N as this is cropland and P and K levels are sufficient. Cropland, so mobilization of equipment not needed.

Before Situation:

Cropland that fails to provided food or cover for target species at the proper location and season to meet the needs of wildlife.

After Situation:

The availability of high-quality seasonal forage or seasonal cover for the target wildlife species is provided. Target wildlife health is improved and populations are increased.

Feature Measure: acre

Scenario Unit: Acre

Scenario Typical Size: 10.0

Scenario Total Cost: $1,295.56

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $129.56

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 645 - Upland Wildlife Habitat Management

Scenario: #33 - Establishment of seasonal forage or cover for wildlife on cropland, with FI

Scenario Description:

The habitat assessment identified the need to provide seasonal forage or cover for target wildlife species or guild. This habitat needs will be met through the establishment of annuals by planting of seed. The typical scenario is for cropland. Seed bed preparation is limited to one light disking, furthered by firming the seed bed by cultipacking the site. The only fertilizer need is N as this is cropland and P and K levels are sufficient. These wildlife forages or seasonal cover will be available for wildlife during the cropping season, and are in lieu of the cash crops typically planted on the field. Thus, income from the cash crop will be foregone for a year.

Before Situation:

Cropland does not provide forage or cover needed for wildlife during the season on dearth.

After Situation:

Annual wildlife forages are planted in lieu of a cash crop. Target wildlife health is improved and populations are increased.

Feature Measure: acre

Scenario Unit: Acre

Scenario Typical Size: 10.0

Scenario Total Cost: $4,206.86

Total Cost per Unit: $420.69

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 645 - Upland Wildlife Habitat Management

Scenario: #349 - Livestock Exclusion for Wildlife

Scenario Description:

This scenario is applied to grazed Pasture, Range, Forest NRCS Land Uses where wildlife habitat is identified as a resource concern. Livestock are excluded from the planning unit for at least a year to allow the existing plant community sufficient time to respond favorably, creating improved wildlife habitat vegetative conditions. In addition to habitat vegetative condition, livestock may be excluded to reduce interactions between livestock and associated livestock management activities, and wildlife species that are particularly sensitive to such interactions. This scenario is for livestock exclusion and not seasonal livestock deferment in support of Prescribed Grazing (Code 528). The area is monitored per the State developed Livestock Exclusion for Wildlife Habitat Implementation Requirement document. Monitoring data is used to trigger adaptive wildlife habitat management actions, as provided in the implementation requirements document.

Before Situation:

The vegetation has been grazed at levels that reduce the functional value (e.g. plant community structure, diversity and richness) of the area for wildlife as identified by NRCS, or the livestock and accompanying livestock management activities create str

After Situation:

The exclusion of livestock improves habitat conditions to the benefit of target wildlife species. Livestock exclusion, habitat or livestock exclusion monitoring, and resulting management actions has maximized the benefits of excluding livestock from the area. If fencing is required to exclude livestock, it will be planned and applied according to Fence (Code 382). Other associated practices might be Access Control (Code 472), Brush Management (Code 314), Herbaceous Weed Control (Code 315), Prescribed Burning (Code 338), and Structures for Wildlife (Code 649). The agricultural producer incurs a loss in income on the site, due to livestock exclusion.

Feature Measure: Acres excluded

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $1,359.90

Total Cost per Unit: $34.00

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 647 - Early Successional Habitat Development-Mgt

Scenario: #1 - Mowing

Scenario Description:

This scenario addresses inadequate habitat for fish and wildlife where succession is set back by mowing short, herbaceous vegetation prior to using another treatment, to create early successional habitat (disking, herbicide application, etc.). Mowing can be used to increase structural diversity by creating areas of shorter vegetation preferred by some species or during certain life stages of species. The typical setting for this scenario is at the edge of crop fields, in pastures, at the edge of woodlands or brushy areas, and in odd areas such as pivot corners. Where additional chemical control of weeds, including invasives grasses, is required to reduce competition for the desired plant community, conservation practice 315, herbaceous weed control, should be used. Where the seedbank is inadequate for natural regeneration and seeding is required, use conservation practice 327, Conservation Cover, or 550, Range Planting. Where the need is to create early successional habitat within or at the edge of a woodland or forest use conservation practice 666, forest stand improvement, to remove trees.

Before Situation:

The site is static or trending to a later successional plant community. The disturbance regime to maintain an earlier successional plant community is lacking. Pastures are often monotypic, lacking in diversity. Competition for sunlight from dense grass st

After Situation:

Early successional habitat created or maintained. Mowing has provided more sunlight for forb establishment or has prepared the site for another treatment (disking, herbicide application, etc.). Typically, mowing, by itself, is not an effective tool for the creation of early successional habitat unless the site already contains features such as bare ground, low litter, above average diversity of forbs, etc. The heterogeneity of the habitat structure has been increased.

Feature Measure: width and length of treated

Scenario Unit: Acre

Scenario Typical Size: 20.0

Scenario Total Cost: $279.66

Total Cost per Unit: $13.98

Based on North Dakota average costs. Individual county costs may vary.

Practice: 647 - Early Successional Habitat Development-Mgt

Scenario: #2 - Disking

Scenario Description:

This practice addresses inadequate wildlife habitat for species requiring early successional habitat. This scenario provides early successional habitat by setting back succession and manipulating species composition by disking vegetation and creating bare ground. The typical setting for this scenario is at the edge of crop fields, in pastures, and in odd areas such as pivot corners. This scenario is applicable nationwide. Where the management of woody plants is required to create or maintain early successional habitat, conservation practice 314, brush management, or 666, forest stand improvement, should be used. Where chemical control of weeds, including invasives, is required to reduce competition for the desired plant community, conservation practice 315, herbaceous weed control, should be used. Where the seedbank is inadequate for natural regeneration and planting is required, use conservation practice 550, range seeding, or 327, Conservation Cover. Where the need is to create early successional habitat within or at the edge of woodland or forest, use conservation practice 666, forest stand improvement, to remove trees.

Before Situation:

The site is static or trending to higher successional plant species. The disturbance regime to maintain a lower successional stage is lacking. Pastures are often monotypic, lacking in diversity. Bare ground for seedling establishment is absent. Stands are

After Situation:

The application of this scenario improves wildlife habitat for species requiring early successional plant communities by reducing competition and creating bare ground for the establishment of early successional plants. Additionally, brood rearing habitat is improved both by the resultant food resources and the increased openness of the plant community that allows chicks to negotiate the terrain and exploit those food resources.

Feature Measure: width and length of treated

Scenario Unit: Acre

Scenario Typical Size: 20.0

Scenario Total Cost: $702.43

Total Cost per Unit: $35.12

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 647 - Early Successional Habitat Development-Mgt

Scenario: #3 - Chemical

Scenario Description:

This practice addresses inadequate wildlife habitat for species requiring early successional habitat. This scenario provides early successional habitat by setting back succession and manipulating species composition by disking vegetation and creating bare ground. The typical setting for this scenario is at the edge of crop fields, in pastures, and in odd areas such as pivot corners. This scenario is applicable nationwide. Where the management of woody plants is required to create or maintain early successional habitat, conservation practice 314, brush management, or 666, forest stand improvement, should be used. Where chemical control of weeds, including invasives, is required to reduce competition for the desired plant community, conservation practice 315, herbaceous weed control, should be used. Where the seedbank is inadequate for natural regeneration and planting is required, use conservation practice 550, range seeding, or 327, Conservation Cover. Where the need is to create early successional habitat within or at the edge of woodland or forest, use conservation practice 666, forest stand improvement, to remove trees.

Before Situation:

The site is static or trending to higher successional plant species. The disturbance regime to maintain a lower successional stage is lacking. Pastures are often monotypic, lacking in diversity. Bare ground for seedling establishment is absent. Stands are

After Situation:

The application of this scenario improves wildlife habitat for species requiring early successional plant communities by reducing competition and creating bare ground for the establishment of early successional plants. Additionally, brood rearing habitat is improved both by the resultant food resources and the increased openness of the plant community that allows chicks to negotiate the terrain and exploit those food resources.

Feature Measure: width and length of treated

Scenario Unit: Acre

Scenario Typical Size: 20.0

Scenario Total Cost: $515.68

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $25.78

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 649 - Structures for Wildlife

Scenario: #5 - Escape Ramp

Scenario Description:

Retrofit an existing watering trough/tank with an appropriately designed and installed wildlife escape ramp to reduce wildlife mortality and maintain water quality within the watering facility. The typical size range for this scenario is 4 watering facilities retrofitted to include an escape ramp (2 ramps per tank).

Before Situation:

Existing watering facilities lack escape potential for wildlife. This results in death of the small wildlife accessing the facility for water, and resulting poor water quality as the animal decays.

After Situation:

Watering facilities provide wildlife safe access. Water quality is improved within the watering facility and wildlife mortality is reduced.

Feature Measure: Each Ramp

Scenario Unit: Each

Scenario Typical Size: 8.0

Scenario Total Cost: $781.10

Total Cost per Unit: $97.64

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 649 - Structures for Wildlife

Scenario: #6 - Fence Markers, Vinyl Undersill

Scenario Description:

Existing fences are retrofitted with vinyl markers that increase wire visibility and reduce mortality due to collision for wildlife species of concern. Markers are installed on the top and third wires according to state standards. Scenario is typically implemented along fences in potential high risk areas (red areas in SGI Fence Collision Risk Model) or where a known problem exists. The typical size range for this scenario is 1 mile of fence.

Before Situation:

Wire fences located in high risk areas pose a collision threat to wildlife of special concern.

After Situation:

Fence related mortality of species of special concern is reduced.

Feature Measure: feet of fence marked

Scenario Unit: Foot

Scenario Typical Size: 5,280.0

Scenario Total Cost: $1,272.04

Total Cost per Unit: $0.24

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 649 - Structures for Wildlife

Scenario: #51 - Nesting Box, Large

Scenario Description:

A structure is provided to support the nesting and rearing of larger targeted species such as waterfowl, bats and barn owls, and is directly mounted to a tree, building or other structure. These structures are designed to meet targeted species biology and life history needs. Addresses Resource Concern: Inadequate Cover/Shelter.

Before Situation:

The area lacks sufficient overall habitat conditions to support viable populations of targeted species. A suitable location to mount the box is available. Predator guards not needed.

After Situation:

The installation of nesting and rearing boxes support the life-cycle needs of targeted species, such as birds, bats and pollinators. Because of suitable location and conditions the nesting box can be directly mounted such as on a tree or building, thereby eliminating the need for mounting poles and predator guards. Species such as cavity dwelling birds and pollinators use this approach, but this treatment is not limited to those species. These structures/features enhance habitat, cover, and improve species survivability.

Feature Measure: Number of structures.

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $130.64

Total Cost per Unit: $130.64

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 649 - Structures for Wildlife

Scenario: #53 - Wildlife Friendly Fence Retrofit, Replacement of Barbed Wire Only with Smooth Wire

Scenario Description:

Fences are retrofitted to meet wildlife-friendly fence guidelines by adjusting wire spacing, replacing barbed wire with smooth wire, making wires more visible, and reducing perching opportunities for avian predators. New wire may be installed to accomplish the objectives when needed to prevent wildlife mortality. Typically, 1,320 foot of fence is retrofitted to meet Fish &Wildlife criteria of 16.5-foot spacing of posts.

Before Situation:

Fences do not meet wildlife-friendly criteria, resulting in hazardous conditions for and unnecessary mortality to wildlife. Fences fragment habitat, provide avian predators of ground-nesting birds with places to perch and hunt. A habitat evaluation or oth

After Situation:

Fences are modified to reduce wildlife mortality. Typical fence is a smooth wire fence for a length of 1,320 feet. All line posts, corner brace assemblies, and wire in the finished structure must be of sound materials.

Feature Measure: Feet Planned

Scenario Unit: Linear Foot

Scenario Typical Size: 1,320.0

Scenario Total Cost: $2,470.85

Total Cost per Unit: $1.87

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 656 - Constructed Wetland

Scenario: #1 - Medium, 0.5 ac or less

Scenario Description:

This practice scenario includes the basic earthwork and native and/or organic wetland vegetation needed to create a constructed wetland to treat contaminated agricultural runoff for a medium site (i.e. 0.5 ac or less). All other components, such as water control structures, dikes or upstream sediment basins, must be paid for under facilitating practices. Soil, water and tissue sampling are required. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrients and pathogens. Associated practices: Structure for Water Control (587); Sediment Basin (350); Dike (356); Pond Sealing or Lining, Compacted Clay Treatment (521D); Pond Sealing or Lining, Flexible Membrane (521A); Fence (382); Grade Stabilization Structure (410); Pumping Plant (533); Waste Transfer (634)

Before Situation:

Contaminated agricultural runoff causes excess ponding and/or water quality degradation.

After Situation:

A 0.25 acre constructed wetland (i.e. 45' x 240') will be constructed with an average 18" depth. Only the earthwork and wetland vegetation are considered in this scenario. Any structures or sediment basins will be designed under a separate practice. The constructed wetland site is near the property boundary, but still takes cropland out of production (1/2 wetland acreage). The constructed wetland treats the influent by reducing excess nutrients and adding oxygen through wetland plants and functions before the effluent is transported to a waste storage facility or discharged off site, if permitted by regulation.

Feature Measure: Area of Constructed Wetlan

Scenario Unit: Acre

Scenario Typical Size: 0.3

Scenario Total Cost: $4,883.03

Total Cost per Unit: $19,532.13

Based on North Dakota average costs. Individual county costs may vary.

Practice: 656 - Constructed Wetland

Scenario: #2 - Large, 0.5 to 1.0 ac.

Scenario Description:

This practice scenario includes the basic earthwork and native and/or organic wetland vegetation needed to create a constructed wetland to treat contaminated agricultural runoff for a large site (i.e. >0.5 ac). All other components, such as water control structures, dikes or upstream sediment basins, must be paid for under facilitating practices. Soil, water and tissue sampling are required. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrients and pathogens. Associated practices: Structure for Water Control (587); Sediment Basin (350); Dike (356); Pond Sealing or Lining, Compacted Clay Treatment (521D); Pond Sealing or Lining, Flexible Membrane (521A); Fence (382); Grade Stabilization Structure (410); Pumping Plant (533); Waste Transfer (634).

Before Situation:

Contaminated agricultural runoff causes excess ponding and/or water quality degradation.

After Situation:

A 1.0 acre wetland (i.e. 95' x 460') will be constructed with an average 18" depth. Only the earthwork and wetland vegetation are considered in this scenario. Any structures or sediment basins will be designed under a separate practice. The constructed wetland site is near the property boundary, but still takes cropland out of production (1/2 wetland acreage). The constructed wetland treats the influent by reducing excess nutrients and adding oxygen through wetland plants and functions before the effluent is transported to a waste storage facility or discharged off site, if permitted by regulation.

Feature Measure: Area of Constructed Wetlan

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $12,740.93

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $12,740.93

Practice: 656 - Constructed Wetland

Scenario: #3 - Large, more than 1.0 ac.

Scenario Description:

This practice scenario includes the basic earthwork needed to create a constructed wetland to improve water quality for a large site (i.e. >1.0ac). All other components, such as water control structures, dikes or upstream sediment basins, must be paid for under facilitating practices. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrients. Associated practices: Structure for Water Control (587); Sediment Basin (350); Dike (356); Pond Sealing or Lining, Compacted Clay Treatment (521D); Pond Sealing or Lining, Flexible Membrane (521A); Fence (382); Grade Stabilization Structure (410); Pumping Plant (533); Waste Transfer (634).

Before Situation:

Contaminated agricultural runoff causes excess ponding and/or water quality degradation.

After Situation:

A 1.25 acre wetland (i.e. 110' x 500') will be constructed with an average 12" depth. Only the earthwork is considered in this scenario. Any structures or sediment basins will be designed under a separate practice. The constructed wetland site is near the property boundary, but still takes cropland out of production (1/2 wetland acreage). The constructed wetland treats the influent by reducing excess nutrients and adding oxygen through wetland plants and functions before the effluent is discharged off site.

Feature Measure: Area of Constructed Wetlan

Scenario Unit: Acre

Scenario Typical Size: 1.3

Scenario Total Cost: $12,333.44

Total Cost per Unit: $9,866.76

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 657 - Wetland Restoration

Scenario: #1 - Fill in dugout

Scenario Description:

Restoring a wetland to its original condition by filling a dugout. Typical size is approximately 1,000 cu. yd. and 1 1/2 acres of land restored. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate structure and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

The site has a constructed dugout with spoil. A suitable seed bank exists for natural regeneration to re-establish hydrophytic vegetation. The site is grazed.

After Situation:

The dugout has been filled, allowing the wetland to function in its original state. Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns. Associated practices are 342-Critical Area Planting, 550-Range Planting, 644-Wetland Wildlife Habitat Management, and 587-Structure for Water Control.

Feature Measure: Cubic Yards of Material Plac

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,000.0

Scenario Total Cost: $4,398.75

Total Cost per Unit: $4.40

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 657 - Wetland Restoration

Scenario: #2 - Depression Sediment Removal

Scenario Description:

A Depressional HGM (Hydrogeomorphic approach to classifying the seven types of wetlands as defined by Brinson, 1993) class wetland is to be restored by removing sediment. The typical size of sediment removal is 1 acre. The site is a recharge depression, fed only from surface runoff. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate structure and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

The wetland has been converted to agricultural production, and the tract may or may not be drained with a surface ditch. The watershed has been converted from a native to an agricultural landuse, and the resultant soil erosion has deposited an average of

After Situation:

The deposition has been removed down to the original topsoil layer. A herbaceous plant community has been seeded. Facilitative practices include 327-Conservation Cover. Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns. Associated practices are 342-Critical Area Planting, 550-Range Planting, 644-Wetland Wildlife Habitat Management, and 587-Structure for Water Control.

Feature Measure: Cubic Yards of Excavation

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,613.0

Scenario Total Cost: $7,089.41

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $4.40

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 657 - Wetland Restoration

Scenario: #3 - Sediment Removal - Saturated Site

Scenario Description:

A Depressional HGM class wetland (Hydrogeomorphic approach to classifying the seven types of wetlands as defined by Brinson, 1993) is to be restored by removing sediment. The typical size of sediment removal is 1 acre. The site is a recharge depression, fed only from surface runoff. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate structure and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

The wetland has been converted to agricultural production, and the tract may or may not be drained with a surface ditch. The watershed has been converted from a native to an agricultural landuse, and the resultant soil erosion has deposited an average of

After Situation:

The deposition has been removed down to the original topsoil layer. A herbaceous plant community has been seeded. Facilitative practices include 327-Conservation Cover. Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns. Associated practices are 342-Critical Area Planting, 550-Range Planting, 644-Wetland Wildlife Habitat Management, and 587-Structure for Water Control.

Feature Measure: Cubic Yards of Excavation

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,613.0

Scenario Total Cost: $8,556.94

Total Cost per Unit: $5.30

Based on North Dakota average costs. Individual county costs may vary.

Practice: 657 - Wetland Restoration

Scenario: #4 - Ditch plug - Lateral Restoration

Scenario Description:

A Depressional HGM class wetland (Hydrogeomorphic approach to classifying the seven types of wetlands as defined by Brinson, 1993) is to be restored by filling in the drainage ditch. The site is a recharge depression, fed only from surface runoff. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate structure and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

The wetland has been converted to agricultural production, and the tract has been drained with a surface ditch. The watershed has been converted from a native to an agricultural landuse.

After Situation:

The drain has been closed by lateral restoration. The ditch has been filled for a distance determined by the permeability of the soil. The earthfill is done with compactive effort. Facilitative practices include 327-Conservation Cover. Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns. Associated practices are 342-Critical Area Planting, 550-Range Planting, 644-Wetland Wildlife Habitat Management, and 587-Structure for Water Control.

Feature Measure: Cubic Yards of Earthfill

Scenario Unit: Cubic Yard

Scenario Typical Size: 111.0

Scenario Total Cost: $1,398.27

Total Cost per Unit: $12.60

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 658 - Wetland Creation

Scenario: #1 - Wetland Creation, Excavation

Scenario Description:

A wetland is created on a flat mineral upland at a location where surface runoff may be intercepted and ponded by excavation. The wetland is created by excavating a depression. Resource concern is 22 - INDEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

The site is in cropland on an upland, non floodplain site (interfluve).

After Situation:

An excavation with an average depth of 24" has created a shallow depression in a broad swale which intercepts surface runoff. The excavated material has been spread on adjacent areas. The INADEQUATE HABITAT FOR FISH AND WILDLIFE resource concern has been addressed with the provision of seasonal open water for terrestrial, aquatic, and waterfowl species. Associated practices are 342-Critical Area Planting, 550-Range Planting, 644-Wetland Wildlife Habitat Management, and 587-Structure for Water Control.

Feature Measure: Cubic Yards of Excavation

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,613.0

Scenario Total Cost: $4,880.71

Total Cost per Unit: $3.03

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 658 - Wetland Creation

Scenario: #3 - Excavation and Embankment

Scenario Description:

A wetland is created on a flat mineral upland at a location where surface runoff may be intercepted and ponded by excavation. The wetland is created by excavating a depression and building a dike to intercept runoff. Resource concern is 22 - INDEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

The site is in cropland on an upland, non floodplain site (interfluve).

After Situation:

An excavation with an average depth of 24" has created a shallow depression in a broad swale which intercepts surface runoff. The excavated material has been spread on adjacent areas. A dike is also constructed at the site with a 8' topwidth, 3:1 sideslopes, 2' fill height for 200'. The INADEQUATE HABITAT FOR FISH AND WILDLIFE resource concern has been addressed with the provision of seasonal open water for terrestrial, aquatic, and waterfowl species. Associated practices are 342-Critical Area Planting, 550-Range Planting, 644-Wetland Wildlife Habitat Management, and 587-Structure for Water Control.

Feature Measure: Cubic Yards of Earth Moved

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,613.0

Scenario Total Cost: $7,891.84

Total Cost per Unit: $4.89

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 660 - Tree-Shrub Pruning

Scenario: #10 - Pruning-Low Height

Scenario Description:

Pruning is done by hand with chain saws, tree loppers, hand shears, or hand saws. Trees are identified for pruning. To improve the quality of the stem wood, branches are pruned from the trees. Trees are growing at a fast pace, with leader growth on trees anywhere from 1.5 feet to 4 feet in length.

Before Situation:

Trees are retaining lower limbs along the entire tree bole, reducing wood quality. Pruning height will be based on overall stand diameter and height. Stand has been thinned and crop trees are identified for pruning. Degrade plant condition- undesirable pl

After Situation:

The typical forest pruning treatment is 20 acres. Trees are pruned to the desirable height of 8-10 feet. Pruned branches are treated if they are a hazard, see Woody Residue Treatment standard.

Feature Measure: area of treatment

Scenario Unit: Acre

Scenario Typical Size: 20.0

Scenario Total Cost: $5,444.23

Total Cost per Unit: $272.21

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 660 - Tree-Shrub Pruning

Scenario: #11 - Pruning- High Height

Scenario Description:

Pruning is done by hand with pole saws or with gas pole saw. Crop trees are identified for pruning. The forest is on highly productive soils. Trees are growing at a fast pace, with leader growth on trees anywhere from 1.5 feet to 4 feet in length. To improve the quality of the stem wood, branches are pruned from the trees.

Before Situation:

Trees are retaining limbs mostly along the mid to upper section of the tree bole, reducing quality. Lower branches (0-8 feet) may have already been pruned, have naturally self pruned to differing heights. Pruning height is at least to eighteen (18) feet a

After Situation:

The typical forest pruning treatment is 20 acres. Trees are pruned to the height of 18 feet or more. Pruned branches are treated so they do not become a fire or health hazard.

Feature Measure: area of treatment

Scenario Unit: Acre

Scenario Typical Size: 20.0

Scenario Total Cost: $10,169.46

Total Cost per Unit: $508.47

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 660 - Tree-Shrub Pruning

Scenario: #29 - Pruning Individual Agroforestry tree - small acreage

Scenario Description:

In agroforestry settings (crop or forest lands) overstory tree crowns are pruned to increase sunlight to understory shrubs, low growing trees, and crop plants that have been purposely established to grow on the same ground. Thirty trees or less per acre require pruning. Associated Conservation Practice Standard (CPS) 384 - Woody Residue Treatment. Resource concern is degraded plant condition - undesirable plant productivity and health.

Before Situation:

Overstory trees are expanding their crowns, providing too much shade on the understory plants. The shade is affecting the growth and production of the understory plants. Pruning branches, leaves, frawns, etc. are needed to maintain the desired about of su

After Situation:

Pruning of the overstory tree crowns is completed, allowing the proper amount of sunlight to reach the understory vegetation, maintaining their grown, health and vigor, and wildlife benefits. Typical treatment area is less than 1 acre; typical scenario based on 1 ac, 30 TPA.

Feature Measure: Tree Pruned

Scenario Unit: Each

Scenario Typical Size: 30.0

Scenario Total Cost: $463.30

Total Cost per Unit: $15.44

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 666 - Forest Stand Improvement

Scenario: #2 - Timber Stand Improvement, Single Stem Treatment

Scenario Description:

Altering the composition and stocking of a stand of trees by means of individual stem treatment. The trees to be retained are marked by a consultant forester. Resource concerns include Undesirable plant productivity and health; Wildlife habitat degradation; Wildfire hazard; and Inadequate structure and composition.

Before Situation:

The existing condition of the stand cannot meet the landowners objectives because the composition consists of unwanted species and the stocking exceeds the recommended level. The species and quality of the trees to be controlled makes a commercial operati

After Situation:

The composition of the stand can meet the landowners objectives and the growth, condition and quality of the remaining trees is improved.

Feature Measure: Acres treated

Scenario Unit: Acre

Scenario Typical Size: 10.0

Scenario Total Cost: $4,281.64

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $428.16

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 666 - Forest Stand Improvement

Scenario: #96 - Intermediate Silvicultural Rx Using Ground Based Logging, Heavy Equipment all slopes

Scenario Description:

Trees are managed as part of a Forest Management Plan (or approved equivalent) to create the appropriate stocking density for forest health or wildlife. Overstocked species over 5 inches in diameter are cut with a feller buncher. Over stocked species under 5 inches in diameter are cut using a chainsaw. Activities are supervised, trees marked, and reviewed according to the management objectives by a specialist to ensure objectives are being achieved. Resource Concerns include: Inadequate Structure and Composition, Undesirable Plant Productivity and Health, and Wildlife Habitat Degradation.

Before Situation:

The density, species composition, and spatial arrangement of trees in a stand are close to achieving the silvicultural specifications, but still require management to achieve desired conditions. The stand in this scenario still exhibit an increased suscep

After Situation:

After adjusting the density, species composition, and spatial arrangement to an acceptable level, stand, and overall quality is improved. As a intermediate silvicultural action, the work is not intensive in nature, but meant to quickly and readily improve conditions related to the identified resource concern. and to achieve desired condition.

Feature Measure: Effective Acres

Scenario Unit: Acre

Scenario Typical Size: 20.0

Scenario Total Cost: $17,468.13

Total Cost per Unit: $873.41

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 666 - Forest Stand Improvement

Scenario: #98 - Comprehensive Forest Stand Treatment with Mastication, All Slopes

Scenario Description:

Trees are managed as part of a Forest Management Plan (or approved equivalent) to create the appropriate stocking density for forest health or wildlife. Overstocked species over 5 inches in diameter are removed with a feller buncher. Over stocked species under 5 inches in diameter are treated mechanically by a variety of machines that remove target trees by grinding. On slopes greater than 50% equipment is tethered to a dozer to prevent resource damages. Activities are supervised, trees marked, and reviewed according to the management objectives by a specialist to ensure objectives are being achieved. Resource Concerns include: Inadequate Structure and Composition, Undesirable Plant Productivity and Health, and Wildlife Habitat Degradation.

Before Situation:

An unhealthy forest contains over-stocked trees lacking diversity in variety and stand age. The effect is an increased susceptibility to insects and disease, an unacceptable uncharacteristic wildfire risk and/or hazard, and degraded understory plant and w

After Situation:

Forest health is managed and improved by manipulating the stand density and structure to restore natural/desirable plant communities. The stand may vary in tree/shrub spacing, density, and class size. After management, stand composition, health and vigor are improved. Trees are healthy and less susceptible to insects and diseases. Wildlife habitat is enhanced. Risk of catastrophic wildfire is reduced.

Feature Measure: Effective Acres

Scenario Unit: Acre

Scenario Typical Size: 10.0

Scenario Total Cost: $28,541.81

Total Cost per Unit: $2,854.18

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 670 - Energy Efficient Lighting System

Scenario: #47 - LED (using existing fixture) < 20 watts

Scenario Description:

The application of this practice consists of the replacement of an incandescent or compact fluorescent light or tube with a new light emitting diode (LED) lamp or tube on a one-for-one basis where the existing fixture and wiring is functioning. The retrofitted lighting system will provide similar light levels as the existing system. Existing lamp is properly disposed according to its contents and applicable environmental laws and regulations. The typical bulb installed is a 9-watt LED.

Before Situation:

A lighting system uses energy inefficiently within an agricultural operation. The existing lighting system consists of incandescent, compact fluorescent, or similar lamps. Inefficient energy use and a recommendation to implement an improvement has been id

After Situation:

A replaced or retrofitted lighting system is installed in an agricultural operation that has a minimum rated efficacy of 90 lumens per watt, can withstand the environmental conditions, is designed for light levels suitable for the area and is expressed as lumens. An analysis of the estimated annual energy savings is completed. The replaced or retrofitted lighting system will reduce overall power requirements (kW) compared to the existing lighting system. Associated activities: CEMA 228 Agricultural Energy Assessment, DIA 120 Agricultural Energy Design.

Feature Measure: Number of lamps replaced

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $14.03

Total Cost per Unit: $14.03

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 670 - Energy Efficient Lighting System

Scenario: #63 - LED (using existing fixture) >= 20 watts and < 100 watts

Scenario Description:

The application of this practice consists of the replacement of an incandescent, compact fluorescent, high-pressure sodium (HPS), or similar lamp or tube with new light emitting diode (LED) flood lamp on a one-for-one basis where the existing fixture and wiring is functioning. The retrofitted lighting system will provide similar light levels as the existing system. Existing lamp is properly disposed according to its contents and applicable environmental laws and regulations. The typical flood lamp installed is a 50-watt LED.

Before Situation:

A lighting system uses energy inefficiently within an agricultural operation. The existing lighting system consists of incandescent, compact fluorescent, or similar lamps. Inefficient energy use and a recommendation to implement an improvement has been id

After Situation:

A replaced or retrofitted lighting system is installed in an agricultural operation that has a minimum rated efficacy of 90 lumens per watt, can withstand the environmental conditions, is designed for light levels suitable for the area and is expressed as lumens. An analysis of the estimated annual energy savings is completed. The replaced or retrofitted lighting system will reduce overall power requirements (kW) compared to the existing lighting system. Associated activities: CEMA 228 Agricultural Energy Assessment, DIA 120 Agricultural Energy Design.

Feature Measure: Number of lamps replaced

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $51.12

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $51.12

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 670 - Energy Efficient Lighting System

Scenario: #79 - LED (using existing fixture) >= 100 watts

Scenario Description:

The application of this practice consists of the replacement of an incandescent, compact fluorescent, mercury vapor, or similar lamp or tube with new light emitting diode (LED) flood lamp or tube on a one-for-one basis where the existing fixture and wiring is functioning. The retrofitted lighting system will provide similar light levels as the existing system. Existing lamp is properly disposed according to its contents and applicable environmental laws and regulations. The typical flood lamp installed is a 150-watt high bay.

Before Situation:

A lighting system uses energy inefficiently within an agricultural operation. The existing lighting system consists of incandescent, compact fluorescent, high pressure sodium, mercury vapor, metal halide, halogen, T12 fluorescent tubes driven by magnetic

After Situation:

A replaced or retrofitted lighting system is installed in an agricultural operation that has a minimum rated efficacy of 90 lumens per watt, can withstand the environmental conditions, is designed for light levels suitable for the area and is expressed as lumens. An analysis of the estimated annual energy savings is completed. The replaced or retrofitted lighting system will reduce overall power requirements (kW) compared to the existing lighting system. Associated activities: CEMA 228 Agricultural Energy Assessment, DIA 120 Agricultural Energy Design.

Feature Measure: Number of lamps replaced

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $118.81

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $118.81

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 670 - Energy Efficient Lighting System

Scenario: #95 - Fixture (including LED) < 20 watts

Scenario Description:

The application of this practice consists of the replacement of an existing lamp and fixture with a new light emitting diode (LED) fixture on a one-for-one basis where the existing fixture and wiring is functioning. The retrofitted lighting system will provide similar light levels as the existing system. Existing lamp, fixture, and ballast are properly disposed according to their contents and applicable environmental laws and regulations. The fixture is for indoor or exterior locations and generally known as general, flood, linear, canopy, pendant, wall pack, low intensity flood, ceiling mounted, or low bay. Low bay lighting is used when ceilings are 20 feet or less in height. Low bay fixtures usually have a diffuser mounted to the bottom of the fixture that serves to spread light over a large area. The typical fixture installed is a 9-watt fixture with diodes or lamp.

Before Situation:

A lighting system uses energy inefficiently within an agricultural operation. The existing lighting system consists of incandescent, compact fluorescent, high pressure sodium, mercury vapor, metal halide, halogen, T12 fluorescent tubes driven by magnetic

After Situation:

A replaced or retrofitted lighting system is installed in an agricultural operation that has a minimum rated efficacy of 90 lumens per watt, can withstand the environmental conditions, is designed for light levels suitable for the area and is expressed as lumens. An analysis of the estimated annual energy savings is completed. The replaced or retrofitted lighting system will reduce overall power requirements (kW) compared to the existing lighting system. Associated activities: CEMA 228 Agricultural Energy Assessment, DIA 120 Agricultural Energy Design.

Feature Measure: Number of fixtures replaced

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $26.22

Total Cost per Unit: $26.22

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 670 - Energy Efficient Lighting System

Scenario: #111 - Fixture (including LED) >= 20 watts and < 40 watts

Scenario Description:

The application of this practice consists of the replacement of an existing lamp and fixture with a new light emitting diode (LED) fixture on a one-for-one basis where the existing fixture and wiring is functioning. The retrofitted lighting system will provide similar light levels as the existing system. Existing lamp, fixture, and ballast are properly disposed according to their contents and applicable environmental laws and regulations. The fixture is for indoor or exterior locations and generally known as general, flood, linear, canopy, pendant, wall pack, low intensity flood, ceiling mounted, or low bay. Low bay lighting is used when ceilings are 20 feet or less in height. Low bay fixtures usually have a diffuser mounted to the bottom of the fixture that serves to spread light over a large area. The typical fixture installed is a 25-watt fixture with diodes or lamp.

Before Situation:

A lighting system uses energy inefficiently within an agricultural operation. The existing lighting system consists of incandescent, compact fluorescent, high pressure sodium, mercury vapor, metal halide, halogen, T12 fluorescent tubes driven by magnetic

After Situation:

A replaced or retrofitted lighting system is installed in an agricultural operation that has a minimum rated efficacy of 90 lumens per watt, can withstand the environmental conditions, is designed for light levels suitable for the area and is expressed as lumens. An analysis of the estimated annual energy savings is completed. The replaced or retrofitted lighting system will reduce overall power requirements (kW) compared to the existing lighting system. Associated activities: CEMA 228 Agricultural Energy Assessment, DIA 120 Agricultural Energy Design.

Feature Measure: Number of fixtures replaced

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $73.95

Total Cost per Unit: $73.95

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 670 - Energy Efficient Lighting System

Scenario: #127 - Fixture (including LED) >= 40 watts and < 80 watts

Scenario Description:

The application of this practice consists of the replacement of an existing lamp and fixture with a new light emitting diode (LED) fixture on a one-for-one basis where the existing fixture and wiring is functioning. The retrofitted lighting system will provide similar light levels as the existing system. Existing lamp, fixture, and ballast are properly disposed according to their contents and applicable environmental laws and regulations. The fixture is for indoor or exterior locations and generally known as general, flood, linear, canopy, pendant, wall pack, low intensity flood, ceiling mounted, or low bay. Low bay lighting is used when ceilings are 20 feet or less in height. Low bay fixtures usually have a diffuser mounted to the bottom of the fixture that serves to spread light over a large area. The typical fixture installed is a 50-watt fixture with diodes or lamp.

Before Situation:

A lighting system uses energy inefficiently within an agricultural operation. The existing lighting system consists of incandescent, compact fluorescent, high pressure sodium, mercury vapor, metal halide, halogen, T12 fluorescent tubes driven by magnetic

After Situation:

A replaced or retrofitted lighting system is installed in an agricultural operation that has a minimum rated efficacy of 90 lumens per watt, can withstand the environmental conditions, is designed for light levels suitable for the area and is expressed as lumens. An analysis of the estimated annual energy savings is completed. The replaced or retrofitted lighting system will reduce overall power requirements (kW) compared to the existing lighting system. Associated activities: CEMA 228 Agricultural Energy Assessment, DIA 120 Agricultural Energy Design.

Feature Measure: Number of fixtures replaced

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $147.90

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $147.90

Practice: 670 - Energy Efficient Lighting System

Scenario: #143 - Fixture (including LED) >= 80 watts

Scenario Description:

The application of this practice consists of the replacement of existing lamps and fixture with a new light emitting diode (LED) fixture on a one-for-one basis where the existing fixture and wiring is functioning. The retrofitted lighting system will provide similar light levels as the existing system. Existing lamp, fixture, and ballast is properly disposed according to its contents and applicable environmental laws and regulations. The fixture is for indoor or exterior locations and generally known as high bay or high intensity flood light or linear. High bay lighting is used when ceilings are 20 - 45 feet in height and where fixtures are mounted at the ceiling height instead of being suspended down to a lower level. High bay fixtures usually have an aluminum or mirror-like reflector which directs light downwards to the floor area or a prismatic reflector to spread light over larger areas. The typical fixture installed is a 200-watt round high bay or 160-watt linear fixture.

Before Situation:

A lighting system uses energy inefficiently within an agricultural operation. The existing lighting system consists of incandescent, compact fluorescent, high pressure sodium, mercury vapor, metal halide, halogen, T12 fluorescent tubes driven by magnetic

After Situation:

A replaced or retrofitted lighting system is installed in an agricultural operation that has a minimum rated efficacy of 90 lumens per watt, can withstand the environmental conditions, is designed for light levels suitable for the area and is expressed as lumens. An analysis of the estimated annual energy savings is completed. The replaced or retrofitted lighting system will reduce overall power requirements (kW) compared to the existing lighting system. Associated activities: CEMA 228 Agricultural Energy Assessment, DIA 120 Agricultural Energy Design.

Feature Measure: Number of fixtures replaced

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $269.80

Total Cost per Unit: $269.80

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 670 - Energy Efficient Lighting System

Scenario: #271 - LED Dimmer or Controller

Scenario Description:

The typical application of this practice consists of the replacement of an existing dimmer or controller where the existing or retrofitted lighting system and wiring is functioning. The dimmer or controller shall be rated to operate with the retrofitted lighting system and includes all wiring, switches and controls. The existing dimmers and controls are properly disposed according to its contents and applicable environmental laws and regulations.

Before Situation:

A replaced or retrofitted lighting system within an agricultural operation has none or an obsolete dimmer or controller. Inefficient energy use and a recommendation to implement an improvement has been identified by an ASABE S612 compliant on-farm energy

After Situation:

A replaced or retrofitted lighting system is installed in an agricultural operation that has a minimum rated efficacy of 90 lumens per watt, can withstand the environmental conditions, is designed for light levels suitable for the area and is expressed as lumens. An analysis of the estimated annual energy savings is completed. The replaced or retrofitted lighting system will reduce overall power requirements (kW) compared to the existing lighting system. Associated activities: CEMA 228 Agricultural Energy Assessment, DIA 120 Agricultural Energy Design.

Feature Measure: Number of dimmers installe

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $516.52

Based on North Dakota average costs. Individual county costs may vary.

Total Cost per Unit: $516.52

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 672 - Energy Efficient Building Envelope

Scenario: #1 - Building Envelope - Attic Insulation

Scenario Description:

Install a minimum R-7 insulation in addition to existing attic or ceiling to reduce heat transfer. Increased insulation reduces seasonal heat loss and heat gain which reduces the respective need for heating and cooling equipment to operate.

Before Situation:

A poultry house with an inefficient building envelope with limited attic insulation.

After Situation:

A more effective and efficient building envelope can be created through addition of, or increased, attic insulation. Associated practices/activities: 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Area of Attic Insulated

Scenario Unit: Square Foot

Scenario Typical Size: 20,000.0

Scenario Total Cost: $20,580.24

Total Cost per Unit: $1.03

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 672 - Energy Efficient Building Envelope

Scenario: #2 - Building Envelope - Wall Insulation

Scenario Description:

Enclose both sidewalls and endwalls from ceiling to floor in one of two manners: 1) metal exterior, 3.5" fiberglass batts (R-11), vapor barrier, & interior plywood or OSB sheathing, or 2) closed-cell polyurethane foam application (minimum 1" thickness (R-7) of 2.5 lbs./cu.ft. or higher density, (3.0 or higher density preferred) with a form of physical protective barrier on lower 2' (may be 6 lbs./cu.ft. or higher density 1/8" thick foam, or treated lumber). Based on a 40' x 400' poultry house.

Before Situation:

A poultry house with an inefficient building envelope with limited wall insulation.

After Situation:

A more effective and efficient building envelope can be created through addition of, or increased, insulation. Associated practices/activities: may include 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Area of Attic Insulated

Scenario Unit: Square Foot

Scenario Typical Size: 4,500.0

Scenario Total Cost: $11,264.71

Total Cost per Unit: $2.50

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 672 - Energy Efficient Building Envelope

Scenario: #3 - Building Envelope - Sealant

Scenario Description:

A typical scenario is sealing the gaps between walls, gables, ceiling, etc. in a poultry house or greenhouse. Sealing is performed by a professional contractor, not merely use of spray foam from a can. The unit basis of payment in this scenario is each house based on 60' x 500' poultry house with an assumed need of sealant to seal 2400 linear feet of gap.

Before Situation:

An agricultural facility with an inefficient building envelope with gaps between walls, ceiling, etc. for a total of 2400 linear feet.

After Situation:

A more effective and efficient building envelope can be created through interior sealing of the exterior walls at the footer plate, eaves, ridge cap, and gable ends. The sealant reduces seasonal heat loss and heat gain due to infiltration which reduces the respective need for heating and cooling equipment to operate. Associated practices/activities: may include 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Perimeter of heated structu

Scenario Unit: Foot

Scenario Typical Size: 2,400.0

Scenario Total Cost: $4,796.78

Total Cost per Unit: $2.00

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 672 - Energy Efficient Building Envelope

Scenario: #5 - Greenhouse - Insulate Unglazed Walls

Scenario Description:

A typical scenario is the installation insulation in green house to address energy loss. The insulation can be either of the cellulose or bubble type (or equivalent). The increased insulation reduces seasonal heat loss and heat gain which reduces the respective need for heating and cooling equipment to operate.

Before Situation:

Green house with standard glazing, plastic or polycarbonate walls and no insulation. Heating and cooling of an existing greenhouse is inefficient due to excessive heat loss.

After Situation:

The greenhouse is fitted with insulation installed truss-to-truss or gutter-to-gutter and/or non glazed endwalls and/or sidewalls, reducing heat loss and gain in the greenhouse. Associated practices/activities: may include 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Square Feet of insulation

Scenario Unit: Square Foot

Scenario Typical Size: 25,000.0

Scenario Total Cost: $10,152.10

Total Cost per Unit: $0.41

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 672 - Energy Efficient Building Envelope

Scenario: #99 - Energy Efficient Glazing

Scenario Description:

The application of this practice consists of the installation of new energy efficient glazing to replace the existing glazing on a structure to reduce heat loss and provide better heat transfer during cold weather conditions while reducing energy use where high-value crops are grown seasonally or year-round. The typical structure is a 30x100 ft. quonset or gothic style structure where the top and sides require 102 ft. length by 42 ft. wide glazing and each end wall requires 32 ft. length and 28 ft. width to replace the existing glazing. In addition, approximately 400 ft. of new spring wire is required for securing the glazing in the existing tracks.

Before Situation:

The existing heated or ventilated greenhouse uses energy inefficiently due to low quality or damaged coverings. Inefficient energy use and a recommendation to implement the improvement has been identified by an ASABE S612 compliant on-farm energy audit or

After Situation:

New greenhouse glazing is installed on an existing greenhouse. The glazing material consists of a multi-layer, minimum 6 mil, greenhouse grade, UV resistant copolymer with infrared retention and anti-condensate properties. The owner must replace the energy efficient glazing with similar qualities at least once during the lifespan of this practice at their expense. An analysis of the estimated annual energy savings is completed. Associated activities: CEMA 228 Agricultural Energy Assessment, DIA 120 Agricultural Energy Design.

Feature Measure: Nominal floor area of green

Scenario Unit: Square Foot

Scenario Typical Size: 3,000.0

Scenario Total Cost: $1,375.74

Total Cost per Unit: $0.46

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 810 - Annual Forages for Grazing Systems

Scenario: #24 - Annual forages mix

Scenario Description:

Seeding crop, pasture or grazing land to multi-species mix of annual grasses, legumes, forbs or similar species. This mix will address all the planned purposes of the Annual Forages for Grazing Systems (810) standard. Plant forage immediately after harvest of a row crop, small grain, or other forage. Seeding equipment typically used is available on-site. When applicable, terminate the annual forage using an approved method prior to planting a subsequent crop per the NRCS Cover Crop Termination.

Before Situation:

Existing forage stands do not meet the forage demands and or quality for grazing animals, particularly during periods of low forage production. Resource concerns include undesirable plant productivity and health, inadequate feed and forage for livestock,

After Situation:

Established annual forage mix improved livestock nutrition through improved forage quality and quantity, reduced erosion and improved soil condition. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping or pasture system.

Feature Measure: acres of annual forages plan

Scenario Unit: Acre

Scenario Typical Size: 20.0

Scenario Total Cost: $2,126.56

Total Cost per Unit: $106.33

Based on North Dakota average costs. Individual county costs may vary.

Practice: 812 - Raised Beds

Scenario: #25 - Framed Raised Bed Small Lot Contamination or Debris Sites only

Scenario Description:

The soil at this site has characteristics that restrict the ability to grow food and fiber crops directly in the soil. The soil has heavy metal contaminants and/or buried debris from past activities on the site. The owner/operator desires to bring the site into agricultural production. Typical size of raised bed 4ft x 16 ft less than or equal to 100 sq ft. Field size 0.10 Acres or less.

Before Situation:

Soils on site are unsuitable for agricultural production. Soil cannot be remediated or debris cannot be removed practically.

After Situation:

Raised beds or mounds are created above the existing soil. Geomembrane may be used to separate plant roots from contacting soil contaminants. Raised beds are designed to meet the owner/operator objectives for overall size. Associated practices may include Trails and Walkways (575), Critical Area Planting (342).

Feature Measure: sq ft

Scenario Unit: Square Foot

Scenario Typical Size: 64.0

Scenario Total Cost: $970.39

Total Cost per Unit: $15.16

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 821 - Low Tunnel Systems

Scenario: #19 - Low tunnel < 1000 square feet- Year 1

Scenario Description:

Garden or small farm grows annual crops including vegetables and other truck crops. Rows require a tunnel or floating cover to extend the growing season (early and late) or to protect from other environmental damage. Typical tunnel floats over crop or is supported by hoop or frame above crop. Tunnel cover is less than 48 inches above the soil. Typical row ranges in size from 30 inches by 200 feet up to 400 feet in length. Producer manages seasonal conditions such as soil temperature, exposure to early or late frost, and insects of food crops. Year 1 of implementation only.

Before Situation:

Crop production occurs within the zone growing season. Plant productivity and health is negatively impacted due to weather/environmental conditions delaying planting.

After Situation:

Row covers are applied and managed to improve plant health and productivity by controlling the micro-climate under the tunnel.

Feature Measure: area covered by tunnel

Scenario Unit: Square Foot

Scenario Typical Size: 500.0

Scenario Total Cost: $3,967.10

Total Cost per Unit: $7.93

Based on North Dakota average costs. Individual county costs may vary.

Practice: 821 - Low Tunnel Systems

Scenario: #20 - Low tunnel management- Year 2-3

Scenario Description:

Garden or small farm grows annual crops including vegetables and other truck crops. Rows require a tunnel or floating cover to extend the growing season (early and late) or to protect from other environmental damage. Typical tunnel floats over crop or is supported by hoop or frame above crop. Tunnel cover is less than 48 inches above the soil. Producer manages seasonal conditions such as soil temperature, exposure to early or late frost, and insects of food crops. Year 2-3 of implementation.

Before Situation:

Crop production occurs within the zone growing season. Low tunnel system Year 1 was implemented. Producer is building skill to manage the tunnel coverings as needed during the growing season to improve plant productivity and health.

After Situation:

Row covers are applied and managed to improve plant health and productivity by controlling the micro-climate under the tunnel.

Feature Measure: area of tunnel

Scenario Unit: Square Foot

Scenario Typical Size: 1,000.0

Scenario Total Cost: $646.14

Total Cost per Unit: $0.65

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 821 - Low Tunnel Systems

Scenario: #21 - Low tunnel 1000-5000 square feet, Year 1

Scenario Description:

Garden or small farm grows annual crops including vegetables and other truck crops. Rows require a tunnel or floating cover to extend the growing season (early and late) or to protect from other environmental damage. Typical tunnel floats over crop or is supported by hoop or frame above crop. Tunnel cover is less than 48 inches above the soil. Typical row ranges in size from 30 inches by 500 feet up to 2000 feet in length. Producer manages seasonal conditions such as soil temperature, exposure to early or late frost, and insects of food crops. Year 1 of implementation only.

Before Situation:

Crop production occurs within the zone growing season. Plant productivity and health is negatively impacted due to weather/environmental conditions delaying planting.

After Situation:

Row covers are applied and managed to improve plant health and productivity by controlling the micro-climate under the tunnel.

Feature Measure: area covered by tunnel

Scenario Unit: Square Foot

Scenario Typical Size: 3,000.0

Scenario Total Cost: $5,979.03

Total Cost per Unit: $1.99

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 823 - Organic Management

Scenario: #9 - Small Scale

Scenario Description:

The typical operation is Transitioning to Organic. The typical farm size is 5 acres or less and fields may be in various stages of organic transition. Organic system include cash row crops, hay or pasture, perennial crops, cover crops and possibly livestock. This practice may be part of a conservation management system to: 1) Improve soil health, 2) Reduce soil erosion, 3) Reduce emissions of greenhouse gases, 4) Reduce transport of pesticides and nutrients transported to surface water, groundwater and air, 5) Improve moisture management, 6) Improve plant productivity and health 7) Reduce plant pest pressure, 8) Enhance habitat for wildlife, pollinators, and other beneficial invertebrates, 9) Improve livestock feed and forage imbalance and 10) Improve or maintain quantity and/or quality of forage for grazing, browsing and productivity. Organic Management Activities with low labor costs will be implemented on a medium to large scale crop production area. In all cases at least one planned organic management activity has risk to an identified resource concern.

Before Situation:

Before practice conditions will vary widely. Conditions range from the client is not using any organic management activities, transitioning to organic on some or all acres, no or limited compliance with National Organic Program requirements; to the client

After Situation:

Planned organic management activities have been implemented to address the identified resource concern(s) and complies with the National Organic Program Requirements. Conservation and organic system actions or operations have been developed or updated with the producer and they have implemented conservation practices with organic management design to address resource concerns. Records are reviewed and evaluated. Improvements planned for the next season are determined.

Feature Measure: Acres

Scenario Unit: Acre

Scenario Typical Size: 5.0

Scenario Total Cost: $13,517.12

Total Cost per Unit: $2,703.42

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 823 - Organic Management

Scenario: #25 - Simple Crops Only

Scenario Description:

The typical operation is Transitioning to Organic. The typical field size is 40 acres and fields may be in various stages of organic transition. Crop system include cash row crops, hay or pasture, perennial crops and cover crops. This practice may be part of a conservation management system to: 1) Improve soil health, 2) Reduce soil erosion, 3) Reduce emissions of greenhouse gases, 4) Reduce transport of pesticides and nutrients transported to surface water, groundwater and air, 5) Improve moisture management, 6) Improve plant productivity and health 7) Reduce plant pest pressure, 8) Enhance habitat for wildlife, pollinators, and other beneficial invertebrates, 9) Improve livestock feed and forage imbalance and 10) Improve or maintain quantity and/or quality of forage for grazing, browsing and productivity. Organic Management Activities with low labor costs will be implemented on a medium to large scale crop production area. In all cases at least one planned organic management activity has risk to an identified resource concern.

Before Situation:

Before practice conditions will vary widely. Conditions range from the client is not using any organic management activities, transitioning to organic on some or all acres, no or limited compliance with National Organic Program requirements; to the client

After Situation:

Planned organic management activities have been implemented to address the identified resource concern(s) and complies with the National Organic Program Requirements. Conservation and organic system actions or operations have been developed or updated with the producer and they have implemented conservation practices with organic management design to address resource concerns. Records are reviewed and evaluated. Improvements planned for the next season are determined.

Feature Measure: Acres

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $13,656.99

Total Cost per Unit: $341.42

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 823 - Organic Management

Scenario: #41 - Simple Crops and Livestock

Scenario Description:

The typical operation is Transitioning to Organic. The typical farm size is 40 acres or less and fields may be in various stages of organic transition. Organic system include cash row crops, hay or pasture, perennial crops, cover crops and possibly livestock. This practice may be part of a conservation management system to: 1) Improve soil health, 2) Reduce soil erosion, 3) Reduce emissions of greenhouse gases, 4) Reduce transport of pesticides and nutrients transported to surface water, groundwater and air, 5) Improve moisture management, 6) Improve plant productivity and health 7) Reduce plant pest pressure, 8) Enhance habitat for wildlife, pollinators, and other beneficial invertebrates, 9) Improve livestock feed and forage imbalance and 10) Improve or maintain quantity and/or quality of forage for grazing, browsing and productivity. Organic Management Activities with low labor costs will be implemented on a medium to large scale crop production area. In all cases at least one planned organic management activity has risk to an identified resource concern.

Before Situation:

Before practice conditions will vary widely. Conditions range from the client is not using any organic management activities, transitioning to organic on some or all acres, no or limited compliance with National Organic Program requirements; to the client

After Situation:

Planned organic management activities have been implemented to address the identified resource concern(s) and complies with the National Organic Program Requirements. Conservation and organic system actions or operations have been developed or updated with the producer and they have implemented conservation practices with organic management design to address resource concerns. Records are reviewed and evaluated. Improvements planned for the next season are determined.

Feature Measure: Acres

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $18,212.44

Total Cost per Unit: $455.31

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 823 - Organic Management

Scenario: #57 - Certified Organic

Scenario Description:

The typical operation is Certified Organic. The typical farm size is 40 acres or less and fields may be in various stages of organic transition. Organic system include cash row crops, hay or pasture, perennial crops, cover crops and possibly livestock. This practice may be part of a conservation management system to: 1) Improve soil health, 2) Reduce soil erosion, 3) Reduce emissions of greenhouse gases, 4) Reduce transport of pesticides and nutrients transported to surface water, groundwater and air, 5) Improve moisture management, 6) Improve plant productivity and health 7) Reduce plant pest pressure, 8) Enhance habitat for wildlife, pollinators, and other beneficial invertebrates, 9) Improve livestock feed and forage imbalance and 10) Improve or maintain quantity and/or quality of forage for grazing, browsing and productivity. Organic Management Activities with low labor costs will be implemented on a medium to large scale crop production area. In all cases at least one planned organic management activity has risk to an identified resource concern.

Before Situation:

Before practice conditions will vary widely. Conditions range from the client is using some organic management activities, to the client is using many organic management activities to address resource concerns. The client will improve or maintain at least

After Situation:

Planned organic management activities have been implemented to address the identified resource concern(s) and complies with the National Organic Program Requirements. Conservation and organic system actions or operations have been developed or updated with the producer and they have implemented conservation practices with organic management design to address resource concerns. Records are reviewed and evaluated. Improvements planned for the next season are determined.

Feature Measure: acres

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $5,017.78

Total Cost per Unit: $125.44

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 823 - Organic Management

Scenario: #73 - Irrigated Pasture for Livestock

Scenario Description:

The typical operation is Transitioning to Organic. The typical pasture system size is 100 acres supporting 100 to 150 cattle or cow-calf pairs, and fields may be in various stages of organic transition. Organic system includes irrigated forage/grass. This practice may be part of a conservation management system to: 1) Improve soil health, 2) Reduce soil erosion, 3) Reduce emissions of greenhouse gases, 4) Reduce transport of pesticides and nutrients transported to surface water, groundwater and air, 5) Improve moisture management, 6) Improve plant productivity and health 7) Reduce plant pest pressure, 8) Enhance habitat for wildlife, pollinators, and other beneficial invertebrates, 9) Improve livestock feed and forage imbalance and 10) Improve or maintain quantity and/or quality of forage for grazing, browsing and productivity. Organic Management Activities with low labor costs will be implemented on a medium to large scale crop production area. In all cases at least one planned organic management activity has risk to an identified resource concern.

Before Situation:

Before practice conditions will vary widely. Conditions range from the client is not using any organic management activities, transitioning to organic on some or all acres, no or limited compliance with National Organic Program requirements; to the client

After Situation:

Planned organic management activities have been implemented to address the identified resource concern(s) and complies with the National Organic Program Requirements. Conservation and organic system actions or operations have been developed or updated with the producer and they have implemented conservation practices with organic management design to address resource concerns. Records are reviewed and evaluated. Improvements planned for the next season are determined.

Feature Measure: Acres

Scenario Unit: Acre

Scenario Typical Size: 100.0

Scenario Total Cost: $19,973.61

Total Cost per Unit: $199.74

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 823 - Organic Management

Scenario: #89 - Complex Crops Only

Scenario Description:

The typical operation is Transitioning to Organic. The typical field size is 40 acres and fields may be in various stages of organic transition. Crop system include cash row crops, hay or pasture, perennial crops and cover crops. This practice may be part of a conservation management system to: 1) Improve soil health, 2) Reduce soil erosion, 3) Reduce emissions of greenhouse gases, 4) Reduce transport of pesticides and nutrients transported to surface water, groundwater and air, 5) Improve moisture management, 6) Improve plant productivity and health 7) Reduce plant pest pressure, 8) Enhance habitat for wildlife, pollinators, and other beneficial invertebrates, 9) Improve livestock feed and forage imbalance and 10) Improve or maintain quantity and/or quality of forage for grazing, browsing and productivity. Organic Management Activities with low labor costs will be implemented on a medium to large scale crop production area. In all cases at least one planned organic management activity has risk to an identified resource concern.

Before Situation:

Before practice conditions will vary widely. Conditions range from the client is not using any organic management activities, transitioning to organic on some or all acres, no or limited compliance with National Organic Program requirements; to the client

After Situation:

Planned organic management activities have been implemented to address the identified resource concern(s) and complies with the National Organic Program Requirements. Conservation and organic system actions or operations have been developed or updated with the producer and they have implemented conservation practices with organic management design to address resource concerns. Records are reviewed and evaluated. Improvements planned for the next season are determined.

Feature Measure: Acres

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $15,354.60

Total Cost per Unit: $383.86

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 823 - Organic Management

Scenario: #105 - Complex Crops and Livestock

Scenario Description:

The typical operation is Transitioning to Organic. The typical field size is 40 acres and fields may be in various stages of organic transition. Organic system includes cash row crops, hay or pasture, perennial crops, cover crops and livestock. This practice may be part of a conservation management system to: 1) Improve soil health, 2) Reduce soil erosion, 3) Reduce emissions of greenhouse gases, 4) Reduce transport of pesticides and nutrients transported to surface water, groundwater and air, 5) Improve moisture management, 6) Improve plant productivity and health 7) Reduce plant pest pressure, 8) Enhance habitat for wildlife, pollinators, and other beneficial invertebrates, 9) Improve livestock feed and forage imbalance and 10) Improve or maintain quantity and/or quality of forage for grazing, browsing and productivity. Organic Management Activities with low labor costs will be implemented on a medium to large scale crop production area. In all cases at least one planned organic management activity has risk to an identified resource concern.

Before Situation:

Before practice conditions will vary widely. Conditions range from the client is not using any organic management activities, transitioning to organic on some or all acres, no or limited compliance with National Organic Program requirements; to the client

After Situation:

Planned organic management activities have been implemented to address the identified resource concern(s) and complies with the National Organic Program Requirements. Conservation and organic system actions or operations have been developed or updated with the producer and they have implemented conservation practices with organic management design to address resource concerns. Records are reviewed and evaluated. Improvements planned for the next season are determined.

Feature Measure: acres

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $21,475.63

Total Cost per Unit: $536.89

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 823 - Organic Management

Scenario: #121 - Small Scale FI

Scenario Description:

The typical operation is Transitioning to Organic. The typical farm size is 5 acres or less and fields may be in various stages of organic transition. Organic system include cash row crops, hay or pasture, perennial crops, cover crops and possibly livestock. This practice may be part of a conservation management system to: 1) Improve soil health, 2) Reduce soil erosion, 3) Reduce emissions of greenhouse gases, 4) Reduce transport of pesticides and nutrients transported to surface water, groundwater and air, 5) Improve moisture management, 6) Improve plant productivity and health 7) Reduce plant pest pressure, 8) Enhance habitat for wildlife, pollinators, and other beneficial invertebrates, 9) Improve livestock feed and forage imbalance and 10) Improve or maintain quantity and/or quality of forage for grazing, browsing and productivity. Organic Management Activities with low labor costs will be implemented on a medium to large scale crop production area. In all cases at least one planned organic management activity has risk to an identified resource concern.

Before Situation:

Before practice conditions will vary widely. Conditions range from the client is not using any organic management activities, transitioning to organic on some or all acres, no or limited compliance with National Organic Program requirements; to the client

After Situation:

Planned organic management activities have been implemented to address the identified resource concern(s) and complies with the National Organic Program Requirements. Conservation and organic system actions or operations have been developed or updated with the producer and they have implemented conservation practices with organic management design to address resource concerns. Records are reviewed and evaluated. Improvements planned for the next season are determined.

Feature Measure: acres

Scenario Unit: Acre

Scenario Typical Size: 5.0

Scenario Total Cost: $14,683.29

Total Cost per Unit: $2,936.66

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 823 - Organic Management

Scenario: #137 - Simple Crops Only FI

Scenario Description:

The typical operation is Transitioning to Organic. The typical farm size is 5 acres or less and fields may be in various stages of organic transition. Organic system include cash row crops, hay or pasture, perennial crops, cover crops and possibly livestock. This practice may be part of a conservation management system to: 1) Improve soil health, 2) Reduce soil erosion, 3) Reduce emissions of greenhouse gases, 4) Reduce transport of pesticides and nutrients transported to surface water, groundwater and air, 5) Improve moisture management, 6) Improve plant productivity and health 7) Reduce plant pest pressure, 8) Enhance habitat for wildlife, pollinators, and other beneficial invertebrates, 9) Improve livestock feed and forage imbalance and 10) Improve or maintain quantity and/or quality of forage for grazing, browsing and productivity. Organic Management Activities with low labor costs will be implemented on a medium to large scale crop production area. In all cases at least one planned organic management activity has risk to an identified resource concern.

Before Situation:

Before practice conditions will vary widely. Conditions range from the client is not using any organic management activities, transitioning to organic on some or all acres, no or limited compliance with National Organic Program requirements; to the client

After Situation:

Planned organic management activities have been implemented to address the identified resource concern(s) and complies with the National Organic Program Requirements. Conservation and organic system actions or operations have been developed or updated with the producer and they have implemented conservation practices with organic management design to address resource concerns. Records are reviewed and evaluated. Improvements planned for the next season are determined.

Feature Measure: acres

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $14,998.31

Total Cost per Unit: $374.96

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 823 - Organic Management

Scenario: #153 - Simple Crops and Livestock FI

Scenario Description:

The typical operation is Transitioning to Organic. The typical field size is 40 acres and fields may be in various stages of organic transition. Organic system include cash row crops, hay or pasture, perennial crops, cover crops and livestock. This practice may be part of a conservation management system to: 1) Improve soil health, 2) Reduce soil erosion, 3) Reduce emissions of greenhouse gases, 4) Reduce transport of pesticides and nutrients transported to surface water, groundwater and air, 5) Improve moisture management, 6) Improve plant productivity and health 7) Reduce plant pest pressure, 8) Enhance habitat for wildlife, pollinators, and other beneficial invertebrates, 9) Improve livestock feed and forage imbalance and 10) Improve or maintain quantity and/or quality of forage for grazing, browsing and productivity. Organic Management Activities with low labor costs will be implemented on a medium to large scale crop production area. In all cases at least one planned organic management activity has risk to an identified resource concern.

Before Situation:

Before practice conditions will vary widely. Conditions range from the client is not using any organic management activities, transitioning to organic on some or all acres, no or limited compliance with National Organic Program requirements; to the client

After Situation:

Planned organic management activities have been implemented to address the identified resource concern(s) and complies with the National Organic Program Requirements. Conservation and organic system actions or operations have been developed or updated with the producer and they have implemented conservation practices with organic management design to address resource concerns. Records are reviewed and evaluated. Improvements planned for the next season are determined.

Feature Measure: Acres

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $19,553.76

Total Cost per Unit: $488.84

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 823 - Organic Management

Scenario: #169 - Complex Crops FI

Scenario Description:

The typical operation is Transitioning to Organic. The typical field size is 40 acres and fields may be in various stages of organic transition. Crop system include cash row crops, hay or pasture, perennial crops and cover crops. This practice may be part of a conservation management system to: 1) Improve soil health, 2) Reduce soil erosion, 3) Reduce emissions of greenhouse gases, 4) Reduce transport of pesticides and nutrients transported to surface water, groundwater and air, 5) Improve moisture management, 6) Improve plant productivity and health 7) Reduce plant pest pressure, 8) Enhance habitat for wildlife, pollinators, and other beneficial invertebrates, 9) Improve livestock feed and forage imbalance and 10) Improve or maintain quantity and/or quality of forage for grazing, browsing and productivity. Organic Management Activities with low labor costs will be implemented on a medium to large scale crop production area. In all cases at least one planned organic management activity has risk to an identified resource concern.

Before Situation:

Before practice conditions will vary widely. Conditions range from the client is not using any organic management activities, transitioning to organic on some or all acres, no or limited compliance with National Organic Program requirements; to the client

After Situation:

Planned organic management activities have been implemented to address the identified resource concern(s) and complies with the National Organic Program Requirements. Conservation and organic system actions or operations have been developed or updated with the producer and they have implemented conservation practices with organic management design to address resource concerns. Records are reviewed and evaluated. Improvements planned for the next season are determined.

Feature Measure: acres

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $23,466.71

Total Cost per Unit: $586.67

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 823 - Organic Management

Scenario: #185 - Complex Crops and Livestock FI

Scenario Description:

The typical operation is Transitioning to Organic. The typical field size is 40 acres and fields may be in various stages of organic transition. Organic system includes cash row crops, hay or pasture, perennial crops, cover crops and livestock. This practice may be part of a conservation management system to: 1) Improve soil health, 2) Reduce soil erosion, 3) Reduce emissions of greenhouse gases, 4) Reduce transport of pesticides and nutrients transported to surface water, groundwater and air, 5) Improve moisture management, 6) Improve plant productivity and health 7) Reduce plant pest pressure, 8) Enhance habitat for wildlife, pollinators, and other beneficial invertebrates, 9) Improve livestock feed and forage imbalance and 10) Improve or maintain quantity and/or quality of forage for grazing, browsing and productivity. Organic Management Activities with low labor costs will be implemented on a medium to large scale crop production area. In all cases at least one planned organic management activity has risk to an identified resource concern.

Before Situation:

Before practice conditions will vary widely. Conditions range from the client is not using any organic management activities, transitioning to organic on some or all acres, no or limited compliance with National Organic Program requirements; to the client

After Situation:

Planned organic management activities have been implemented to address the identified resource concern(s) and complies with the National Organic Program Requirements. Conservation and organic system actions or operations have been developed or updated with the producer and they have implemented conservation practices with organic management design to address resource concerns. Records are reviewed and evaluated. Improvements planned for the next season are determined.

Feature Measure: acres

Scenario Unit: Acre

Scenario Typical Size: 40.0

Scenario Total Cost: $29,587.75

Total Cost per Unit: $739.69

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 823 - Organic Management

Scenario: #201 - Simple Crops Large Acreage

Scenario Description:

The typical operation is Transitioning to Organic. The typical operation size is 1280 acres and fields may be in various stages of organic transition. Crop system include cash row crops, hay or pasture, perennial crops and cover crops. This practice may be part of a conservation management system to: 1) Improve soil health, 2) Reduce soil erosion, 3) Reduce emissions of greenhouse gases, 4) Reduce transport of pesticides and nutrients transported to surface water, groundwater and air, 5) Improve moisture management, 6) Improve plant productivity and health 7) Reduce plant pest pressure, 8) Enhance habitat for wildlife, pollinators, and other beneficial invertebrates, 9) Improve livestock feed and forage imbalance and 10) Improve or maintain quantity and/or quality of forage for grazing, browsing and productivity. Organic Management Activities with low labor costs will be implemented on a medium to large scale crop production area. In all cases at least one planned organic management activity has risk to an identified resource concern.

Before Situation:

Before practice conditions will vary widely. Conditions range from the client is not using any organic management activities, transitioning to organic on some or all acres, no or limited compliance with National Organic Program requirements; to the client

After Situation:

Planned organic management activities have been implemented to address the identified resource concern(s) and complies with the National Organic Program Requirements. Conservation and organic system actions or operations have been developed or updated with the producer and they have implemented conservation practices with organic management design to address resource concerns. Records are reviewed and evaluated. Improvements planned for the next season are determined.

Feature Measure: acres

Scenario Unit: Acre

Scenario Typical Size: 1,280.0

Scenario Total Cost: $125,871.48

Total Cost per Unit: $98.34

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 823 - Organic Management

Scenario: #217 - Simple Crops Large Acreage FI

Scenario Description:

The typical operation is Transitioning to Organic. The typical operation size is 1280 acres and fields may be in various stages of organic transition. Crop system include cash row crops, hay or pasture, perennial crops and cover crops. This practice may be part of a conservation management system to: 1) Improve soil health, 2) Reduce soil erosion, 3) Reduce emissions of greenhouse gases, 4) Reduce transport of pesticides and nutrients transported to surface water, groundwater and air, 5) Improve moisture management, 6) Improve plant productivity and health 7) Reduce plant pest pressure, 8) Enhance habitat for wildlife, pollinators, and other beneficial invertebrates, 9) Improve livestock feed and forage imbalance and 10) Improve or maintain quantity and/or quality of forage for grazing, browsing and productivity. Organic Management Activities with low labor costs will be implemented on a medium to large scale crop production area. In all cases at least one planned organic management activity has risk to an identified resource concern.

Before Situation:

Before practice conditions will vary widely. Conditions range from the client is not using any organic management activities, transitioning to organic on some or all acres, no or limited compliance with National Organic Program requirements; to the client

After Situation:

Planned organic management activities have been implemented to address the identified resource concern(s) and complies with the National Organic Program Requirements. Conservation and organic system actions or operations have been developed or updated with the producer and they have implemented conservation practices with organic management design to address resource concerns. Records are reviewed and evaluated. Improvements planned for the next season are determined.

Feature Measure: acres

Scenario Unit: Acre

Scenario Typical Size: 1,280.0

Scenario Total Cost: $168,793.95

Total Cost per Unit: $131.87

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: 827 - Strategic Harvested Forage Management

Scenario: #2 - Strategic Harvested Forage Management - High Density

Scenario Description:

Bale grazing to improve organic matter, aggregate stability or soil organism habitat. Grazing forages in this manner, will help reduce nutrient concentrations from confined animal lots while incorporating organic matter, feeding and diversifying the soil microbiome, building better soil aggregation and increasing soil health. Grazing in this manner increases carbon and nutrients in the soil, this improves plant health, vigor, and quality.

Before Situation:

Plant health and vigor are negatively impacted by one or more of the following: poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Bare soil is prevalent and is impacting organic matter, aggregate stability and soil org

After Situation:

Animals will graze bales where they are placed in the field. Bales will be placed at different locations each week. Bale grazing will not occur on the same acres each year. After bale grazing is completed grazing on areas will be according to 528 standard. Benefits include improved rangeland and/or pasture health, decrease bare ground, improved soil biological habitat, adequate rest and recovery periods, protection of sensitive areas, improved water quality and reduced risk of invasive or noxious weed encroachment.

Feature Measure: Acres

Scenario Unit: Acre

Scenario Typical Size: 20.0

Scenario Total Cost: $5,562.92

Total Cost per Unit: $278.15

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: RFRN - FA Rental Payment based on NRCS Defined Model

Scenario: #7 - Rental Payment, Irrigated Cropland

Scenario Description:
FA payment earned for rental activity to provide conservation benefit based on NRCS defined tasks or templates.

Before Situation:
Eligible Lands with Project Resource Concerns

After Situation:
Eligible Lands where Project Resource Concerns are managed via Rental Contract

Feature Measure: Acre

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $192.00

Total Cost per Unit: $192.00

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: RFRN - FA Rental Payment based on NRCS Defined Model

Scenario: #8 - Rental Payment, Non-irrigated Cropland

Scenario Description:
FA payment earned for rental activity to provide conservation benefit based on NRCS defined tasks or templates.

Before Situation:
Eligible Lands with Project Resource Concerns

After Situation:
Eligible Lands where Project Resourced Concerns are managed via Rental Contract

Feature Measure: Acre

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $81.50

Total Cost per Unit: $81.50

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.

Practice: RFRN - FA Rental Payment based on NRCS Defined Model

Scenario: #9 - Rental Payment, Pastureland

Scenario Description:
FA payment earned for rental activity to provide conservation benefit based on NRCS defined tasks or templates.

Before Situation:
Eligible Lands with Project Resource Concerns

After Situation:
Eligible Lands where Project Resource Concerns are managed via Rental Contract

Feature Measure: Acre

Scenario Unit: Acre

Scenario Typical Size: 1.0

Scenario Total Cost: $21.50

Total Cost per Unit: $21.50

Based on North Dakota average costs. Individual county costs may vary.

Disclaimer: Do not use this information for practice implementation. Use the site-specific Design or Implementation Requirements.