

**CONSERVATION  
STEWARDSHIP  
PROGRAM**  
Programmatic  
Environmental Assessment  
June 2009



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## 1.0 INTRODUCTION

### 1.1 Conservation Stewardship Program Overview

The Conservation Stewardship Program (CSP) is a new voluntary conservation program authorized by Congress in the Food, Conservation, and Energy Act of 2008 (hereafter referred to as the 2008 Act). The program provides technical and financial assistance to producers of agricultural and forestry operations for the conservation and improvement of natural resources including soil, water, air, energy, plant, and animal life on working lands. It is designed to encourage agricultural producers to address resource concerns<sup>1</sup> on private and tribal lands in a comprehensive manner by:

- Undertaking additional conservation activities,<sup>2</sup> and
- Improving, maintaining and managing existing conservation activities.

The Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), acting on behalf of the Secretary of Agriculture, is responsible for the implementation of CSP. Eligible applicants who rank sufficiently high to be approved for a CSP contract receive compensation for carrying out additional conservation activities, and improving, maintaining and managing existing conservation activities, to improve and conserve the quality and condition of natural resources.

### 1.2 Eligibility

CSP is applicable in any of the 50 States, District of Columbia, Commonwealth of Puerto Rico, Guam, Virgin Islands, American Samoa, and the Commonwealth of the Northern Mariana Islands. Agricultural and non-industrial private forestry producers are eligible to participate in CSP if, at the time of application, they are an operator of record in the Farm Services Agency (FSA) farm records management system, have documented control of the land for the life of the proposed contract, are in compliance with Farm Bill highly erodible land and wetland conservation provisions,<sup>3</sup> are in compliance with Adjusted Gross Income provisions,<sup>4</sup> and provide information, as required by NRCS, to determine eligibility for the program. To be eligible, applicants must also demonstrate at the time of the contract offer that they are meeting

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<sup>1</sup> A *resource concern* is “a specific natural resource impairment or problem” that represents a significant concern in a State or region, and is likely to be addressed successfully through the implementation of conservation activities by producers on land eligible for enrollment in the program. See section 1238D(6) of the 2008 Act.

<sup>2</sup> *Conservation activities* are “conservation systems, practices, management measures or conservation planning needed to address a resource concern or improve environmental quality through the treatment of natural resources.” Conservation activities include structural, vegetative, and management activities, as well as conservation planning needed to address a resource concern. See Section 1238D(1) of the 2008 Act.

<sup>3</sup> Highly erodible land and wetland *conservation provisions* are found at 7 Code of Federal Regulations (CFR) Part 12.

<sup>4</sup> *Adjusted Gross Income provisions* are found at 7 CFR Part 1400.

the stewardship threshold<sup>5</sup> for at least one resource concern and will meet or exceed the stewardship threshold for at least one priority resource concern<sup>6</sup> by the end of the proposed stewardship contract by:

- Installing and adopting additional conservation activities; and
- Improving, maintaining, and managing conservation activities in place at the time the contract offer is accepted.

CSP payments<sup>7</sup> may only be provided for activities conducted on working lands that are being actively managed, to include cropland, grassland, prairieland, improved pastureland, rangeland, nonindustrial private forest (NIPF)<sup>8</sup> land, forested land that is an incidental part of an eligible agricultural operation, and other agricultural land (including cropped woodland, marshes, and agricultural land used for the production of livestock). The following lands are eligible for enrollment: private agricultural lands; agricultural Indian lands<sup>9</sup>; and NIPF land. A special rule<sup>10</sup> within the 2008 Act limits NIPF enrollment to not more than 10 percent of the annual acres enrolled nationally in any fiscal year.

An application must include all eligible land on a producer's agricultural operation. Lands enrolled in the Conservation Reserve Program, Wetlands Reserve Program, Grassland Reserve Program, Conservation Security Program, and public agricultural lands owned by a Federal, State, or local unit of government are not eligible for enrollment. In addition, land used for crop production after June 18, 2008, that had not been planted, considered to be planted or devoted to crop production for at least four of the six years preceding that date is not eligible for enrollment, unless one of three exceptions are met. Under CSP, a participant must enroll their entire agricultural and/or NIPF operation. Separate applications are submitted for agricultural and NIPF lands.

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<sup>5</sup> A *stewardship threshold* is defined as the level of natural resource conservation and environmental management required, as determined by NRCS using conservation measurement tools, to conserve and improve the quality of a resource. See Section 1238D(7) of the 2008 Act.

<sup>6</sup> A *priority resource concern* is a resource concern that is identified by the State Conservationist, in consultation with the State Technical Committee and local work groups, as a priority for a State, or the specific geographic areas within a State.

<sup>7</sup> *Payment*, as defined in the Interim Final Rule for CSP, means financial assistance provided to the participant under the terms of the CSP contract.

<sup>8</sup> *Nonindustrial private forest lands* are defined in Section 2001(d)(18) of the 2008 Act as rural land that "(A) has existing tree cover or is suitable for growing trees; and (B) is owned by any nonindustrial private individual, group, association, corporation, Indian Tribe, or other private legal entity that has definitive decisionmaking authority over the land."

<sup>9</sup> *Indian lands* means all land held in trust by the United States for individual Indians or Indian Tribes, or all land titles held by individual Indians or Tribes, subject to Federal restrictions against alienation or encumbrance, or lands subject to the rights of use, occupancy and/or benefit of certain Indian Tribes. This term also includes land for which the title is held in fee status by Indian Tribes, and the U.S. Government-owned land under the Bureau of Indian Affairs jurisdiction. *Indian Tribe* means any Indian Tribe, band, nation, pueblo, or other organized group or community, which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians.

<sup>10</sup> For the *Special Rule for Nonindustrial Private Forest Land*, see Section 1238E(b)(2) of the 2008 Act.

### 1.3 Stewardship Contracts

Applications will be accepted by NRCS on a continuous enrollment basis, with one or more ranking periods throughout the fiscal year. Contract offers will be evaluated and ranked at the ranking pool<sup>11</sup> level within a State, using the conservation measurement tool<sup>12</sup> to the maximum extent practicable, based on the following factors:

- Level of conservation treatment proposed for all priority resource concerns;
- Degree to which the proposed conservation treatment effectively increases conservation performance on all applicable priority resource concerns;
- Number of priority resource concerns proposed to be treated to meet or exceed the stewardship threshold level; and
- Extent to which other resource concerns, in addition to priority resource concerns, will be addressed to meet or exceed the stewardship threshold by the end of the contract period.

Conservation treatment on all eligible land will be used to determine an offer's ranking score and annual payments to the participant. Stewardship contracts will be developed for those producers determined eligible and who rank sufficiently high. These contracts will include provisions stating the amount of payment to be made to the participant for each year of the contract, requirements of the participant, and other items necessary to ensure the provisions of the program are achieved. CSP contracts will be for a 5-year period. NRCS and the program participant will also develop a Conservation Stewardship Plan which:

- Records the participant's decisions;
- Describes additional conservation activities to be implemented, managed and improved; and
- Includes a schedule of conservation activities to be implemented, managed or improved under the conservation stewardship contract.

Participants must operate and maintain: existing conservation activities on the agricultural operation to at least the level of conservation performance identified at the time of application for the conservation stewardship contract period; and additional activities installed and adopted over the term of the contract.

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<sup>11</sup> State Conservationists will establish *ranking pools* for each unique grouping of identified priority resource concerns for the State or each geographic area within the State so that applicants will be ranked relative to other applicants who share similar resource challenges. Ranking pools will be based on the same State or geographic area boundaries used to identify priority resource concerns. Separate ranking pools will be established for NIPF lands and agricultural lands. Within each established ranking pool, the State conservation will also set up special sub-pools for conservation access for certain farmers and ranchers, including: (1) Socially Disadvantaged Farmers and Ranchers and (2) Beginning Farmers and Ranchers.

<sup>12</sup> The 2008 Act directed the development of *conservation measurement tools*, defined as "procedures to estimate the level of conservation performance to be achieved by a producer in implementing conservation activities, including indices or other measures developed by the Secretary." See Section 1238D(2) of the 2008 Act. The term *conservation measurement tool* refers to the procedures developed by NRCS to estimate degrees of relative conservation performance improvement and facilitate ordinal ranking of applications.

## 1.4 Payments and Limitations

During the period from October 1, 2008, to September 30, 2017, the Secretary of Agriculture is directed to enroll an additional 12,769,000 acres nationwide for each fiscal year. Each State Conservationist will receive annual acreage allocations, primarily based on the total acres of eligible agricultural and NIPF land in the State. In addition, 10 percent of acres will be set aside specifically for assistance to Socially Disadvantaged<sup>13</sup> and Beginning Farmers and Ranchers.<sup>14</sup>

CSP provides participants with three possible types of payments: (1) annual payments for installing and adopting additional conservation activities and improving, maintaining and managing existing activities; (2) supplemental payments for the adoption of resource conserving crop rotations; and (3) payments for on-farm research and demonstration activities or pilot testing. In establishing payment rates for annual and supplemental payments, NRCS will consider:

- Costs incurred by the participant associated with planning, design, materials, installation, labor, management, maintenance, or training;
- Income foregone by the participant; and
- Expected environmental benefits, determined by estimating conservation performance improvement using the conservation measurement tool.

Annual payments are provided to compensate participants for increased conservation performance achieved by adopting additional conservation activities and improving, maintaining and managing existing activities on eligible acres. An individual participant's annual payment level will be estimated by the conservation measurement tool and computed by land-use acres for enrolled agricultural land and NIPF.

Payments will not be provided for conservation activities for which there is no cost incurred or income forgone by the participant or for conservation practices or enhancements applied with financial assistance through other USDA programs. In addition, payments are not available for the design, construction or maintenance of animal waste storage or treatment facilities or associated waste transport or transfer devices for animal feeding operations<sup>15</sup>.

Supplemental payments may be provided to program participants receiving annual payments who agree to adopt new "resource conserving crop rotations"<sup>16</sup> for the term of the contract. State Conservationists will determine whether a resource conserving crop rotation is eligible for supplemental payments. Payment rates will be based on costs incurred, income foregone and

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<sup>13</sup> *Socially Disadvantaged Farmer or Rancher* means a producer who has been subjected to racial or ethnic prejudices because of their identity as a member of a group without regard to their individual qualities.

<sup>14</sup> *Beginning Farmer or Rancher* means an individual or entity who: (a) has not operated a farm, ranch or nonindustrial private forest land, or who has operated a farm, ranch or nonindustrial private forest land for not more than 10 consecutive years, and (b) will materially and substantially participate in the operation of the farm or ranch.

<sup>15</sup> Activities specifically *excluded* from receiving CSP payments, are found in Section 1238G(e)(3) of the 2008 Act.

<sup>16</sup> A *resource conserving crop rotation* is defined in the 2008 Act as including at least one resource conserving crop, reducing erosion, improving soil fertility and tilth, interrupting pest cycles, and in applicable areas, reducing depletion of soil moisture or otherwise reducing the need for irrigation. See Section 1238G(f)(4) of the 2008 Act.

expected environmental benefits, determined by estimating conservation performance improvement using the conservation measurement tool, for the acres planted under the rotation.

A maximum national average rate of \$18 per acre is set by the 2008 Act. This is to include costs of all financial assistance, technical assistance, and any other expenses associated with enrollment or participation in the program. In addition, there are payment limitations for each person or legal entity of \$40,000 during any fiscal year for all CSP contracts entered into and \$200,000 for all CSP contracts entered into during any 5-year period, excluding funding arrangements with federally recognized Indian Tribes or Alaska Native corporations. Each stewardship contract is limited to \$200,000 over the life of the initial contract period.

## **2.0 NEED FOR ACTION**

As stated in the 2008 Act, the underlying need is to encourage agricultural producers to address resource concerns on private, non-Federal lands in a comprehensive manner by undertaking additional conservation activities and improving, maintaining, and managing existing conservation activities. NRCS has been charged with implementing CSP as authorized and funded by Congress to meet this need.

The proposed Federal action being considered by NRCS is the promulgation of regulations to implement CSP as required by the 2008 Act. As the scope of the proposed action is for a national program, the analysis herein is referred to as a Programmatic Environmental Assessment (EA) and evaluates the potential environmental impacts at a broad program scale. NRCS is using this Programmatic EA to determine whether promulgation of the Interim Final Rule will significantly affect the quality of the human environment, such that NRCS must prepare an Environmental Impact Statement (EIS).

In accordance with the Council on Environmental Quality (CEQ) regulations,<sup>17</sup> this Programmatic EA is “a concise public document that briefly provides sufficient evidence and analysis for determining whether to prepare an EIS or a finding of no significant impact.” In accordance with NRCS regulations that implement the National Environmental Policy Act (NEPA),<sup>18</sup> this EA contains the following information:

- A brief discussion of the need for action,
- Alternatives,
- A discussion of the anticipated environmental impacts, and
- A list of agencies and persons consulted.

Actions that may be taken by NRCS at the State and/or local levels to further implement CSP will be able to tier<sup>19</sup> to or incorporate by reference, the general and broad scale analysis from this

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<sup>17</sup> *CEQ Regulations for Implementing NEPA*, 40 CFR Part 1508.9.

<sup>18</sup> *NRCS Regulations for Compliance with NEPA*, Definitions, 7 CFR Part 650.4(b)(2), [http://www.nrcs.usda.gov/programs/Env\\_Assess/pdf\\_files/Final\\_NRCS\\_7\\_PART\\_650\\_NEPA\\_revision.pdf](http://www.nrcs.usda.gov/programs/Env_Assess/pdf_files/Final_NRCS_7_PART_650_NEPA_revision.pdf).

<sup>19</sup> *Tiering* refers to the coverage of general matters in broader environmental analyses (such as national programmatic documents) and subsequent narrower environmental analyses (such as regional or basin-wide

national Programmatic EA into more local (State, area-wide, and/or site-specific) level analyses. Any subsequent analyses prepared to implement CSP at the State or local level will meet NEPA's intent by focusing in on the issues/concerns pertinent to that site-specific action.

### **3.0 ALTERNATIVES AND SCOPE OF ANALYSIS**

#### **3.1 Scoping and Public Involvement**

Alternatives have been developed that address how CSP may or may not be implemented by NRCS to fulfill the charge given to the Secretary of Agriculture by Congress. The alternatives characterize the aspects of CSP which the agency has discretion to address and implement under CSP. The alternatives help to inform the decision maker and the public about the courses of action the agency has considered in arriving at a particular decision. All alternatives except for the No Action Alternative must meet the purpose and need for action. The No Action Alternative, which may or may not meet the purpose and need for action, is required to be evaluated to provide the baseline upon which to compare the relative merits and disadvantages of the action alternatives.

In 2007, USDA leadership listened to opinions of producers and other stakeholders about future farm policy through 52 Farm Bill forums held throughout the United States. Other interested parties submitted more than 4,000 comments through the Internet and mail. Because the forums were held before CSP was created, no comments were received about this specific program. However, some comments, such as those summarized below, are applicable.

- All individuals, nationwide, who are good stewards of the land, should be rewarded; the program should cover the Nation, not just specific watersheds.
- Forest land needs to be considered as a land use, not treated as incidental land.
- Payment should be based on the amount of new conservation work completed, not existing practices.
- Organic practices should be rewarded. Cover cropping and crop rotations should be emphasized.
- Conservation programs should be fully oriented to help farmers achieve reductions in nitrogen and phosphorus runoff, and to do so in a manner that sustains our agricultural economy.
- Green payments should be the centerpiece of the next Farm Bill, focusing on paying for conservation of resources rather than production of commodities.
- Conservation funding should reward existing good stewards for achieving environmental benefits rather than providing funding for traditional programs that only fix natural resource problems.

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program analyses or ultimately site-specific evaluations) incorporating this general discussions by reference and concentrating solely on the issues specific to that analysis. See the CEQ Regulations for Implementing NEPA, Section 1508.28, <http://ceq.hss.doe.gov/nepa/regs/ceq/1508.htm>.

### **3.2 Alternative 1 – No Action – No Implementation of CSP**

Alternative 1, the No Action Alternative, is not to proceed with the implementation of CSP as required by Congress. Although this alternative is not feasible because Congress has required USDA to promulgate regulations for CSP, consideration of this alternative is needed to provide a baseline against which to compare the effects of the agency's preferred alternative.

### **3.3 Alternative 2 – Agency Preferred Alternative – Implementation of 2008 CSP Requirement**

Alternative 2, the Agency's preferred alternative, is to implement the CSP under the Interim Final Rule developed by NRCS and according to the statutory requirements that Congress has placed on the program. Many of the statutory requirements are described in the introductory section of this Programmatic EA. NRCS will promulgate the Interim Final Rule at the national level to ensure consistency of program implementation across the Nation. However, implementation of CSP will occur at the State and local levels, including decisions regarding selection of priority resource concerns, evaluation and ranking of contract offers, and contract development.

## **4.0 IMPACTS OF ALTERNATIVES**

### **4.1 Scope of Analysis**

The analysis that follows provides general information from a national perspective on the potential impacts on the human environment associated with the promulgation of rules to implement CSP. Due to the broad-scale nature of the analysis, many of the assessments are qualitative and are based on a review of the best available scientific studies and analyses and on professional judgments. In assessing impacts, consideration has been given to:

- Permanence of an impact;
- Potential for natural attenuation of the impact;
- Uniqueness or replaceability of the resource;
- Abundance or scarcity of the resource; and
- Potential mitigation measures that can offset or reduce the anticipated impact.

For this Programmatic EA, potential environmental effects are analyzed according to soil, water, air, plants, animals, energy, and human resources (SWAPA + EH). Additionally, special environmental concerns (SEC) identified in NRCS regulations,<sup>20</sup> environmental laws, and executive orders are included in the SWAPA+H analysis, as appropriate, and include:

- Prime and unique farmlands

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<sup>20</sup> NRCS Regulations for Compliance with NEPA, Subpart B – *Related Environmental Concerns*, 7 CFR Part 650, [http://www.nrcs.usda.gov/programs/Env\\_Assess/pdf\\_files/Final\\_NRCS\\_7\\_PART\\_650\\_NEPA\\_revision.pdf](http://www.nrcs.usda.gov/programs/Env_Assess/pdf_files/Final_NRCS_7_PART_650_NEPA_revision.pdf).

- Clean Water Act
- Floodplain management
- Wetlands
- Wild and scenic rivers
- Coastal Zone Management Act
- Coral reefs
- Clean Air Act
- Endangered and threatened species
- Noxious and invasive species
- Essential fish habitat
- Migratory birds
- Riparian areas
- Natural areas
- Scenic Beauty
- Cultural resources/historic properties
- Environmental justice

## **4.2 Uncertainty in Analysis**

CSP is a voluntary program, so program participation and the associated impacts cannot be guaranteed. In addition, the wide variety of agricultural operations and related environmental and social concerns across the Nation, and the CSP statutory framework,<sup>21</sup> requires that NRCS implement CSP with flexibility to address differences in State, tribal, and local situations. State Conservationists must have some flexibility concerning the selection of priority resource concerns so that the program is most effective under the circumstances that exist at the State and local levels. At the same time, NRCS must maintain program integrity by ensuring a level of consistency in the way States carry out CSP responsibilities through the promulgation of national rules.

The primary factor that will influence the magnitude of the impacts resulting from the Agency's Preferred Alternative (Alternative 2) in each State is the selection of three to five priority resource concerns. These will be determined by each State Conservationist, in consultation with the State Technical Committee, agricultural and forestry producers, and other stakeholders. Therefore, it is unknown which resource concerns will be selected in what locations. Furthermore, evaluation and ranking of contract offers and contract development will be done at the State and local levels as well. It is likely that differences between the States will cause a great deal of variability in impacts across the country and, perhaps, from year-to-year as well. These differences depend upon the decisions made at the State and local levels. Because CSP is "customized" to address local concerns, the impacts of program implementation on specific

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<sup>21</sup> For more information, see the following Sections of the 2008 Act: 1238F(b)(3) regarding "national, State, and local conservation priorities" and 1238G(a)(2) regarding identification of priority resource concerns "in a particular watershed or other appropriate region or area within a State."

natural resources is impossible to predict except in a very general, broad-scale and qualitative manner.

The conservation activities to be implemented under CSP, as defined in the 2008 Act, include “measures that are designed to address a resource concern.” The Interim Final Rule for CSP describes the specific activities eligible to receive annual payments as conservation practices and “enhancements.” Conservation practices are specified treatments, such as a structural or vegetative practice or management technique, for which standards and specifications have been developed by NRCS. Conservation practice standards are documented in the NRCS Field Office Technical Guide (FOTG).<sup>22</sup> Enhancements are a type of conservation activity installed and adopted to treat natural resource concerns and improve conservation performance by achieving a level of management intensity that exceeds the sustainable level for a given resource concern. An enhancement directly related to a practice standard is applied in a manner that exceeds the minimum treatment requirements of the standard.

NRCS has developed network effects diagrams depicting the typical direct, indirect, and cumulative effects of traditional conservation practices, as described in Appendix A, and has also summarized general effects in the Conservation Practice Physical Effects (CPPE).<sup>23</sup> Payments may be made to participants for on-farm research and demonstration activities, and pilot testing of new technologies and innovative conservation activities. The effects of these types of activities cannot be predicted at this time and must undergo further evaluation at the State and/or site-specific level when applications for research, demonstration and pilot testing activities are considered for funding.

### **4.3 NRCS Use of the Environmental Evaluation**

A site-specific environmental evaluation (EE) is required for all NRCS technical and financial assistance.<sup>24</sup> The EE identifies relevant resource concerns and alternatives, evaluates potential impacts, and determines needed mitigation for soil, water, air, plant, animal, and human resources that may exist on the site. The EE also determines if there is a potential for planned conservation activities to impact protected resources. NRCS guidance on the site-specific EE process and definitions of protected resources can be found in the NRCS National Environmental Compliance Handbook (NRCS 2006).<sup>25</sup> The EE addresses, as needed, “Special Environmental Concerns” including the Clean Air Act; Clean Water Act; Coastal Zone Management Areas; Coral Reefs; Cultural Resources; Endangered and Threatened Species; Environmental Justice; Essential Fish Habitat; Floodplain Management; Invasive Species; Migratory Birds; Natural Areas; Prime and Unique Farmlands; Riparian Areas; Scenic Beauty; Wetlands; Wild and Scenic Rivers; and any applicable State or local concerns, laws, ordinances, or other regulations.

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<sup>22</sup> FOTG information is available at the *electronic FOTG website*, <http://www.nrcs.usda.gov/technical/efotg/>.

<sup>23</sup> *Conservation Practices Physical Effects (CPPE)* information can be found at <http://www.nrcs.usda.gov/technical/standards/nhcp.html> and in each State’s electronic Field Office Technical Guide (FOTG), <http://www.nrcs.usda.gov/technical/efotg/>.

<sup>24</sup> *NRCS Regulations for Compliance with NEPA*, 7 CFR Part 650, [http://www.nrcs.usda.gov/programs/Env\\_Assess/pdf\\_files/Final\\_NRCS\\_7\\_PART\\_650\\_NEPA\\_revision.pdf](http://www.nrcs.usda.gov/programs/Env_Assess/pdf_files/Final_NRCS_7_PART_650_NEPA_revision.pdf).

<sup>25</sup> *National Environmental Compliance Handbook*, <http://directives.nrcs.usda.gov/17091.wba>.

In some cases, States may choose to conduct State or area-wide evaluations which identify specific concerns within the area and provide an assessment which can be incorporated by reference into site-specific EEs. For example, in consultation with the U.S. Fish and Wildlife Service, it may be determined that the conservation activities proposed under CSP to address priority resource concerns in a State do not have the potential to impact listed species, thereby eliminating the need to conduct in-depth, site-specific evaluations of potential impacts to these species for each CSP contract. Similarly, a State or area-wide assessment might identify a specific concern that, if present, could be adversely impacted by a proposed conservation activity and therefore, must be further assessed during any site-specific evaluation.

Accordingly, the presence or absence of any specific concerns and potential impacts of program implementation are then evaluated through the on-site EE process. Site-specific analyses will not be subject to the uncertainties described in section 4.2, will provide an opportunity for NRCS planners to identify and mitigate any potential adverse impacts that may be associated with the proposed activities in accordance with NRCS policy,<sup>26</sup> and will meet the intent of NEPA by focusing on the issues/concerns pertinent to that site-specific action.

#### **4.4 General Overview of the Baseline**

The contiguous 48 States cover 1.9 billion acres, and about 71 percent, or nearly 1.4 billion acres of this area is in non-Federal, rural land uses. As shown in Figure 1, non-Federal rural lands are predominantly forest land, rangeland, and cropland. In 2002, there were over 2 million farms in the United States, covering over 938 million acres.<sup>27</sup> In addition, in 2006, 11.3 million landowners controlled over 371 million acres of NIPF lands, or about 88 percent of the privately owned forested lands in the Nation. Of these, 2.4 million NIPF landowners have reported that 100 million acres of forests are associated with a farm or ranch (Butler, 2008).<sup>28</sup>

Land uses, and therefore the associated resource concerns, are not uniform across the continental United States (Figure 2), with nearly 75 percent of the Nation's non-Federal forest land located east of the Mississippi River and approximately 99 percent of rangeland located west of the Mississippi River:

- Approximately 50 percent of the Nation's cropland is concentrated in just 2 of the 12 Major River Basins -- the Missouri and the Souris-Red-Rainy/Upper Mississippi.
- Approximately 52 percent of the Nation's non-Federal forest land is concentrated in just three of the Major River Basins -- the South Atlantic-Gulf, New England/Mid Atlantic, and the Ohio/Tennessee River.
- Approximately 72 percent of the Nation's non-Federal rangeland is concentrated in three of the Major River Basins -- the Missouri, the Texas-Gulf/Rio Grande, and the Arkansas-White-Red.

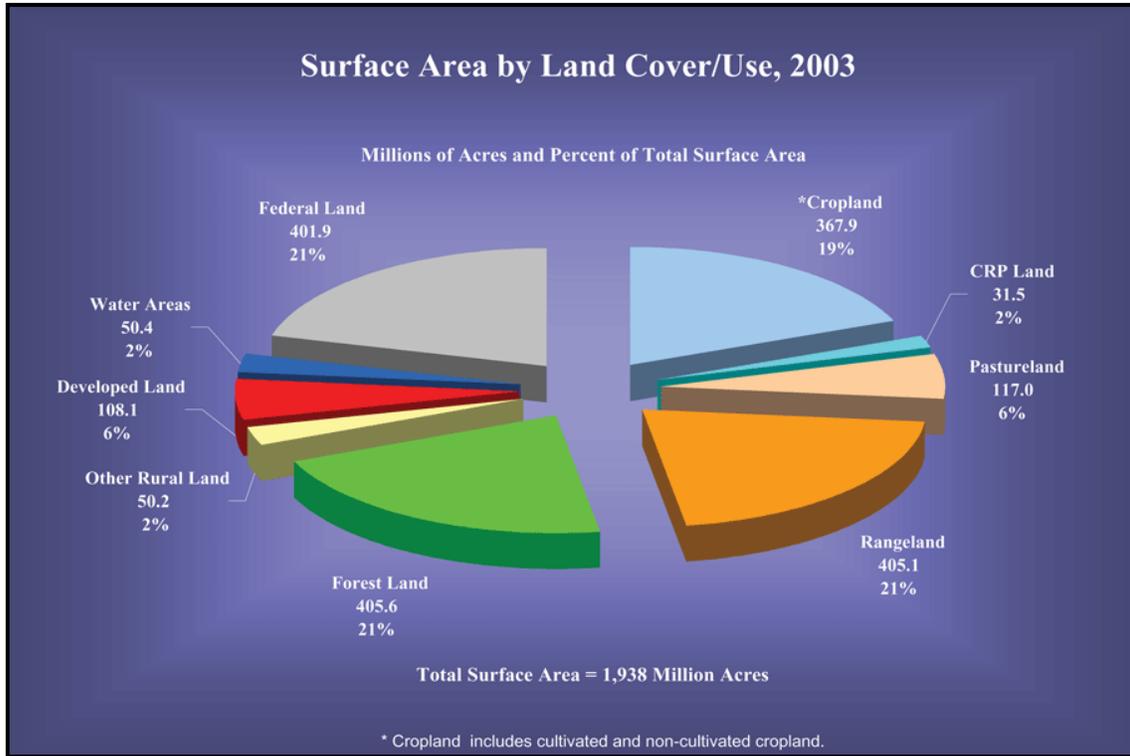
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<sup>26</sup> See *NRCS Environmental Policy* located in the NRCS General Manual at Title 190 Part 410.3 (Subpart A), <http://directives.sc.gov.usda.gov/viewerFS.aspx?id=666>.

<sup>27</sup> 2002 Census of Agriculture, <http://www.agcensus.usda.gov/Publications/2002/index.asp>.

<sup>28</sup> Butler, B.J. 2008. Family Forest Owners in the United States, 2006. Gen. Tech. Rep. NRS-27. Newtown Square, PA: USDA Forest Service, Northern Research Station. 72 pages.

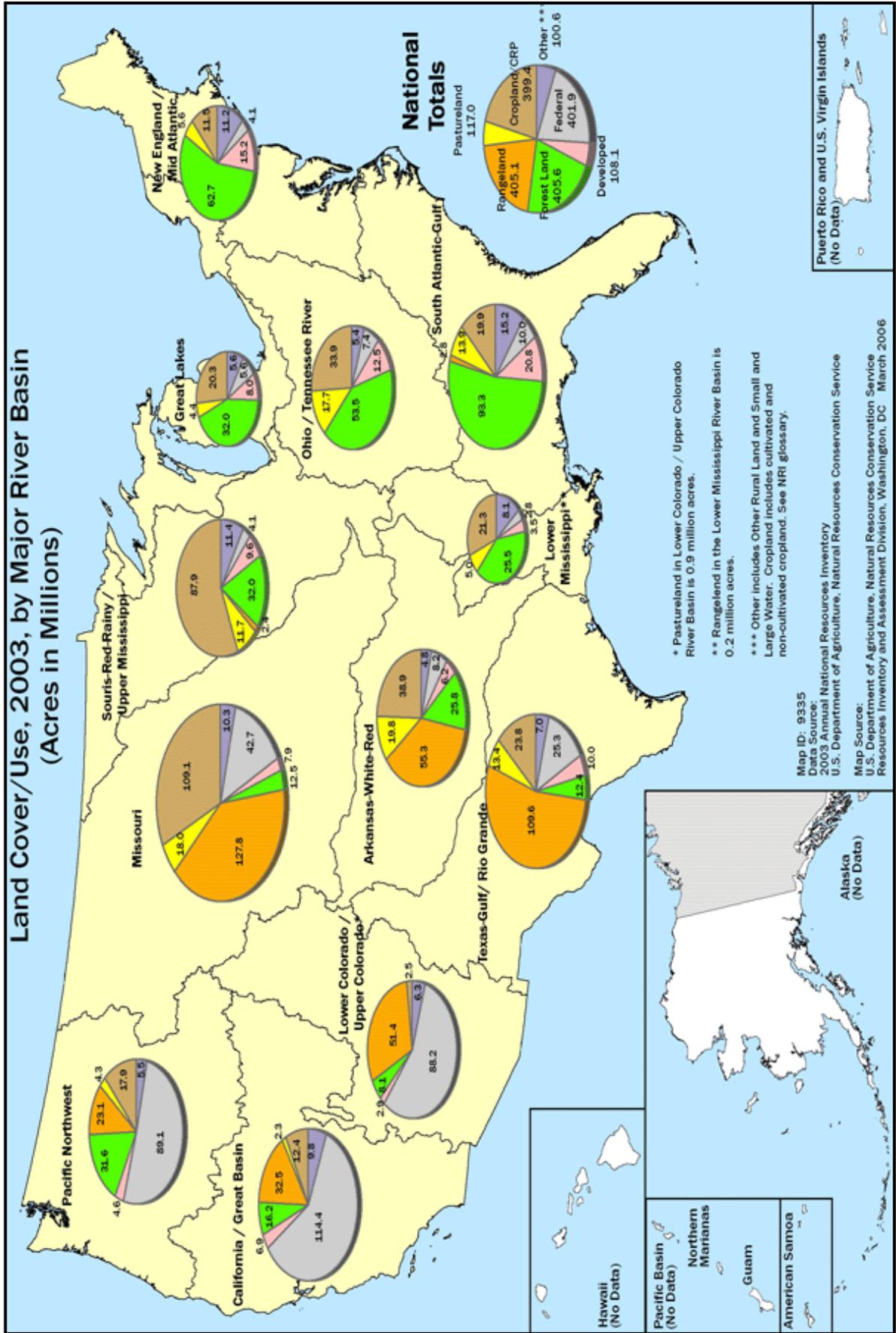
**Figure 1: 2003 U.S. Land Uses** (source: 2003 NRCS National Resources Inventory Data, [www.nrcs.usda.gov/technical/NRI/](http://www.nrcs.usda.gov/technical/NRI/)) (note that Federal lands are not included in the other land cover/use categories)



These agricultural and forestry operations can have impacts, both beneficial and adverse, on natural resources and resource concerns including soil, water, air, plants, animals, humans, and energy. For more specific characterizations and baseline information on each of these resources, see Section 3 of the September 2008 Environmental Quality Incentives Program (EQIP) Programmatic EA,<sup>29</sup> which is incorporated herein by reference.

<sup>29</sup> September 2008 EQIP Programmatic EA, [http://www.nrcs.usda.gov/programs/Env\\_Assess/index.html](http://www.nrcs.usda.gov/programs/Env_Assess/index.html).

Figure 2: Land Use by Major River Basin (source: 2003 NRCS National Resources Inventory Data, [www.nrcs.usda.gov/technical/NRI/](http://www.nrcs.usda.gov/technical/NRI/))



Historically, NRCS has addressed resource concerns through the use of conservation practices and systems of practices within the Nine-Step NRCS Conservation Planning Process. The National Handbook of Conservation Practices<sup>30</sup> contains national standards for each conservation practice. These standards are included in the handbook only after the public has had the opportunity to comment on them.<sup>31</sup> State technical staffs then localize the standards to fit conditions in each State and establish quality and quantity requirements (specifications) for applying each conservation practice. Standards for conservation practices are detailed in Section IV of the local FOTG.<sup>32</sup> Conservation practice standards, quality criteria,<sup>33</sup> and local resource data are maintained in the FOTG to provide detailed information for planners to plan and design practices in a manner consistent with local conditions and resource concerns. Commonly, suites of conservation practices are planned and installed together as part of a Conservation Management System designed to enhance soil, water, and related natural resources for sustainable use. Conservation practice standards and State-specific conservation practice specifications include considerations that ensure the minimization of potentially adverse impacts to associated resources. NRCS has developed network effects diagrams that depict typical impacts of conservation practices. These diagrams are discussed in detail in Appendix A.

#### **4.4.1 Soils**

##### **4.4.1.1 Soil Erosion**

Estimated water (sheet and rill) erosion on cropland in 2003 was 971 million tons per year, and erosion due to wind was 776 million tons per year.<sup>34</sup> Soil erosion can occur on any land where soil is exposed and, therefore, susceptible to erosion due to climatic factors, soil characteristics, landscape features, and cropping practices; however soil erosion is concentrated in several Major River Basins.

- Water (sheet and rill) erosion (2003) – 51 percent occurred in just 2 of the 12 Major River Basins -- the Missouri and the Souris-Red-Rainy/Upper Mississippi.
- Wind erosion (2003) – 88 percent occurred in just four of the twelve Major River Basins -- the Missouri, the Souris-Red-Rainy/Upper Mississippi, the Arkansas-White-Red, and the Texas-Gulf/Rio Grande. The Texas-Gulf/Rio Grande basin has the highest wind erosion rates in the country.

Total erosion amounts on croplands decreased 43 percent between 1982 and 2003 across all Major River Basins. In 2003, 102 million acres (28 percent of all cropland) were eroding above

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<sup>30</sup> For additional information on the *National Handbook of Conservation Practices* (450-VI-NHCP, November, 2001) and individual conservation practices, see <http://www.nrcs.usda.gov/technical/Standards/nhcp.html>.

<sup>31</sup> For a description of how NRCS develops its *conservation practice standards*, see NRCS General Manual Title 450, Part 401, Subpart B, at the NRCS Electronic Directives System website, <http://directives.sc.egov.usda.gov/viewerFS.aspx?hid=19430>.

<sup>32</sup> Local FOTG information is available at the *electronic FOTG website*, <http://www.nrcs.usda.gov/technical/efotg/>.

<sup>33</sup> NRCS *quality criteria* are established standards for resource conditions to provide sustained use and are found in Section III of each State's electronic FOTG, <http://www.nrcs.usda.gov/technical/efotg/>.

<sup>34</sup> 2003 NRCS National Resources Inventory Data, [www.nrcs.usda.gov/technical/NRI/](http://www.nrcs.usda.gov/technical/NRI/).

soil loss tolerance rates, and 266 million acres (72 percent of cropland) were eroding at or below soil loss tolerance rates.

Conservation activities that have traditionally been used to reduce soil erosion are summarized in Appendix B. Activities to reduce soil erosion generally involve covering the soil with live vegetation, crop residues, or other materials to prevent soil detachment; creating barriers to wind or water to reduce detachment and transport; creating channels or other barriers to re-direct and slow water runoff; and creating detention areas to promote sedimentation.

#### **4.4.1.2 Soil Quality**

Soil quality describes how well soil functions to sustain biological productivity, regulate and partition soil water and solutes, filter and buffer organic and inorganic materials, store and cycle nutrients and carbon, and provide stability and support for plants or structures for human habitation (modified from Seybold et al, 1998<sup>35</sup>). Soil quality is evaluated using inherent and dynamic soil properties.

Inherent soil properties are generally not affected by human management and include soil texture, depth to bedrock, clay type, cation exchange capacity, and drainage class. In contrast, dynamic soil properties can change over months to years in response to management and land use. Dynamic soil properties include organic matter, soil structure, infiltration, and water and nutrient holding capacity.

Soil organic matter is a dynamic property of particular interest due to soils' ability to "sequester" carbon. Model simulations<sup>36</sup> have estimated that an average of 58 tons of soil organic carbon is present per cropland acre. Soil organic carbon levels vary considerably among cropland acres, both by region and by crop within regions. Simulations found the Upper Midwest region to have the highest soil organic carbon, averaging 71 tons per cropland acre. The lowest levels, 43 and 44 tons per acre, were in the Southern Great Plains and South Central regions respectively. Legume hay consistently had the highest soil organic carbon levels in every region, while cotton and peanuts had the lowest soil organic carbon levels in regions where those crops are grown. Soils covered by permanent vegetation in forests, pastures, and rangelands can also provide long-term carbon storage. The National Resource Ecology Lab at Colorado State University has estimated that private grassland and shrubland soils in the United States gained 1.6 million metric tons per year in the 1990s (Negra et al, 2008).<sup>37</sup>

Dynamic soil properties, including carbon, are influenced by the type, diversity, and amount of vegetative cover, which is in turn influenced by agricultural and forestry management. Soil

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<sup>35</sup> Seybold, C.A., M.J. Mausbach, D.L. Karlen, and H.H. Rogers. 1998. Quantification of soil quality. In *Soil Processes and the Carbon Cycle*. R. Lal, J.M. Kimble, R.F. Follett, and B.A. Stewart, eds. CRC Press, Boca Raton, FL.

<sup>36</sup> Potter, Steven R., et al. 2006. Model Simulation of Soil Loss, Nutrient Loss, and Change in Soil Organic Carbon Associated with Crop Production. USDA-NRCS Conservation Effects Assessment Project (CEAP). <http://www.nrcs.usda.gov/TECHNICAL/NRI/ceap/croplandreport/>.

<sup>37</sup> Negra, Christine, et al. 2008. Indicators of Carbon Storage in U.S. Ecosystems: Baseline for Terrestrial Carbon Accounting. *Journal of Environmental Quality* 37:1374-1382.

disturbance impacts soil dynamic properties. For example, tillage accelerates decomposition of organic matter and prevents its accumulation, thereby reducing soil stability and soil quality and increasing soil susceptibility to water and wind erosion. The use of high residue crops, cover crops and crop rotations on cropland, management to maintain recommended minimum forage heights on grazing lands, and the application of best management practices on forest lands generally increase soil condition by providing protective soil cover and organic matter. Specific conservation activities that have traditionally been used to improve soil condition resource concerns such as organic matter depletion, compaction, and contaminants are summarized in Appendix B.

## **4.4.2 Water**

### **4.4.2.1 Water Quality**

Disturbance of soil cover and of the soil itself can produce wind and water induced soil erosion and associated sedimentation. Agriculture operations apply inorganic and organic fertilizers, primarily nitrogen, phosphorus and potassium, to promote plant growth. Herbicides, insecticides and fungicides are also applied to control pests that may reduce plant and animal growth and productivity. Off-site movement of soil, nutrients and pesticides into surface and ground waters can degrade water quality. Some contaminants are adsorbed to soil particles (e.g., phosphate), so are typically transported with eroded sediments. Other contaminants are more soluble and typically transported in runoff waters and through infiltration (e.g., nitrate).

Sampling by the U.S. Geological Survey (USGS) (2008)<sup>38</sup> for the National Water Quality Assessment Program (NAWQA) during the period 1991 to 2002 found 13 percent of streams draining agricultural lands and just over 20 percent of groundwater wells sampled in agricultural landscapes to have nitrate concentrations exceeding Federal drinking water standards (10 parts per million). However, only 2 percent of samples from grasslands and shrublands exceeded the standards. Nitrate concentrations in all forested sites that were sampled were less than 6 parts per million in both ground and surface waters.

One-hundred percent of streams sampled for NAWQA were found to have detectable levels of pesticides, with more than 85 percent of the streams sampled having five or more pesticides detected. Of these streams, 13 percent had pesticide levels exceeding human health benchmarks for at least one pesticide. When compared to aquatic life benchmarks, approximately 57 percent of streams in agricultural watersheds were found to have one or more pesticides that exceeded benchmarks. By comparison, one or more pesticides were detected in 61 percent of groundwater wells sampled, but only 1.3 percent exceeded human health benchmarks. Table 1 contains a comparison of results from the NAWQA study for stream and groundwater samples in agricultural landscapes.

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<sup>38</sup> Wilson, J.T., et al. 2008. Methods and sources of data used to develop selected water-quality indicators for streams and ground water for the 2007 edition of *The State of the Nation's Ecosystems* report with comparisons to the 2002 edition: U.S. Geological Survey Open-File Report 2008-1110. 61 p., plus 1 oversized table and 25 appendixes.

**Table 1: Comparison of Results From Stream and Ground Water Samples Collected for NAWQA in Agricultural Landscapes During the Period 1991 to 2002 (from Wilson et al. 2008)**

Contaminant	Nitrate	Pesticides					
		Detected 1 or more	Detected 5 or more	Human Health 1 or more	Human Health 2 to 3	Aquatic Health 1 or more	Aquatic Health 4 or more
Streams (%)	> 10 ppm 13	100	85	13	4	57	12
Groundwater (%)	20	61	10	1.3	0	n/a	n/a

Note: “Human Health” and “Aquatic Health” refer to the exceedance of established benchmark criteria.

Pathogens and pharmaceuticals from livestock operations are emerging water quality issues. With an increasing trend in the size and concentration of livestock operations, concerns about potential water quality issues from these sources have also increased. Pathogens and other contaminants from livestock may reach surface waters through both point and nonpoint pathways. In some cases, contamination of ground waters may occur as well.

Conservation activities on agricultural and forested land improve water quality by:

- Reducing erosion and associated transport of sediment-born contaminants (e.g., cover crops),
- Controlling or redirecting surface water runoff and associated soluble contaminants and pathogens (e.g., terraces),
- Providing mechanisms to filter contaminants and pathogens from runoff (e.g., filter strips or other buffers), and
- Changing management to apply nutrients and pesticides at appropriate agronomic rates (e.g., nutrient management).

Specific conservation activities that have traditionally been used to improve water quality concerns are summarized in Appendix B. Management of manure and mortality on livestock operations can also be used to improve water quality, but these activities are not eligible for payments under CSP.

#### 4.4.2.2 Water Quantity

Water availability is a growing concern across the globe. Agricultural uses of water include irrigation, livestock, and aquaculture. Irrigation is the largest consumptive use of freshwater in the United States, accounting for 65 percent of total water withdrawals (excluding those for thermoelectric power) (Hutson et al 2004).<sup>39</sup> However, it should be noted that this figure includes non-agricultural irrigation, such as on golf courses and cemeteries. Livestock and aquaculture each account for less than one percent of water withdrawals. In 2000, 137 billion

<sup>39</sup> Hutson, S.S. et al. 2004. Estimated Use of Water in the United States in 2000. U.S. Geological Survey Circular 1268.

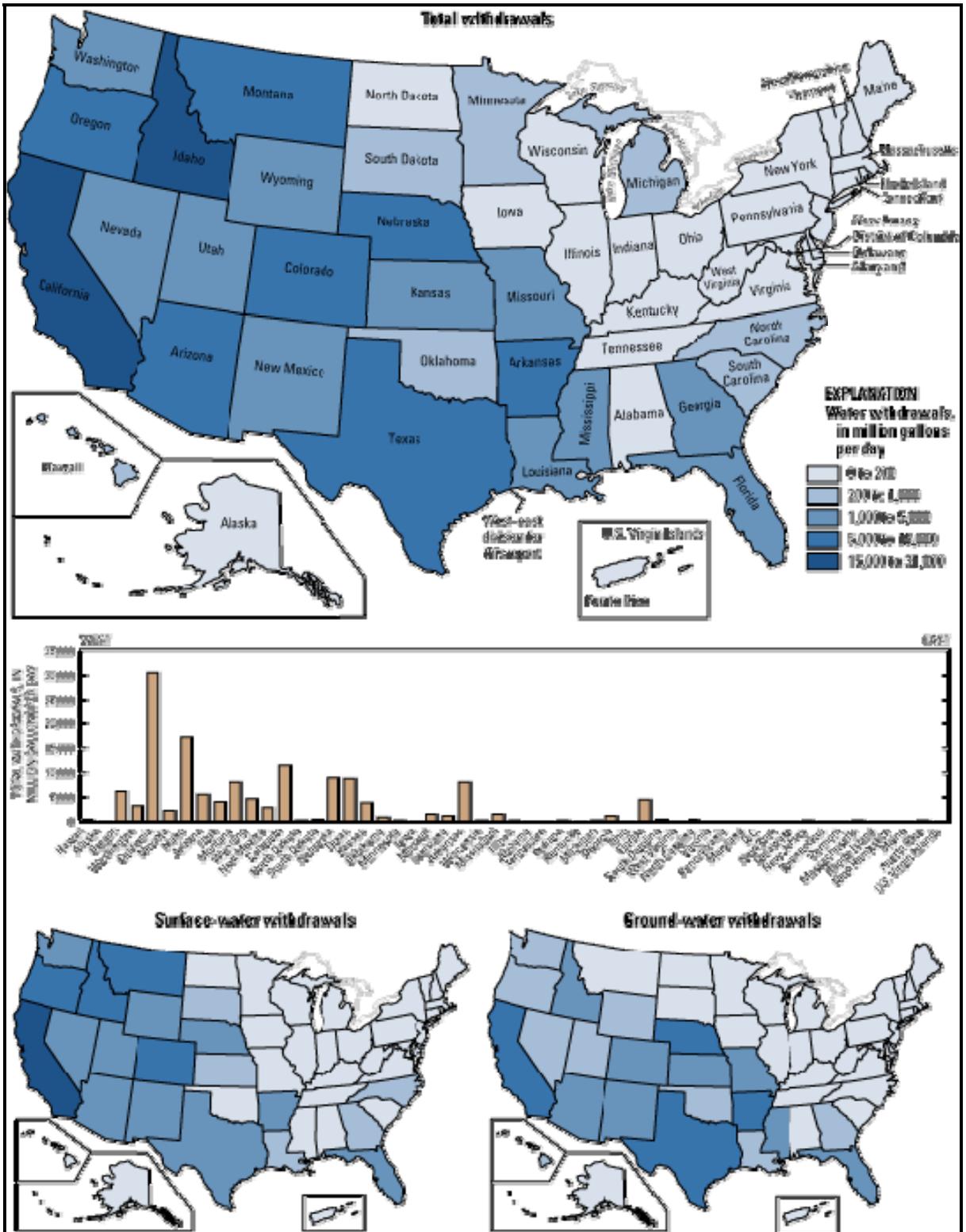
gallons of water per day were used for irrigation of 61,900,000 acres, with surface waters accounting for 58 percent of withdrawals and groundwater comprising the remaining 42 percent. Seventeen western States in areas where annual precipitation is typically less than 20 inches, account for the majority of withdrawals (85 percent) and irrigated acres (75 percent). Figure 3 provides a summary of irrigation water use in the United States.

At the other end of the spectrum are lands where excessive water quantity is a resource concern. Examples that may restrict land use and management include:

- “Excessive seepage” where subsurface water wells up to the surface;
- “Runoff, flooding, or ponding” when the land becomes inundated;
- “Excessive subsurface water” where high or perched water tables saturate upper soil layers; and
- “Drifted snow” where wind-blown snow forms deposits and accumulates around and over surface structures restricting ingress, egress and conveyance of humans and animals.

Conservation activities are used to address excessive water by removing, redirecting, or retaining this water to improve plant productivity. On irrigated land, a variety of activities are available to improve the efficiency of water application (e.g., irrigation water management or use of high efficiency irrigation systems), reduce evaporation (e.g., cover crops, conservation tillage, and mulching), and to increase water supply (e.g., water well and irrigation storage reservoir). Specific conservation activities that have traditionally been used to address water quantity concerns including insufficient supply, excessive quantities, and inefficient use are summarized in Appendix B.

Figure 3: 2000 Irrigation Withdrawals by Source and State (from Hutson et al. 2004, see <http://pubs.usgs.gov/circ/2004/circ1268/htdocs/figure07.html>)



### 4.4.3 Air

Air quality issues related to agricultural and forestry operations tend to involve five air quality components: particulate matter (PM), ozone (O<sub>3</sub>) precursors, greenhouse gases (GHG), chemical spray drift, and odor. Conservation activities that have traditionally been used to address these air quality issues are summarized in Appendix B, and specific examples are provided below.

Agricultural operations can contribute to PM and ozone concentrations via emissions of direct PM, volatile organic compounds (VOC), oxides of nitrogen (NO<sub>x</sub>), and ammonia. All biological organisms emit VOC, and VOC is also emitted during the breakdown or combustion of biological materials. NO<sub>x</sub> is generally associated with combustion including farm vehicle, tractor, and irrigation engines, and with agricultural and forestry burning. PM may be either emitted directly (e.g., as dust, which is a form of PM) or formed in the atmosphere from other pollutants, such as ammonia from animal operations or fertilizer applications. Conservation activities that may be used to reduce PM generation include Anionic Polyacrylamide erosion control, conservation cover, cover crops, and establishment and renovation of windbreaks and shelterbelts. Activities that reduce the spread of wildfires such as firebreaks, fuel breaks, and forest slash treatment can reduce PM generation and the production of O<sub>3</sub>.

GHG emissions are a global concern. While agricultural emissions of GHGs are minor compared to other sectors such as industry, transportation and electric generation, agriculture is also both a source and an important means of reducing GHGs. Carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) are the primary GHG of concern from agricultural operations. However, agriculture and forestry are also an important means of reducing GHG through soil and biomass carbon sequestration. Anthropogenic sources of CO<sub>2</sub> in agriculture are combustion processes and soil tillage. N<sub>2</sub>O is emitted from nitrogen conversion processes in the soil and manure piles, while methane is primarily from animal production and manure storage. Conservation tillage, nutrient management, prescribed grazing, and establishment of permanent vegetation are some of the conservation activities that can mitigate these emissions. Conservation tillage in particular will enhance soil carbon sequestration on croplands.

Another air quality issue related to agriculture is odor. The main classes of odorous compounds produced by agricultural sources are VOCs, odorous sulfur compounds, and ammonia. Agricultural odors typically arise from animal operations, manure management, and land application of manure. Conservation activities such as feed management, nutrient management, manure management, and lagoon covers can reduce the production and emission of odorous compounds.

The drift of chemical sprays, primarily pesticides, away from the intended target is another air quality concern that can result from agricultural operations. This concern can be reduced through the application of nutrient management and pest management to ensure that the proper amounts of chemicals are applied only in the areas where they are needed. Consideration of the method and timing of application, including wind speed and direction, is also important.

#### 4.4.4 Plants

Plants provide food and energy for people and livestock and food, cover, and shelter for wildlife. A main objective of almost any agricultural or forestry operation is to grow healthy, productive plants. Depending on the land use, this may involve planting annual crops, planting and/or managing native or introduced vegetation, or some combination of these. Healthy plant communities on rangeland, native and naturalized pastures, and forest lands protect and improve soil quality, reduce soil erosion, improve water quality, provide forage for livestock and wildlife, provide habitat for wildlife, provide fiber and energy, and sequester carbon.

Where vegetation has been planted on agricultural lands, historically stands of monocultural, even-aged and often introduced grasses and trees have predominated. During recent years, efforts have been undertaken to re-introduce diverse vegetative communities of native species. The emphasis on longleaf pine (*Pinus palustris*) and reestablishment of longleaf pine ecosystems in the southeast under the Conservation Reserve Program (CRP) is one example. Eradication of saltcedar (*Tamarix ramosissima*) with reintroduction of native willows and cottonwoods in southwestern riparian ecosystems, and restoration of sagebrush ecosystems in the Sage Steppe through removal of invasive western juniper (*Juniperus occidentalis*) is occurring as well. NRCS has encouraged and facilitated this process through the development of ecological site descriptions that describe how disturbance affects a specific native plant community and help planners and landowners to understand the processes that may be needed to restore the historic native plant community.

Noxious and invasive plant and animal species, and a host of introduced diseases, are a growing concern across the Nation. Once a non-native, invasive species has been introduced, monitoring and control can be a monumental task. Invasive plants may crowd out native plants, make areas more susceptible to catastrophic fire, degrade habitat for native wildlife, and may harm economic, environmental, and/or human health. Noxious, invasive species reduce productivity (e.g., gypsy moth), and may even threaten the continued existence of native species and, ultimately, change the historic vegetative composition of entire ecosystems (e.g., Chestnut blight and more recently redbay ambrosia beetle). The economic impact of these species on the United States economy is estimated in the billions of dollars,<sup>40</sup> and agricultural, forest, and other private landowners spend millions of dollars for control of noxious and invasive species each year.

Over 9,000 species of native plants are considered to be “at risk” in the United States.<sup>41</sup> Of these, 747 plant species have been listed as threatened or endangered (Table 2). The distribution of at risk plant and animal species across the United States is shown in Figure 4. The major risks to plants include many of the same factors that result in declining animal population such as destruction or alteration of habitat, spread of invasive species, emergence of lethal disease, and changes in climate.<sup>42</sup>

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<sup>40</sup> Westbrooks, R.G. 1998. Invasive Plants: Changing the Landscape of America. Fact book produced by the Federal Interagency Committee for the Management of Noxious and Exotic Weeds. Washington, D.C. 107 pp.

<sup>41</sup> For more information on *at-risk species*, see NatureServe, 2008, <http://www.natureserve.org/>.

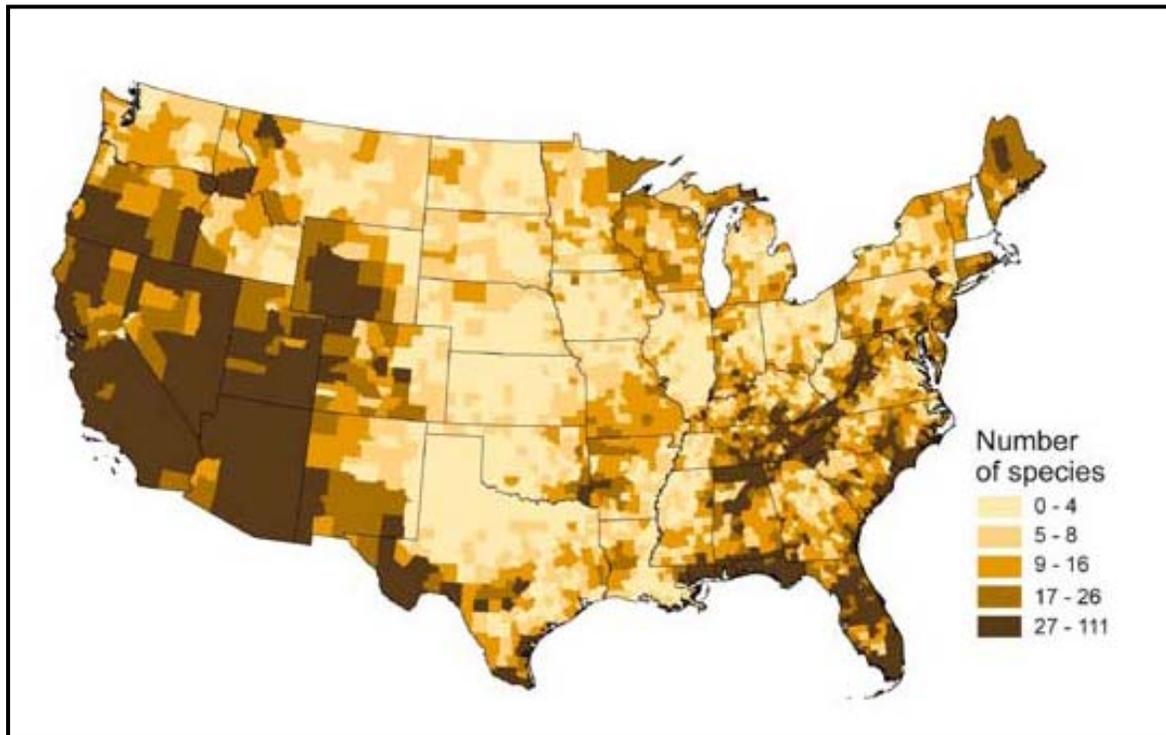
<sup>42</sup> Steni, B.A. and K. Gravuer, 2008. Hidden in Plain Sight: The Role of Plants in State Wildlife Action Plans. NatureServe, [http://www.natureserve.org/publications/hidden\\_plain\\_sight.jsp](http://www.natureserve.org/publications/hidden_plain_sight.jsp).

**Table 2: Numbers of Animals and Plants Listed as Threatened or Endangered in the U.S.**  
 (from U.S. Fish and Wildlife Service [http://ecos.fws.gov/tess\\_public/TESSBoxscore](http://ecos.fws.gov/tess_public/TESSBoxscore))

<b>Group</b>	<b>Endangered</b>	<b>Threatened</b>	<b>Total Listings</b>
Mammals	69	13	82
Birds	75	15	90
Reptiles	13	24	37
Amphibians	13	10	23
Fishes	74	65	139
Clams	62	8	70
Snails	64	11	75
Insects	47	10	57
Arachnids	12	0	12
Crustaceans	19	3	22
Corals	0	2	2
<b>Animal Subtotal</b>	<b>448</b>	<b>161</b>	<b>609</b>
Flowering Plants	570	143	713
Conifers and Cycads	2	1	3
Ferns and Allies	24	2	26
Lichens	2	0	2
<b>Plant Subtotal</b>	<b>598</b>	<b>146</b>	<b>744</b>
<b>Grand Total</b>	<b>1046</b>	<b>307</b>	<b>1353</b>

Conservation activities address plant natural resource concerns by replacing and removing plants, changing management, and otherwise maintaining and improving habitat. On pasture and range lands, activities may involve improving the availability and management of forage and livestock, controlling or managing access, controlling noxious and invasive species, enhancing wildlife food and cover, and enhancing plant biodiversity. On forest land, activities often involve planting and/or managing trees and shrubs to promote productivity, health and vigor, improvement of wildlife food and cover, control of noxious and invasive species, and enhancement of plant biodiversity. Specific conservation activities that have traditionally been used to address plant natural resource concerns are summarized in Appendix B.

**Figure 4: Geographic Distribution (by County) of At-Risk Species (from Flather, Knowles, McNeese, and Jason 2008<sup>43</sup>)**



#### **4.4.5 Animals**

##### **4.4.5.1 Fish and Wildlife**

Privately owned, non-Federal lands provide important habitat for many aquatic and terrestrial wildlife species. Like all animals, fish and wildlife need food, water, and cover/shelter/structure. Connectivity of habitats, space, and balance among populations are important, and fish also need appropriate water temperatures. When people use the land, whether it is for agriculture, forestry, industry, or urban and suburban development, they change the quantity and quality of the wildlife habitat. As a result, the types and numbers of wildlife that can live on the land and in the associated waters change as well.

Six hundred nine species of animals in the United States are listed as threatened or endangered by the U.S. Fish and Wildlife Service (Table 2). Approximately one-third of wildlife species have been designated by the individual States as being “at risk” or “species of concern.” The geographic distribution of these species in the United States is shown in Figure 4. The percentage of native at risk wildlife is higher in fresh waters (37 percent) than in forests (19

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<sup>43</sup> Flather, Curtis H.; Knowles, Michael S.; McNeese, Jason. 2008. Geographic patterns of at-risk species: A technical document supporting the USDA Forest Service Interim Update of the 2000 RPA Assessment. Gen. Tech. Rep. RMRS-GTR-211. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 21 p.

percent) or grasslands and shrublands (18 percent) (Heinz Center, 2008).<sup>44</sup> Declines in migratory bird species in particular have been documented around the world.<sup>45</sup> These declines may be due to a number of factors, including habitat conversion and fragmentation; changes in land management and use; herbicide and pesticide use; and threats to wintering and migratory habitats. Many of these same factors impact other wildlife species as well.

Pollinators are another important subset of terrestrial wildlife critical to the reproduction of many plant species upon which humans and wildlife depend. Native bees, which number more than 4,000 species in North America, are thought to be declining in number due to habitat loss, pesticide use, and disease among other factors.<sup>46</sup>

Conservation activities can address fish and wildlife natural resource concerns by changing food availability; improving water availability and quality; and protecting, improving, or manipulating habitat to benefit specific species. Many activities involve the establishment or management of vegetation, although a few involve structural measures. Specific conservation activities that have traditionally been used to address fish and wildlife natural resource concerns are summarized in Appendix B.

#### **4.4.5.2 Domestic Animals**

Specific natural resource concerns associated with domestic animals include inadequate quantities and quality of feed and forage, inadequate shelter, and inadequate quantity or quality of water. In order to reduce stress and mortality and maximize productivity, livestock producers must provide adequate food, water and cover. They also must handle overall health care, reproduction and manure management.

Conservation activities are used to address domestic animal natural resource concerns by: managing forage production through manipulation of the intensity, frequency, duration, distribution, and season; adjusting organic and inorganic fertilizer inputs; improving livestock water supplies and systems; and managing livestock manure. Because the presence and management of livestock may impact other natural resources such as soil and water quality, consideration of the impacts of livestock and any planned management upon these resources must be considered. Specific conservation activities that have traditionally been used to address domestic animal natural resource concerns are summarized in Appendix B.

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<sup>44</sup> H. John Heinz III Center for Science Economics and the Environment. 2008. The State of the Nation's Ecosystems: Focus on Wildlife. Washington, D.C. <http://www.heinzcenter.org/ecosystems>.

<sup>45</sup> For information and examples related to the *decline of migratory bird species*, see <http://www.un.org/apps/news/story.asp?NewsID=26605&Cr=biodiversity&Cr1=%20>, <http://news.bbc.co.uk/1/hi/sci/tech/5017346.stm>, and U.S. Geological Survey Status and Trends of Biological Resources, [http://biology.usgs.gov/status\\_trends/catalog.do?item=102](http://biology.usgs.gov/status_trends/catalog.do?item=102).

<sup>46</sup> For more information, see the Xerces Society, <http://www.xerces.org/pollinator-conservation/>.

#### 4.4.6 Energy

Energy related costs are a significant agricultural operating expense. On-farm energy conservation saves money for the farmer, reduces overall national energy consumption, and reduces air pollution and GHG emissions. In some cases, on-farm energy generation is possible through the production of biogas and capture of wind, solar, and geothermal energy. Agriculture and forestry can also be sources of biomass for renewable energy generation.

Conservation activities to address energy concerns include those that increase efficiency, for example, by reducing the number of trips made by a tractor across a field or the amount of irrigation water that must be pumped. Other activities may assist producers in collecting, storing, and utilizing biogas produced on the farm or generating other forms of renewable energy. Some of the activities that may be used to conserve or generate energy are shown in Appendix B.

#### 4.4.7 Socioeconomic Considerations

The conservation planning process includes consideration of economic, social, and cultural resource factors. Some of the economic aspects that are addressed in formulating and evaluating conservation plans include: cost effectiveness, financial condition, markets, levels of inputs and/or management required, base acreage, USDA Program eligibility, and sustainability. Social considerations include: public health and safety, values, client characteristics, risk tolerance/aversion, and tenure. Cultural considerations include: absence or presence of cultural resources, significance of cultural resources, effects of conservation activities on cultural resources, and any necessary mitigation of adverse effects.

Agricultural and forest lands provide income for operators and absentee landowners. In turn, local economies benefit from the income and operating expenses that flow through the community. Communities are also impacted by off-site effects of agricultural operations on natural resources such as soil, water, and air and cultural resources such as scenic beauty.

The 2008 Act authorizes USDA to provide incentives to historically underserved groups to participate in conservation programs. These groups include Beginning Farmers and Ranchers, Socially Disadvantaged Farmers and Ranchers, Limited Resource Farmers and Ranchers, and Indian Tribes.<sup>47</sup>

In 2002, Socially Disadvantaged Farmers and Ranchers and Limited Resource Farmers and Ranchers were found to number 112,195 or 5.1 percent of all farmers in the United States (Figure 5). These farmers operate almost 80 million acres, which is 8.4 percent of United States farmland.<sup>48</sup> Over the last several decades, NRCS has recognized that there are increasing numbers of Limited Resource Farmers and Ranchers. Sometimes, but not always, Limited Resource Farmers and Ranchers are also members of socially disadvantaged groups such as American Indians, African Americans, Asians, and Hispanics. “Limited resource” is a

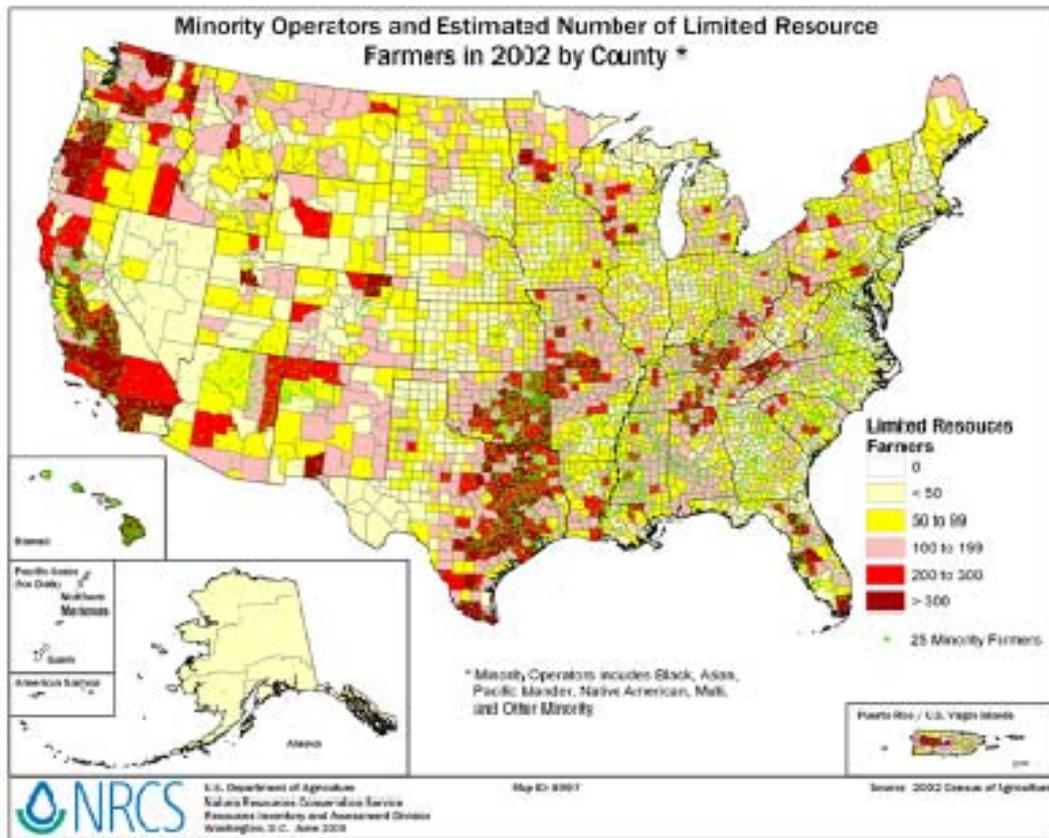
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<sup>47</sup> See Section 2708 of the 2008 Farm Bill for information on incentives for *historically underserved groups*.

<sup>48</sup> 2002 Census of Agriculture, <http://www.agcensus.usda.gov/Publications/2002/index.asp>.

designation based on economic status,<sup>49</sup> while socially disadvantaged affiliation is determined by an individual's self-designation and on definitions found in Federal civil rights law.

**Figure 5: Geographic Distribution (by County) of Socially Disadvantaged and Limited Resource Farmers and Ranchers**

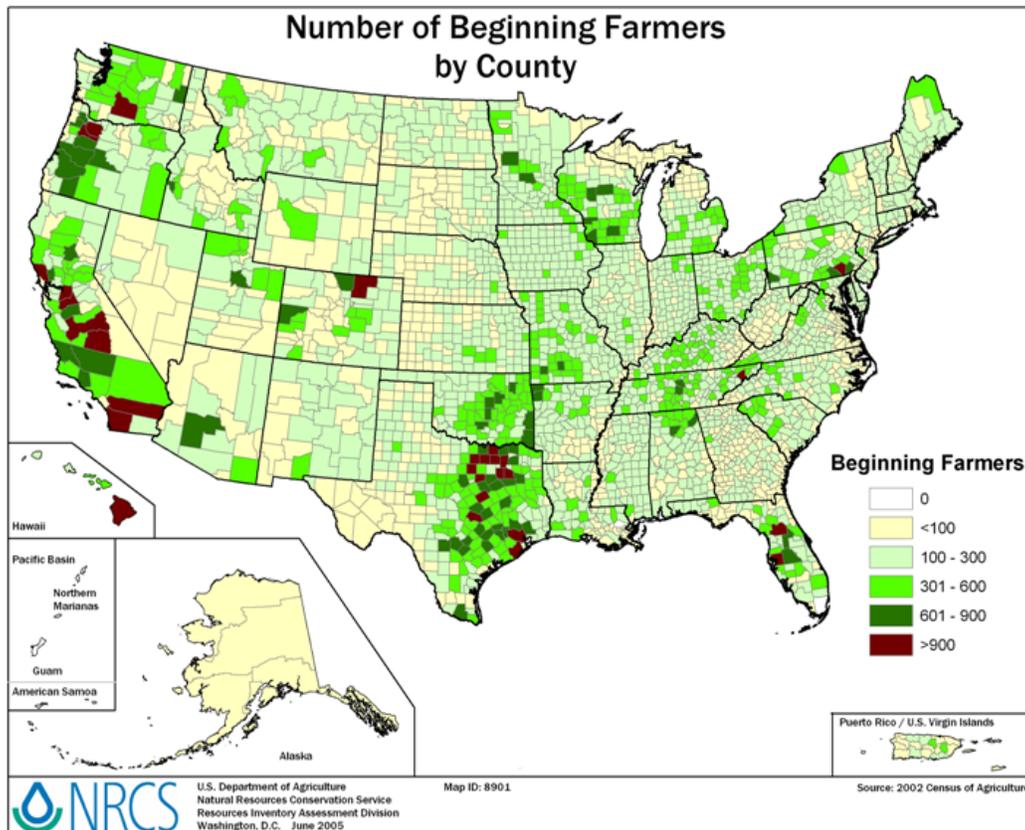


Limited Resource Farmers and Ranchers have limited capital, and therefore tend to acquire lands that are lower in value and productivity. Because of lower productivity, there may be greater potential for unintended natural resource problems to arise when farming these lands. Areas with poor soil quality, for example, may be subject to increased fertilizer application which may result in increased levels of nutrient runoff. Similarly, farming on sloping lands may result in increased runoff and soil erosion. However, these are only logical inferences since we do not have data that directly correlates specific farmers or groups of farmers with increased environmental degradation. Many Limited Resource Farmers and Ranchers are not full-time farmers and often need to work off-farm for wages in other economic sectors to make a living. These individuals need low-cost, technically sound approaches to natural resource conservation.

<sup>49</sup> A *Limited Resource Farmer or Rancher* is defined as having direct or indirect gross farm sales not more than \$100,000 in each of the previous 2 years (adjusted for inflation) and having a total income at or below the poverty level for a family of four or less than 50 percent of the county median household income in each of the previous 2 years.

There are unique challenges of farmers and ranchers who are just beginning their agricultural businesses. Figure 6 illustrates the general locations of beginning farmers across the United States. Of the more than two million principal operators reported in the 2002 Census of Agriculture, 593,139 (28 percent) were listed as being on their present farm or ranch for less than 10 years. Approximately 138,000 of these farmers and ranchers are also members of socially disadvantaged groups.

**Figure 6: Geographic Distribution (by County) of Beginning Farmers**

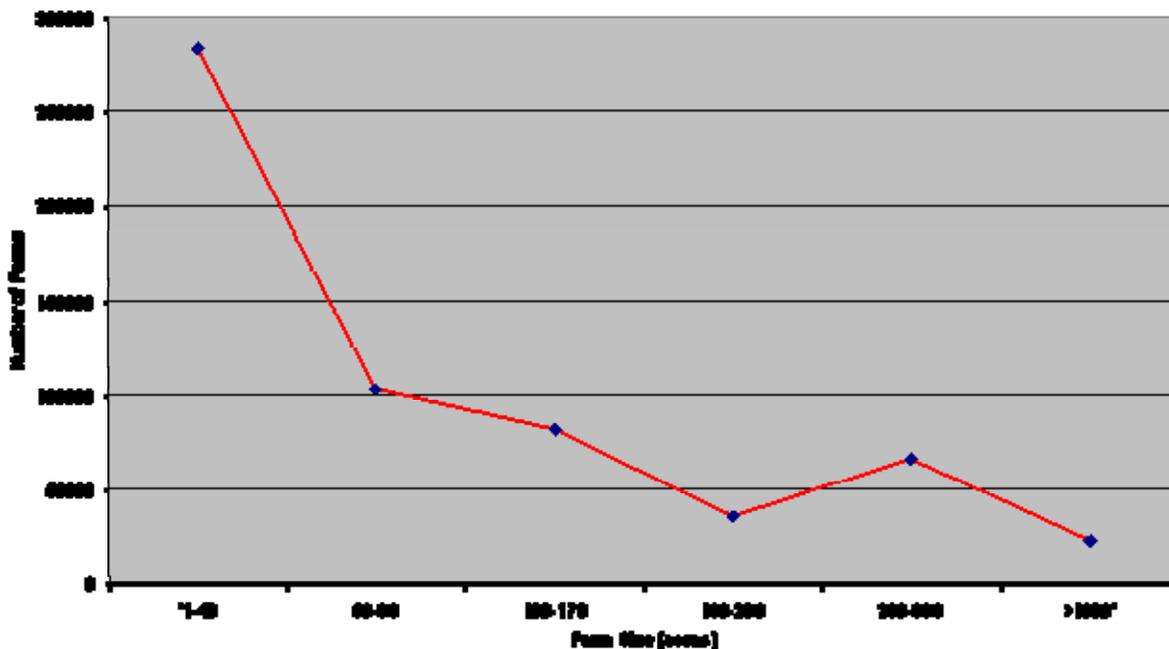


Over 100 million acres of United States agricultural lands are controlled by Beginning Farmers and Ranchers. The majority of all principal operators who are Beginning Farmers and Ranchers have operations of less than 100 acres in size (Figure 7). This may indicate that most Beginning Farmers and Ranchers do not rely solely on their agricultural operations for a living, but instead farm or ranch part time. The 2002 Census of Agriculture shows that of all agricultural operations less than 10 acres in size (179,346), 42 percent (75,354) were operated by beginning farmers or ranchers. These are relatively small operations that would probably not be a sole source of income for their operators. Some may even be retirees or hobby farmers who use agriculture to supplement their incomes.

The number and percentage of Beginning Farmers and Ranchers drops as operation size increases. For agricultural operations over 1,000 acres in size, roughly 13 percent of all principal

operators were on their current operations less than 10 years. The inversely proportional relationship between operation size and number of beginning principal operators may indicate lower initial capital for investment, lower reliance on the operation as a sole source of income (as with retirees or hobby farmers), or a focus on niche market production, such as organically grown produce or livestock, which might be done successfully on smaller acreages.

**Figure 7: Number of Beginning Farmers by Farm Size (data source: 2002 Census of Agriculture)**



#### **4.5 Alternative 1 – No Action – No Implementation of CSP**

Under this alternative, NRCS would not provide financial or technical assistance to private agricultural and forestry landowners under CSP. NRCS would continue to provide other technical and planning assistance upon request. Financial assistance would continue to be provided under the Farm Bill and other conservation programs, but would not be available for the specific conservation activities offered under CSP. Agricultural and forestry landowners and operators would not receive stewardship payments for additional conservation performance above the stewardship threshold condition. Landowners and operators would not have an added incentive, and without compensation for the costs incurred and income foregone, might not be able to implement additional conservation activities to address resource concerns. As a result, the baseline conditions related to the soil, water, air, plant, animal, energy, and socioeconomic factors would continue without change. For some concerns, such as soil erosion, the result may be a continued decline in the resource base and degradation of environmental resources over time.

## **4.6 Alternative 2 – Agency Preferred Alternative – Implementation of 2008 CSP Requirements**

NRCS will provide financial and associated technical assistance to private agricultural and nonindustrial forest landowners under CSP. Eligible applicants will be ranked at the State level within the applicable ranking pool, and those who rank sufficiently high to be approved for CSP contracts will receive compensation for carrying out additional conservation activities to improve and conserve the quality and condition of natural resources. Conservation activities implemented under CSP will be directed to address priority resource concerns which have been identified within the State by the State Conservationist in consultation with the State Technical Committee. Therefore, priority resource concerns will be addressed to a level that meets or exceeds the identified stewardship threshold. In addition, some agricultural producers will adopt “resource conserving crop rotations” on cropland acres.

The proposed Federal action with which NRCS has discretion, and which is analyzed in this Programmatic EA, concerns national rulemaking for CSP. Recognizing that there will be subsequent decisions made by NRCS officials at the State and local levels based on the national program requirements, there are no direct environmental impacts to the quality of the human environment resulting from the proposed action of national rulemaking to implement CSP. However, there is the potential for direct beneficial socioeconomic impacts to historically underserved participants. Indirect beneficial environmental impacts are anticipated on agriculture and forest lands operated by historically underserved participants. It is also anticipated that there will be substantial long-term indirect and cumulative beneficial effects associated with the application of conservation activities by all participants on lands enrolled in the program.

### **4.6.1 Soil, Water, Air, Plant, Animal, and Energy Resources**

For the term of the conservation stewardship contract, CSP participants will install and adopt new conservation activities and will also improve, maintain, and manage conservation activities in place on the operation at the time the contract offer is accepted. The level of stewardship identified using the conservation measurement tool must be maintained. Where applicants have not yet reached the stewardship threshold for a given priority resource concern, annual payments for the application of additional conservation practices will be available. Other Farm Bill conservation programs, such as EQIP, may also be used to reach this level of treatment prior to submitting an application for enrollment in CSP.

As shown in Appendix B and documented in the National Handbook of Conservation Practices<sup>50</sup>, 167 NRCS conservation practices are currently available at the national level to address common natural resource concerns. A subset of these practices, dependent upon the priority resource concerns identified in each State, will be available to assist applicants in reaching required stewardship thresholds on their agricultural and NIPF lands. Examples of

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<sup>50</sup> See *National Handbook of Conservation Practices* (450-VI-NHCP, November, 2001), <http://www.nrcs.usda.gov/technical/Standards/nhcp.html>, for information on specific conservation practices approved for use at the national level.

conservation practices that might be used by CSP participants to address natural resource concerns and achieve stewardship thresholds on crop, range, pasture, and forest lands are provided in Table 3.

**Table 3: Examples of NRCS Conservation Practices and Applicability by Land Use**

<b>Practice Name</b>	<b>Code</b>	<b>Crop</b>	<b>Pasture</b>	<b>Range</b>	<b>Forest</b>
Brush Management	314		X	X	X
Conservation Crop Rotation	328	X			
Residue & Tillage Management, No-Till/Strip Till/ Direct Seed	329	X			
Prescribed Burning	338		X	X	X
Cover Crop	340	X			
Critical Area Planting	342	X	X	X	X
Residue Management, Seasonal	344	X			
Residue & Tillage Management, Mulch Till/Ridge Till	345/346	X			
Windbreak/Shelterbelt Establishment/Renovation	380/650	X	X	X	
Fuelbreak	383		X	X	X
Forest Slash Treatment	384				X
Field Border	386	X			
Riparian Herbaceous Cover/Forest Buffer	390/391	X	X	X	
Filter Strip	393	X			
Firebreak	394		X	X	X
Stream Habitat Improvement & Management	395	X	X	X	X
Irrigation Water Management	449	X	X		
Forage Harvest Management	511		X		
Pasture and Hay Planting	512		X		
Prescribed Grazing	528		X	X	X
Range Planting	550			X	
Tree/Shrub Establishment	612				X
Restoration/Mgmt of Rare & Declining Habitats	643	X	X	X	X
Wetland Wildlife Habitat Management	644	X	X	X	X
Upland Wildlife Habitat Management	645	X	X	X	X
Early Successional Habitat Development/Mgmt	647	X	X	X	X
Road/Trail/Landing Closure and Treatment	654				X
Forest Trails & Landings	655				X
Tree/Shrub Pruning	660				X
Forest Stand Improvement	666				X

Examples of enhancements that may be used by participants in CSP are provided in Appendix C. Installation standards for each enhancement will be defined in the applicable enhancement job sheet. CSP enhancements may be associated with an NRCS conservation practice standard, each of which has established minimum requirements which are described in Section IV of a State's electronic FOTG.<sup>51</sup>

NRCS has used a network effects diagram to illustrate the chain of effects, direct; indirect; and cumulative, of applying each conservation practice according to the standard. These network effects diagrams are explained further in Appendix A, are available on the NRCS website,<sup>52</sup> and are incorporated herein by reference.

There will be indirect effects associated with application of conservation activities. For example, activities associated with reducing soil erosion on cropland have indirect effects that include decreased sediment and turbidity in surface waters, improved aquatic habitat, improved air quality, improved crop productivity, and often improved energy efficiency. Similar impacts result from improved management of livestock and vegetation on pasture and range lands. Activities applied on forest land may indirectly improve water quantity and quality, improve air quality, and restore or enhance wildlife habitat. Wildlife activities may indirectly improve air and water quality and often result in the creation of potential recreational opportunities. An overview of the potential impacts of applying conservation practices on cropland, grazing lands, and forests is provided (and incorporated herein by reference) in the 2003 and 2008 EQIP Programmatic EA.<sup>53</sup>

Implementing conservation activities under CSP will increase the beneficial effects of associated conservation practices as shown on the network effects diagrams. Enhancements will be developed specifically to provide a higher level of treatment than what is required under traditional conservation practice standards. In many cases, this can be achieved through implementation of additional management activities. For example, as shown in the network effects diagram for the NRCS practice standard Nutrient Management (Appendix A), managing the amount, placement, and timing of plant nutrient application can decrease nutrient transport to surface and ground waters. Enhancements involving additional management of nutrient applications, such as using stalk and/or leaf tissue tests to adapt application rates, applying 50 percent or more of the total nitrogen required by a crop after crop emergence, applying all phosphorous fertilizer at least 3 inches deep, and precision application of nutrients based on management zones, can lead to additional reductions in nutrient transport and improved water quality.

Because critical decisions made independently by over 50 State Conservationists will affect these outcomes, it is impossible to predict on a broad scale the magnitude of these impacts. However, it is possible to describe the general types of impacts that will occur. Across the country, soil erosion will decrease, soil quality will be improved, water quality will improve, water quantity issues will be addressed, water will be used more efficiently, air quality will improve, plant

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<sup>51</sup> Local FOTG information is available at the *electronic FOTG* website, <http://www.nrcs.usda.gov/technical/efotg/>.

<sup>52</sup> *Practice Network Effect Diagrams* are available at [http://www.nrcs.usda.gov/programs/Env\\_Assess/index.html](http://www.nrcs.usda.gov/programs/Env_Assess/index.html).

<sup>53</sup> For the 2008 *EQIP Programmatic EA*, see [http://www.nrcs.usda.gov/programs/Env\\_Assess/index.html](http://www.nrcs.usda.gov/programs/Env_Assess/index.html). Contact the [NRCS National Environmental Coordinator](#) (202-720-4925) for a copy of the 2003 EQIP Programmatic EA.

condition will improve, needs will be met for domestic animals and wildlife, energy will be used more efficiently, and use of on-farm renewable energy sources will increase.

#### **4.6.2 Socioeconomic Concerns**

NRCS will ensure that outreach is provided so as not to limit producer participation because of size or type of operation or production system. Outreach efforts will include small-scale farms, specialty crop and organic producers, and other groups identified at the State and local levels.

The Farm Bill specifies that 12,769,000 acres be enrolled in CSP each year. Up to 10 percent of these acres (1.3 million acres) can be in NIPF. Nationally, 5 percent (650,000 acres) will be set aside for Socially Disadvantaged Farmers and Ranchers and another 5 percent will be made available to Beginning Farmers and Ranchers. Assuming the program is fully funded by Congress at the level identified in the 2008 Act and all funds are obligated, the CSP will enroll the following each year:

- 1 percent of the agricultural acreage in the Nation;
- 0.5 percent of the NIPF land;
- 0.8 percent of the acreage owned and/or operated by Socially Disadvantaged Farmers and Ranchers; and
- 0.7 percent of the acreage operated by Beginning Farmers and Ranchers.

Because Beginning Farmers and Ranchers have been found to own or operate smaller acreages, it can be assumed that a slightly higher percentage of this group might participate in CSP and address resource concerns on their lands.

As noted previously, agricultural operations can have direct, indirect, and cumulative impacts on the human environment. Implementation of conservation activities on these operations through CSP will also produce benefits both on-site (to the farm and the farmer) and off-site (to the community and environment) as natural resource concerns are addressed.

#### **4.6.3 Special Environmental Concerns**

It is not anticipated that the types of conservation activities implemented under CSP will result in adverse impacts to special environmental concerns, particularly those protected by law, Executive Order, or agency policy. CSP implementation will not result in adverse impacts to prime and unique farmlands, floodplain management, natural areas, or scenic beauty. Activities conducted under this program will not result in land being brought into agricultural production, the intensification of agricultural or forestry production, construction of new structures, or land being converted to non-agricultural uses. Due to the nature of the activities proposed, it is unlikely that there will be detrimental impacts to wetlands, wild and scenic rivers, waters of the United States, coastal zone management areas, coral reefs, essential fish habitat, riparian areas, migratory birds, endangered or threatened species, cultural resources, or historic properties. It is also unlikely that activities will result in a spread of noxious or invasive species; violations of the Clean Air Act or Clean Water Act; or a disproportionately high and adverse effect on the human

health or environment of low-income, minority, or Indian populations (environmental justice). In fact, funds will be set aside to assist minority populations under the program, resulting in benefits to this group and a reduction in resource concerns on their lands.

The effects of the conservation activities may vary somewhat depending on the local ecosystem(s), landscape position, methods of installation, and scope or magnitude of the activity. Impacts will be evaluated at a more localized level through additional State and local NEPA analyses and/or use of the site-specific EE prior to program implementation. NRCS will consult with regulatory agencies on State and local levels, as needed and as appropriate, to ensure that actions do not adversely affect special resources of concern. NRCS also implements activities in a manner that is consistent with NRCS policy to minimize adverse effects, through appropriate avoidance or other mitigating measures, to the extent feasible.<sup>54</sup> The use of the site-specific EE and other established agency procedures and policies for compliance with two specific regulatory authorities, the National Historic Preservation Act (NHPA) and the Endangered Species Act, are discussed below.

#### **4.6.3.1 National Historic Preservation Act**

To ensure compliance with Section 106 of the NHPA<sup>55</sup> and associated authorities, NRCS primarily follows the procedures developed in accordance with a nationwide programmatic agreement between NRCS, the Advisory Council on Historic Preservation (ACHP), and the National Conference of State Historic Preservation Officers,<sup>56</sup> which called for NRCS to develop consultation agreements with State Historic Preservation Officers (SHPOs) and federally recognized tribes (or their designated Tribal Historic Preservation Officers [THPOs]). These State-level consultation agreements focus historic preservation reviews on resources and locations that are of special regional concern to these parties. Importantly, these consultation agreements also streamline the more inclusive Section 106 regulations of the ACHP<sup>57</sup> by exempting certain classes of undertakings from review. For example, undertakings like the development of a conservation plan for which NRCS would provide no financial assistance for implementation would have little likelihood of affecting historic properties. Such projects would not require consultation with SHPOs or tribes to identify, evaluate, or treat significant cultural resources. However, historic preservation review with consulting parties would be necessary under these consultation agreements for CSP-funded undertakings that would likely impact historic properties. In cases where there are no State-level agreements or tribal consultation protocols for tribes that have an interest in the activity, NRCS must comply with the provisions of the ACHP Section 106 regulations prior to proceeding to implementation of the action.

A site-specific EE and Section 106 review and consultation should identify the likely presence or absence of historic properties that need further consideration under NHPA. In such cases, historic preservation professionals who meet the Secretary of Interior's professional qualification

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<sup>54</sup> See *NRCS Environmental Policy*, NRCS General Manual Title 190, Part 410.3, <http://directives.sc.gov.usda.gov/viewerFS.aspx?id=666>.

<sup>55</sup> 16 U.S. Code 470 f, as amended.

<sup>56</sup> Nationwide Programmatic Agreement relative to Conservation Assistance, [http://www.nrcs.usda.gov/technical/ECS/culture/PA\\_31.pdf](http://www.nrcs.usda.gov/technical/ECS/culture/PA_31.pdf).

<sup>57</sup> 36 CFR 800.

standards may need to conduct on-site identification and evaluation studies to determine whether there are or are not historic properties within the area of potential effects. If historic properties are present, these same historic preservation professionals must report to NRCS whether there will be an effect and define the nature of the effect. If there is an adverse effect, NRCS must determine whether the undertaking (conservation activity or system) may be moved or modified to avoid effects.

If an historic property would be affected by the proposed conservation activity or system (undertaking), the State Conservationist, SHPO, American Indian Tribes/THPOs, and other consulting parties would consult on the need for project-specific mitigation measures or treatments, including avoidance of adverse effects by slight relocation or redesign of the conservation activity or system, if feasible. If an adverse effect is anticipated, NRCS must submit documentation to the ACHP as part of the Section 106 process, and preparation of an EA or EIS may also be warranted. Documentation may include comments from all the consulting parties and a proposed Memorandum of Agreement agreed upon by all the consulting parties that outline the steps that will be taken to avoid, treat, minimize, or mitigate the adverse effects and afford the ACHP an opportunity to participate in resolution of any potential adverse effects.

#### **4.6.3.2 Endangered Species Act**

For Endangered Species Act (ESA) compliance involving CSP activities, NRCS will conduct Section 7(a)(2) interagency consultation with the appropriate regulatory agency (U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service) when endangered or threatened species or critical habitats are determined to be present. Through the Section 7 process, determinations will be made regarding whether the proposed action will have “no effect” on, is “not likely to adversely affect,” or is “likely to adversely affect” endangered or threatened species. When they are present, determinations will also be made regarding impacts to designated critical habitats.

In some States, NRCS has undertaken Section 7 Programmatic Consultation(s) and has a Programmatic Agreement in place that outlines an agreed upon process. Certain conservation practices or activities may have been pre-determined to be within a category of actions having “no effect” on or “may affect, not likely to adversely affect” (including beneficial effects) endangered or threatened species. However, a Section 7 Programmatic Agreement with the Service(s) may also specify measures that are required to be implemented in conjunction with the proposed conservation activities in order to apply a “no effect” and “may affect, not likely to adversely affect” determination. If such practices or actions are implemented according to the Programmatic Agreement between the agencies, there may be no further need to consult under Section 7 of the ESA.

If a Section 7 Programmatic Agreement is not in effect and the action has the potential for effects (beneficial or adverse), or if the Programmatic has pre-determined that a conservation practice or activity is “likely to adversely affect” an endangered or threatened species, a site-specific Section 7 consultation is needed. This may involve additional analysis and documentation through informal or formal consultation as required by the ESA and preparation of an EA or EIS may also be warranted.

#### 4.6.4 Mitigation and Adaptive Management

As part of the conservation planning process and CSP contract development process, a site-specific EE is prepared and any adverse effects to natural resource concerns are identified and addressed. NRCS recognizes that an activity designed and intended to improve one resource concern may have unintended adverse consequences that can result in the degradation of one or more other resource concerns. The network effects diagrams described in Appendix A include mitigating practices in those situations where unintended adverse impacts have been identified. NRCS staff can use these diagrams to assist them in determining the potential for unintended adverse effects and identification of appropriate mitigating actions in order to comply with NRCS policy to minimize adverse effects, through appropriate avoidance or other mitigating measures, to the extent feasible.<sup>58</sup> Programmatic Agreements also exist in some States that identify appropriate mitigating measures as discussed in Section 4.6.3.

Adaptive management is also an integral part of the conservation planning process. NRCS staff will have contact with landowners throughout the life of the CSP contract and will follow up to ensure that conservation activities are applied to address priority natural resource concerns as agreed to under the contract. Contracts can be modified, as necessary, to obtain the desired outcomes, although additional payments cannot be added during the initial contract period for activities not included in the original contract.

#### 4.6.5 Permits and Permitting

It is not anticipated that Federal, State, tribal, or local permits will be needed for the vast majority of CSP activities, most of which will involve a higher level of management for on-going agricultural and forestry activities. NRCS will evaluate each conservation activity in the development stage at the national and State levels to determine if permits may be required. If permits are needed for an activity, CSP participants will be responsible for obtaining them, and NRCS will not proceed with technical or financial assistance for application of the activity until the permit is obtained as required by NRCS policy.<sup>59</sup>

#### 4.6.6 Cumulative impacts

CEQ regulations stipulate that a cumulative effects analysis be conducted to consider the potential environmental impacts resulting from “the incremental impacts of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency or person undertakes such other actions.”<sup>60</sup> Cumulative effects most likely arise when a relationship exists between a proposed action and other actions expected to occur in a similar location or during a similar time period. An action which overlaps with or is in proximity to other proposed actions would be expected to have more potential for a cumulative effect

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<sup>58</sup> See *NRCS Environmental Policy*, NRCS General Manual Title 190, Part 410.3, <http://directives.sc.gov.usda.gov/viewerFS.aspx?id=666>.

<sup>59</sup> *Compliance with Laws and Regulations*, NRCS General Manual Title 450 Part 405.1, <http://directives.sc.gov.usda.gov/viewerFS.aspx?id=525>.

<sup>60</sup> *CEQ Regulations for Implementing NEPA*, 40 CFR Part 1508.7, <http://ceq.hss.doe.gov/nepa/regs/ceq/1508.htm>.

relationship than actions that are more geographically separated. Similarly, actions that coincide, even partially, in time tend to have potential for cumulative effects.

Cumulative impacts have been identified on the network effects diagrams for NRCS conservation practices. Individual conservation activities and systems result in cumulative effects upon soil, water, air, plants, animals, energy, and humans. Soil erosion reductions are additive. Improvements in water quality are produced by a variety of practices on all land uses. Plant productivity increases from the application of a variety of practices on cropland, pastureland, and forest land. Wildlife benefits occur from practices on all land uses. Agriculture/forestry income stability, community economic returns, and often human health and safety increase cumulatively, as well when conservation practices are applied across the landscape.

Cumulative impacts from other Federal, State, tribal, and local entities might result from:

- Regulatory mandates and statutory requirements;
- Technical assistance provided by NRCS without financial assistance; and
- Financial and technical assistance provided through other conservation programs.

The cumulative total of environmental impacts associated with implementation of CSP is difficult to measure and will vary depending upon the location and timing of application across the landscape. Overall, CSP will have a cumulative positive benefit to the environment both on and off the site where conservation activities are implemented. These cumulative benefits can be enhanced by targeted financial assistance, which focuses assistance on priority resource concerns at the State and local levels as will be done in CSP.

In addition to CSP, there are a number of other voluntary conservation programs that help to conserve, enhance, protect, and improve private and non-Federal lands. A brief overview of the relevant Federal programs is provided below. Other programs could be used on the same or adjacent tracts of agricultural and forestry lands and, therefore, may result in overlapping cumulative effects.

#### **4.6.6.1 Other Farm Bill Programs**

**The Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP)** are designed to establish vegetative cover on environmentally sensitive lands. These voluntary programs have also been characterized as land idling programs designed to idle existing cropland for varying amounts of time. The intent of the programs is to retire marginally productive lands that also contribute significant amounts of pollutants to surface waters when used for agricultural production or provide significant wildlife benefits if idled with appropriate vegetative cover, or both. Land enrolled in CRP/CREP is eligible for CSP after the CRP/CREP contract expires.

**The Wetlands Reserve Program (WRP)** offers incentives to landowners to voluntarily enhance and restore degraded wetlands in exchange for retiring marginal land from agricultural production. A limited amount of adjacent land can be included as a buffer. Three options are

offered to landowners: a permanent easement, a 30-year easement, and a restoration cost share agreement only. Lands enrolled under the permanent easement option are not eligible for enrollment in CSP. Theoretically, lands under a 30-year easement would be eligible when the easement expires. Lands enrolled under a restoration cost-share agreement only would be eligible for CSP at the end of the agreement period, which is typically 10 years.

**The Grassland Reserve Program (GRP)** is targeted toward protecting grassland and shrubland under threat of conversion to other uses. Landowners may voluntarily enroll in permanent (or the maximum allowed under State law) easements or may enroll in a rental contract for 10, 15, or 20 years. Lands enrolled in GRP are not eligible for CSP. However, these lands could become eligible after the rental contract expires.

**The Farm and Ranch Lands Protection Program (FRPP)** helps farmers to keep their land in agricultural use and protect associated conservation values. The voluntary program achieves this aim by purchasing conservation easements that essentially buy up development rights from the landowners. The landowners also agree to implement a conservation plan for any highly erodible land contained in the easement area. Lands enrolled in FRPP are eligible for CSP.

**The Healthy Forest Reserve Program (HFRP)** helps forest land owners to restore, enhance, and protect forest lands. The purposes of the voluntary program are to promote the recovery of threatened and endangered species, improve biodiversity, and enhance carbon sequestration. Like WRP, landowners are offered a variety of easement options and as an option for a cost-share agreement only; and financial assistance is provided to implement practices needed to achieve the purposes of the program. Land enrolled in HFRP is eligible for CSP.

**The Environmental Quality Incentives Program (EQIP)** provides financial and technical assistance to landowners and operators to voluntarily address resource concerns on working agricultural and forestry lands through the installation or implementation of structural and management practices. EQIP offers contracts with a minimum term that ends one year after the implementation of the last scheduled practices and a maximum term of ten years. Payments up to 75 percent of the incurred costs and income foregone of certain conservation practices and activities are provided. NRCS promotes CSP and EQIP as complementary programs. It is anticipated that EQIP may be used by some potential CSP participants to reach stewardship thresholds.

**The Wildlife Habitat Incentives Program (WHIP)** is designed to create high quality wildlife habitats. Special priority is given to projects that support wildlife species of Federal, State, local, or tribal importance. Privately owned agricultural lands, nonindustrial private forest lands, and tribal lands are eligible. NRCS provide technical assistance and up to 75 percent cost-share assistance to establish and improve fish and wildlife habitat through voluntary cost-share agreements that last from one year after the last conservation practice is implemented to a maximum of ten years. Where wildlife habitats have been identified as a priority resource concern, it is possible that WHIP may be used by potential CSP participants to reach wildlife stewardship thresholds so that they may become eligible to participate in CSP.

#### **4.6.6.2 Federal and State Forestry Programs**

The U.S. Forest Service, through its State and Private Forestry (S&PF) mission area provides expert advice, technology, and financial assistance to help landowners and resource managers sustain the Nation's forests and protect communities and the environment from wildland fires. Through grants and cooperative agreements, State forestry agencies and other partners deliver the majority of this landowner assistance through three State and Private Forestry "umbrella" program areas that receive annual Federal appropriations: Forest Health Management, Cooperative Fire Protection, and Cooperative Forestry. Forest Health Management assistance includes conducting suppression, prevention, and management activities on native and non-native insect and disease forest pests and invasive plants. Cooperative Fire Protection programs focus on the urgent need to reduce the threat of wildland fires in wildland-urban interface areas. Assistance is provided to complete community wildfire protection plans and to implement high priority hazard mitigation projects identified in those plans, which often includes non-industrial private forestlands.

Cooperative Forestry Programs include the Forest Stewardship Program and the Forest Legacy Program. The Forest Stewardship Program provides technical and financial assistance to States to encourage the long-term stewardship of NIPF lands. Long-term multi-resource forest stewardship plans provide landowners with the information they need to achieve their unique objectives while sustaining a variety of environmental goods and services including clean air and water, biodiversity, and wildlife habitat. Forest stewardship plans enable landowners to keep their forests in a healthy condition to reduce the risk of wildfire and pest/disease infestations. Forest stewardship plans also contribute to the future supply of forest products from private lands and thus, the health of our rural economies.

The Forest Legacy Program helps protect environmentally important Forest areas that are threatened by conversion to nonforest uses. The program uses conservation easements and other mechanisms to conserve private forests and operates on a "willing seller and willing buyer" basis. Eminent domain or adverse condemnation is not authorized.

#### **4.6.7 Unavoidable Adverse Impacts**

The proposed action (Alternative 2) is not anticipated to cause any direct adverse effects on any resources due to the nature of the national rulemaking actions being considered. Alternative 2 is also not anticipated to result in any indirect or cumulative adverse effects on any resources based on the implementation of conservation activities, as these activities are designed to enhance and improve natural resources. NRCS policy also requires that conservation plans avoid or mitigate unintended adverse environmental impacts to natural resources.

#### **4.6.8 Relationship of Short-Term Use and Long-Term Productivity**

The proposed action (Alternative 2) would have few, if any, adverse short-term impacts to resources. However, unintended short-term adverse impacts would be mitigated to the maximum extent possible and would lead to a higher level of long-term productivity for natural resources. The long-term productivity would result from conservation planning efforts and activities

designed to enhance soil, water, air, plant, animal, and energy resources above the stewardship level.

#### **4.6.9 Irreversible and Irretrievable Commitment of Resources**

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effect that the use of these resources has on future generations. Irreversible effects primarily result from the use or destruction of a specific resource that cannot be replaced within a reasonable timeframe. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action. There will be no irreversible and irretrievable commitments of resources resulting from the national rulemaking process.

### **5.0 Persons and Agencies Consulted**

Susan Andrews	Leader, Soil Quality Team, NRCS East National Technology Support Center, North Carolina
Stefanie Aschmann	Leader, Energy Team, NRCS West National Technology Support Center, Oregon
Bill Boyd	Leader, Manure Management Team, NRCS East National Technology Support Center, North Carolina
Sally Butler	Forester, NRCS, Maine
Frank Clearfield	Leader, Social Science Team, NRCS East National Technology Support Center, North Carolina
Matt Harrington	National Environmental Coordinator, National Headquarters, D.C.
Greg Johnson	Leader, Air Quality Team, NRCS West National Technology Support Center, Oregon
Christopher Jones	State Resource Conservationist, NRCS, Maine
John Long	Economist, NRCS, Maine
Phil McLoud	Agricultural Engineer, NRCS East National Technology Support Center, North Carolina
Jeff Norment	Biologist, NRCS, Maine
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## 6.0 APPENDICES

### Appendix A: Conservation Network Effects Diagrams

To assist in the analysis of environmental impacts, NRCS has developed Network Effects Diagrams depicting the chain of natural resource effects resulting from the application of each conservation practice. Each of the diagrams first identifies the typical setting to which the practice is applied. This includes identification of the predominating land use and the environmental resource concerns that trigger use of the conservation practice. The diagrams then identify the conservation practice used to mitigate or address the resource concerns. One network effects diagram for the NRCS conservation practice standard Nutrient Management is provided below. All of the available network effects diagrams are incorporated by reference and can be viewed at the following website:

[http://www.nrcs.usda.gov/programs/Env\\_Assess/index.html](http://www.nrcs.usda.gov/programs/Env_Assess/index.html).

Following identification of the conservation practice, there is a description of the physical activities that are carried out to implement the practice. From there, the diagrams depict the occurrence of the direct, indirect, and cumulative effects of the practice. Effects are qualified with a "+" or a "-" which qualitatively denotes an increase ("+") or decrease ("-") in the effect. Pluses and minuses do not equate to good and bad or positive and negative. Impacts are characterized in this manner due to the fact that site-specific conditions can influence the degree or intensity of the potential environmental impact. Only the general effects that are considered the most important ones from a national perspective are illustrated.

Additional information on the process used to develop the Network Effects Diagrams is available in the NRCS Watershed Science Institute Report CED-WSSI-2002-2, "Analyzing Effects of Conservation Practices – A Prototypical Method for Complying with National Environmental Policy Act (NEPA) Requirements for Farm Bill Implementation." This document is included in the NRCS National Environmental Compliance Handbook and is available through the NRCS on-line directives system at <http://directives.nrcs.usda.gov/17091.wba>.

## NUTRIENT MANAGEMENT

### PRACTICE INTRODUCTION

**USDA, Natural Resources Conservation Service—Practice Code 590**



### NUTRIENT MANAGEMENT

This practice involves managing the amount, placement, and timing of plant nutrients to obtain optimum yields and minimize the risk of surface and ground water pollution.

### PRACTICE INFORMATION

Nutrient management may be used on any area of land where plant nutrients are applied to enhance yields and maintain or improve chemical and biological condition of the soil. The source of plant nutrients may be from organic wastes, commercial fertilizer, legumes, or crop residue. The objective is to apply the proper amount of nutrients at the proper time to achieve the desired yield and minimize entry of nutrients into surface or ground water supplies.

Planning nutrient management involves the following considerations, among others:

- National, State, and local water quality standards

- Sources and forms of plant nutrients available to the farmer
- Amounts and timing of nutrients based on soil testing, planned yield, and growing season of target plants
- Evaluation of use of crop rotations that enhance efficiency of nutrient utilization and improve soil tilth
- Waste storage requirements and land area requirements for proper management of plant nutrients

### COMMON ASSOCIATED PRACTICES

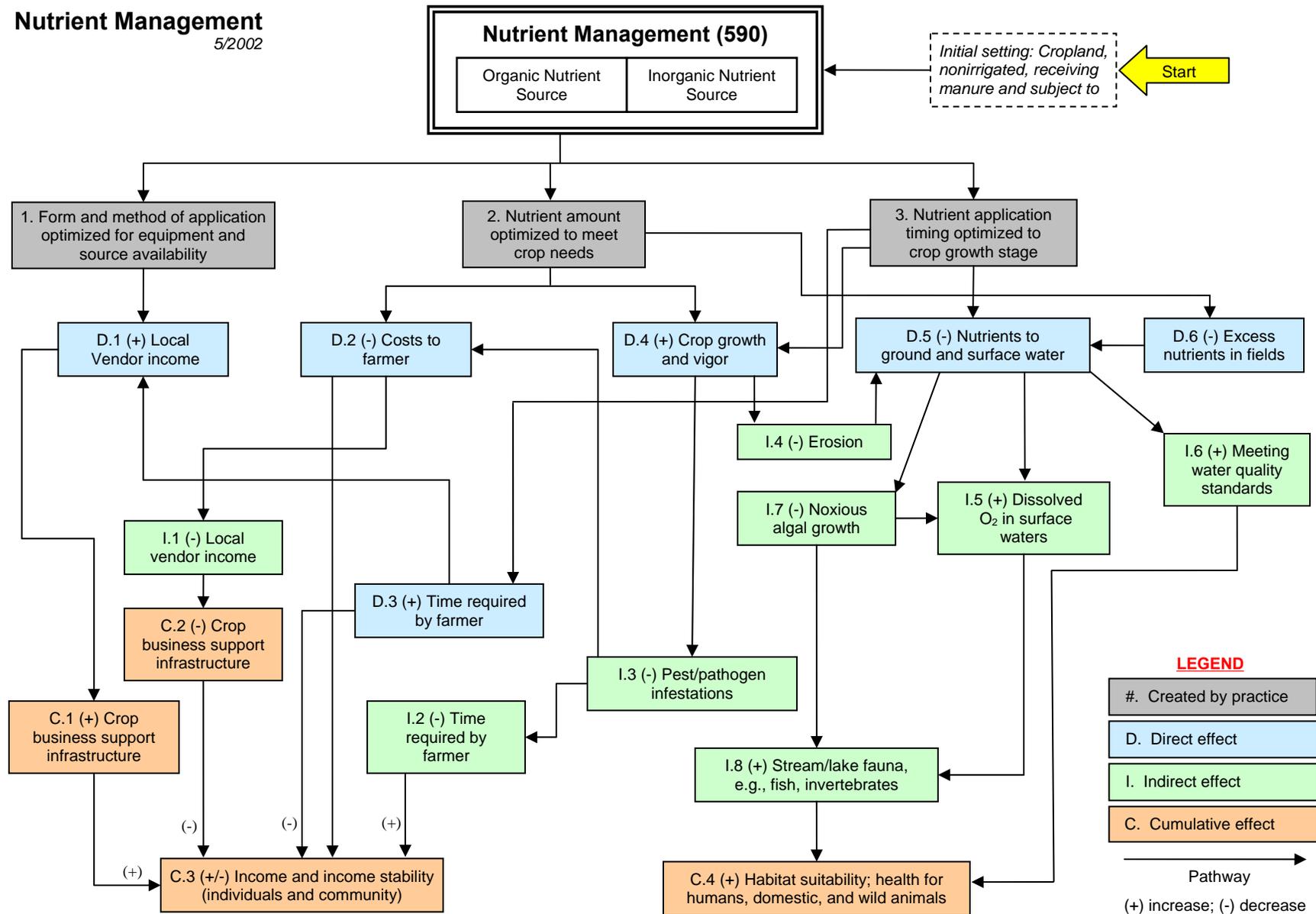
Nutrient Management is commonly used in a Conservation Management System on a variety of land uses with practices such as Pest Management (595), Waste Utilization (633), Irrigation Water Management (449), and Residue Management (344).

For more information, refer to the practice standard in the NRCS Field Office Technical Guide and associated specifications and design criteria.

The following page identifies the effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. All appropriate local, State, tribal, and Federal permits and approvals are the responsibility of the landowners and are presumed to have been obtained. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

# Nutrient Management

5/2002



**Note:** Effects are qualified with a plus (+) or minus (-). These symbols indicate only an increase (+) or a decrease (-) in the effect upon the resource, not whether the effect is beneficial or adverse.

The diagram above identifies the effects expected to occur when this practice is applied according to NRCS practice standards and specifications. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. All appropriate local, State, tribal, and Federal permits and approvals are the responsibility of the landowners and are presumed to have been obtained. All income changes are partially dependent upon market fluctuations which are independent of the conservation practices. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

## **Appendix B: Common Natural Resource Concerns and Mitigating Conservation Activities**

<b>Resource Concern</b>	<b>Conservation Activities To Address Concern</b>
<b>Soil</b>	
Soil Erosion – Sheet and Rill	Alley Cropping (311); Conservation Cover (327); Contour Buffer Strips (332); Contour Farming (330); Contour Orchard and Other Fruit Area (331); Cover Crop (340); Critical Area Planting (342); Heavy Use Area Protection (561); Mulching (484); Multi-Story Cropping (379); Pasture and Hay Planting (512); Prescribed Grazing (528); Range Planting (550); Residue Management (329, 344, 345, 346); Row Arrangement (557); Silvopasture Establishment (381); Stripcropping (585); Terrace (600); Tree and Shrub Establishment (612);Vegetative Barriers (601)
Soil Erosion – Wind	Alley Cropping (311); Conservation Cover (327); Cover Crop (340); Critical Area Planting (342); Cross Wind Ridges (589A); Field Border (386); Heavy Use Area Protection (561); Herbaceous Wind Barriers (603); Mulching (484); Pasture and Hay Planting (512); Prescribed Grazing (528); Range Planting (550); Residue Management (329, 344, 345, 346); Silvopasture Establishment (381); Stripcropping (585); Surface Roughening (609); Tree and Shrub Establishment (612); Windbreak Shelterbelt Establishment and Renovation (380, 650)
Soil Erosion –Ephemeral and Classic Gully	Alley Cropping (311); Cover Crop (340); Critical Area Planting (342); Diversion (362); Field Border (386); Grade Stabilization Structure (410); Grassed Waterway (412); Heavy Use Area Protection (561); Lined Waterway Or Outlet (468); Mulching (484); Pasture and Hay Planting (512); Precision Land Forming (462); Prescribed Grazing (528); Range Planting (550); Roof Runoff Structure (558); Silvopasture Establishment (381); Stripcropping (585); Terrace (600); Tree and Shrub Establishment (612); Underground Outlet (620); Water and Sediment Control Basin (638); Vegetative Barriers (601)
Soil Erosion – Streambank and Shoreline	Access Control (472); Channel Bank Vegetation (322); Channel Stabilization (584); Critical Area Planting (342); Fence (382); Fish Passage (396); Grade Stabilization Structure (410); Heavy Use Area Protection (561); Prescribed Grazing (528); Riparian Forest Buffer (391); Riparian Herbaceous Cover (390); Stream Crossing (578); Stream Habitat Improvement (395); Streambank and Shoreline Protection (580); Watering Facility (614)
Soil Erosion – Irrigation Induced	Aboveground Multi-Outlet Pipeline (431); Cover Crop (340); Irrigation Water Conveyance (430); Irrigation Water Management (449); Irrigation Land Leveling (464); Mulching (484); Residue Management (329, 344, 345, 346); Row Arrangement (557)
Soil Erosion – Road Banks/Construction Sites	Access Control (472); Anionic Polyacrylamide Erosion Control (450); Channel Bank Vegetation (322); Channel Stabilization (584); Critical Area Planting (342); Fence (382); Grade Stabilization Structure (410); Heavy Use Area Protection (561); Lined Waterway Or Outlet (468); Mulching (484);Sediment Basin (350); Stream Crossing (578); Underground Outlet (620);Water and Sediment Control Basin (638)
Soil Condition – Organic Matter Depletion	Alley Cropping (311); Conservation Cover (327); Conservation Crop Rotation (328); Contour Farming (330); Contour Orchard and Other Fruit Area (331); Cover Crop (340); Critical Area Planting (342); Multi-Story Cropping (379); Mulching (484); Pasture and Hay Planting (512); Prescribed Grazing (528); Range Planting (550); Residue Management (329, 344, 345, 346); Silvopasture Establishment (381); Stripcropping (585); Tree and Shrub Establishment (612); Waste Utilization (633); Windbreak Shelterbelt Establishment and Renovation (380, 650)
Soil Condition – Compaction	Access Control (472); Conservation Cover (327); Critical Area Planting (342); Deep Tillage (324); Grazing Land Mechanical Treatment (548); Prescribed Grazing (528); Range Planting (550); Residue Management (329, 344, 345, 346)

<b>Resource Concern</b>	<b>Conservation Activities To Address Concern</b>
<b>Soil</b>	
Soil Condition – Contaminants (Salts, Pesticides, and Other Chemicals)	Agrichemical Handling Facility (309); Conservation Crop Rotation (328); Cover Crop (340); Field Border (386); Filter Strip (393); Irrigation System, Sprinkler (442); Irrigation Water Management (449); Nutrient Management (590); Pasture and Hay Planting (521); Pest Management (595); Salinity and Sodic Soil Management (610); Subsurface Drain (606)
Soil Condition – Nutrient Cycling (Animal Manures and Other Organics, Commercial Fertilizer)	Agrichemical Handling Facility (309); Alley Cropping (311); Conservation Cover (327); Conservation Crop Rotation (328); Cover Crop (340); Feed Management (592); Multi-Story Cropping (379); Nutrient Management (590); Pasture and Hay Planting (521); Prescribed Grazing (528); Riparian Forest Buffer (391); Tree/Shrub Establishment (612)
<b>Water</b>	
Water Quantity: Excessive Water	Cover Crop (340); Dam (402); Dam, Diversion (348); Dike (356); Diversion (362); Drainage Water Management (554); Grassed Waterway (412); Hillside Ditch (423); Land Smoothing (466); Lined Waterway Or Outlet (468); Open Channel (582); Precision Land Forming (462); Pumping Plant (533); Spring Development (574); Structure For Water Control (587); Subsurface Drain (606); Surface Drainage, Field Ditch (607); Surface Drainage, Main or Lateral (608); Underground Outlet (620); Water and Sediment Control Basin (638); Wetland Creation, Enhancement and Restoration (658, 659, 657)
Water Quantity: Insufficient Water	Cover Crop (340); Dike (356); Diversion (362); Irrigation Storage Reservoir (436); Irrigation System, Microirrigation (441); Irrigation System, Sprinkler (442); Irrigation System, Tailwater Recovery (447); Irrigation Water Conveyance (428 and 430); Irrigation Water Management (449); Mulching (484); Obstruction Removal (500); Pumping Plant (533); Spring Development (574); Structure For Water Control (587); Water Harvesting Catchment (636); Water Spreading (640); Water Well (642); Watering Facility (614)
Water Quantity: Inefficient Use Of Water	Aboveground, Multi-Outlet Pipeline (431); Dam (402); Dam, Diversion (348); Irrigation Land Leveling (464); Irrigation Regulating Reservoir (552); Irrigation Storage Reservoir (436); Irrigation System (441, 442, 443, 447); Irrigation Water Management (449); Land Smoothing (466); Mulching (484); Pond Sealing or Lining (521A-D); Pumping Plant (533); Residue Management (329, 344, 345, 346); Row Arrangement (557); Spring Development (574); Structure For Water Control (587); Water Well (642); Windbreak Shelterbelt Establishment and Renovation (380, 650)
Water Quality: Pesticides In Surface and Ground Water	Agrichemical Handling Facility (309); Conservation Cover (327); Cover Crop (340); Filter Strip (393); Irrigation System, Microirrigation (441); Irrigation System, Tailwater Recovery (447); Irrigation Water Management (449); Pest Management (595); Prescribed Grazing (528); Riparian Forest Buffer (391); Riparian Herbaceous Cover (390); Stripcropping (585); Vegetated Treatment Area (635)
Water Quality: Nutrients and Pathogens In Surface and Ground Water	Agrichemical Handling Facility (309); Contour Farming (330); Cover Crop (340); Feed Management (592); Filter Strip (393); Heavy Use Area Protection (562); Irrigation Water Management (449); Nutrient Management (590); Riparian Forest Buffer (391); Riparian Herbaceous Cover (390); Stream Crossing (578); Stripcropping (585); Vegetated Treatment Area (635)
Water Quality: Suspended Sediment In Surface Water	Alley Cropping (311); Conservation Cover (327); Contour Farming (330); Contour Orchard and Other Fruit Area (331); Cover Crop (340); Critical Area Planting (342); Filter Strip (393); Irrigation Water Management (449); Lined Waterway Or Outlet (468); Mulching (484); Prescribed Forestry (409); Residue Management (329, 344, 345, 346); Riparian Forest Buffer (391); Riparian Herbaceous Cover (390); Sediment Basin (350); Stream Crossing (578); Streambank and Shoreline Protection (580); Stripcropping (585); Terrace (600); Tree and Shrub Establishment (612); Vegetated Treatment Area (635); Vegetative Barriers (601); Water and Sediment Control Basin (638)

Resource Concern	Conservation Activities To Address Concern
<b>Air</b>	
Air Quality: Particulate Matter (PM)	Alley Cropping (311); Anionic Polyacrylamide Erosion Control (450); Atmospheric Resources Quality Management (370); Conservation Cover (327); Cover Crop (340); Feed Management (592); Firebreak (394); Forest Slash Treatment (384); Forest Stand Improvement (666); Fuel Break (383); Hedgerow Planting (422); Herbaceous Wind Barriers (603); Irrigation Water Management (449); Mulching (484); Nutrient Management (590); Prescribed Burning (338); Prescribed Grazing (528); Pumping Plant (533); Residue Management (329, 344, 345, 346); Stripcropping (585); Surface Roughening (609); Waste Facility Cover (367); Windbreak/Shelterbelt Establishment and Renovation (380, 650)
Air Quality: Ozone Precursors	Atmospheric Resources Quality Management (370); Firebreak (394); Forest Slash Treatment (384); Forest Stand Improvement (666); Fuel Break (383); Nutrient Management (590); Pest Management (595); Prescribed Burning (338); Pumping Plant (533)
Air Quality: Greenhouse Gases (CO <sub>2</sub> , N <sub>2</sub> O, CH <sub>4</sub> )	Alley Cropping (311); Atmospheric Resource Quality Management (370); Conservation Cover (327); Cover Crop (340); Feed Management (592); Firebreak (394); Forest Slash Treatment (384); Forest Stand Improvement (666); Fuel Break (383); Hedgerow Planting (422); Nutrient Management (590); Residue Management (329, 344, 345, 346); Riparian Forest Buffer (391); Stripcropping (585); Tree/Shrub Establishment (612); Waste Facility Cover (367)
Air Quality: Odors	Amendments for Treatment of Agricultural Waste (591); Atmospheric Resources Quality Management (370); Composting Facility (317); Conservation Cover (327); Cover Crop (340); Feed Management (592); Hedgerow Planting (422); Nutrient Management (590); Waste Facility Cover (367); Waste Utilization (633); Windbreak/Shelterbelt Establishment and Renovation (380, 650)
Air Quality: Chemical Spray Drift	Alley Cropping (311); Atmospheric Resources Quality Management (370); Nutrient Management (590); Pest Management (595); Windbreak/Shelterbelt Establishment and Renovation (380, 650)
<b>Plants</b>	
Plant Condition: Quantity, Diversity, Health, and Vigor	Access Control (472); Alley Cropping (311); Brush Management (314); Conservation Crop Rotation (328); Cover Crop (340); Early Successional Habitat Development/Management (647); Field Border (386); Firebreak (394); Forage Harvest Management (511); Forest Slash Treatment (384); Forest Stand Improvement (666); Forest Trails & Landings (655); Fuel Break (383); Hedgerow Planting (422); Irrigation System, Microirrigation (441); Irrigation System, Sprinkler (442); Irrigation Water Management (449); Multi-Story Cropping (379); Mulching (484); Nutrient Management (590); Pasture and Hay Planting (512); Pest Management (595); Prescribed Burning (338); Prescribed Forestry (409); Prescribed Grazing (528); Range Planting (550); Riparian Forest Buffer (391); Salinity and Sodic Soil Management (610); Silvopasture Establishment (381); Tree/Shrub Establishment (612); Tree/Shrub Pruning (660); Tree/Shrub Site Prep (490); Upland Wildlife Habitat Management (645); Wetland Creation, Enhancement and Restoration (658, 659, 657); Wetland Wildlife Habitat Management (644)
Plant Condition: Threatened, Endangered, and Declining Species	Forest Stand Improvement (666); Pest Management (595); Prescribed Burning (338); Prescribed Grazing (528); Restoration and Management Of Rare and Declining Habitats (643); Upland Wildlife Habitat Management (645); Wetland Enhancement (659); Wetland Restoration (657); Wetland Wildlife Habitat Management (644)

Resource Concern	Conservation Activities To Address Concern
<b>Animals</b>	
Terrestrial Wildlife: Adequate Cover, Food, Connectivity, and Water	Access Control (472); Brush Management (314); Conservation Cover (327); Early Successional Habitat Development/Management (647); Field Border (386); Forage Harvest Management (511); Forest Stand Improvement (666); Hedgerow Planting (422); Pasture and Hay Planting (512); Pest Management (595); Prescribed Burning (338); Prescribed Forestry (409); Prescribed Grazing (528); Range Planting (550); Restoration and Management of Rare and Declining Habitats (643); Riparian Forest Buffer (391); Riparian Herbaceous Cover (390); Shallow Water Development and Management (646); Silvopasture Establishment (381); Tree/Shrub Establishment (612); Upland Wildlife Habitat Management (645); Watering Facility (614); Wetland Creation, Enhancement and Restoration (658, 659, 657); Wetland Wildlife Habitat Management (644); Windbreak/Shelterbelt Establishment (380)
Aquatic Animals: Structure, Cover, Food, Connectivity, and Favorable Water Temperatures	Access Control (472); Channel Bank Vegetation (322); Fish Passage (396); Nutrient Management (590); Pest Management (595); Prescribed Grazing (528); Restoration and Management Of Rare and Declining Habitats (643); Riparian Forest Buffer (391); Riparian Herbaceous Cover (390); Shallow Water Development and Management (646); Stream Habitat Improvement and Management (395); Streambank and Shoreline Protection (580); Wetland Creation, Enhancement and Restoration (658, 659, 657); Wetland Wildlife Habitat Management (644); Windbreak/Shelterbelt Establishment (380)
Fish and Wildlife: Threatened, Endangered, and Declining Species	Access Control (472); Brush Management (314); Early Successional Habitat Development (647); Fish Passage (396); Forest Stand Improvement (666); Prescribed Forestry (409); Prescribed Grazing (528); Restoration and Management of Declining Habitats (643); Shallow Water Management For Wildlife (646); Stream Habitat Improvement and Management (395); Streambank and Shoreline Protection (580); Upland Wildlife Habitat Management (645); Watering Facility (614); Wetland Enhancement (659); Wetland Restoration (657); Wetland Wildlife Habitat Management (644)
Domestic Animals: Cover, Food, and Water	Animal Trails and Walkways (575); Brush Management (314); Feed Management (592); Fence (382); Forage Harvest Management (511); Heavy Use Area Protection (561); Nutrient Management (590); Pasture and Hay Planting (512); Pest Management (595); Pond (378); Prescribed Burning (338); Prescribed Grazing (528); Pumping Plant (533); Range Planting (550); Riparian Forest Buffer (391); Pipeline (516); Silvopasture Establishment (381); Spring Development (574); Stream Crossing (578); Watering Facility (614); Windbreak/Shelterbelt Establishment (380)
<b>Energy</b>	
Energy: Conservation	Conservation Crop Rotation (328); Cover Crop (340); Irrigation System – Sprinkler (442); Irrigation System – Tailwater Recovery (447); Irrigation Water Management (449); Mulching (484); Nutrient Management (590); Pipeline (516); Prescribed Grazing (528); Pumping Plant (533); Residue Management (329, 344, 345, 346); Spring Development (574); Stream Crossing (578); Waste Utilization (633); Windbreak/Shelterbelt Establishment and Renovation (380, 650)
Energy: Renewable Energy	Pumping Plant (533); Silvopasture Establishment (381); Tree/Shrub Establishment (612); Waste Facility Cover (367); Waste Utilization (633)

## Appendix C: Examples of CSP Enhancements

### Possible Cropland Enhancements

Resource Concern	Enhancement	Associated Practice (Code)
<b>Soil Erosion</b>	<ol style="list-style-type: none"> <li>1) Use continuous no-till and maintain a high level of residue through critical erosion periods</li> <li>2) Establish conservation cover on culturally significant sites to protect cultural resources</li> </ol>	<ol style="list-style-type: none"> <li>1) Residue &amp; Tillage Management (329)</li> <li>2) Conservation Cover (327)</li> </ol>
<b>Soil Quality</b>	<ol style="list-style-type: none"> <li>1) Implement a controlled traffic system</li> <li>2) Manage soil and or surface water levels to: <ul style="list-style-type: none"> <li>• Reduce soil oxidation and/or reduce wind erosion or PM</li> <li>• Reduce nutrients or pathogens or pesticides in surface water</li> </ul> </li> <li>3) Increase residue levels by 10%</li> <li>4) Utilize cover crops to improve soil quality: <ul style="list-style-type: none"> <li>• Implement continuous cover crops</li> <li>• Use cover crop mixes that contain two or more different species of cover crops, including at least one legume and a high C to N ratio crop</li> </ul> </li> <li>5) Use deep rooted crops to break up pans in the soil to improve internal drainage</li> </ol>	<ol style="list-style-type: none"> <li>1) Controlled Traffic (325-<i>new</i>)</li> <li>2) Drainage Water Management (554)</li> <li>3) Residue &amp; Tillage Management (329, 345, 346)</li> <li>4) Cover Crop (340)</li> <li>5) Conservation Crop Rotation (328)</li> </ol>
<b>Water Quality</b>	<ol style="list-style-type: none"> <li>1) Manage nutrient application: <ul style="list-style-type: none"> <li>• Use stalk and/or leaf tissue tests to adjust nitrogen application rates</li> <li>• Apply nutrients (fertilizer, manure, etc.) no more than 30 days prior to the planned planting date of the crop</li> <li>• Apply only slow-release or controlled-release formulations of nitrogen</li> <li>• Apply 50 percent or more of the total nitrogen required by the crop after crop emergence</li> <li>• Apply split applications of nitrogen based on a Pre-Sidedress Nitrogen Test</li> <li>• Apply all phosphorus fertilizer at least 3 inches deep and/or as 2x2 starter fertilizer</li> <li>• Use precision application technology to apply nutrients to fit the variations in site-specific conditions found within fields</li> </ul> </li> <li>2) Use cover crops to manage nutrients: <ul style="list-style-type: none"> <li>• Plant a grass-type cover crop that will scavenge nitrogen left in the soil after the harvest of a previous crop</li> <li>• Follow fall manure application with a winter cover crop</li> </ul> </li> <li>3) Use a roller crimper to kill cover crops, eliminating herbicide use, or plant a cool season crop that will die back naturally as summer crops grow</li> </ol>	<ol style="list-style-type: none"> <li>1) Nutrient Management (590)</li> <li>2) Cover Crop (340)</li> <li>3) Residue &amp; Tillage Management (329, 345, 346), Cover Crop (340)</li> </ol>

Resource Concern	Enhancement	Associated Practice (Code)
	4) Use high level Integrated Pest Management to reduce pesticide environmental hazard and only apply the lowest hazard pesticide available when an economic threshold has been exceeded 5) Field apply only manure that has been treated to stabilize nutrients and reduce odors and pathogens 6) Produce at least 70% of the operation's nitrogen needs through the use of cover crops or manure 7) Grow at least 75% of feed for livestock on the farm and use manure from the livestock to supply at least 50% of N, 90% of P and K for crops grown on the farm	4) Pesticide Hazard Mitigation (596–new) 5) Waste Utilization (633) 6) Cover Crops (340), Nutrient Management (590), Waste Utilization (633) 7) Nutrient Management (590), Waste Utilization (633)
<b>Water Quantity</b>	1) Implement a high level of irrigation water management: <ul style="list-style-type: none"> <li>• Use flow measurement devices to quantify irrigation water use and control number of applications and amount of water applied</li> <li>• Monitor soil moisture and crop evapotranspiration to schedule application</li> <li>• Use a soil moisture monitoring system with remote access to download soil moisture data</li> <li>• Implement GPS guided variable rate irrigation or other innovative automation technologies that allow application based on variable site conditions within a field</li> <li>• Use data from a regional weather network to improve irrigation scheduling</li> </ul> 2) Perform an evaluation of an existing irrigation pumping plant and implement items needed to improve efficiency of pumping 3) Implement the use of plastic or fiber mulch on the soil surface	1) Irrigation Water Management (449) 2) Pumping Plant (533), Irrigation Water Management (449) 3) Mulching (484)
<b>Air Quality</b>	1) Control particulate matter emissions: <ul style="list-style-type: none"> <li>• Use dust control treatment on unpaved roads and heavy use areas</li> <li>• Replace oil- and wood-fired heaters in orchards and vineyards with clean technologies</li> <li>• Replace burning of prunings, removals and other crop residues with chipping, grinding, etc.</li> </ul> 2) Manage nutrient applications to protect air quality: <ul style="list-style-type: none"> <li>• Inject or incorporate manure</li> <li>• Use nitrification inhibitors</li> </ul> 3) Reduce pesticide hazard to non-target organisms and habitats: <ul style="list-style-type: none"> <li>• Use drift reducing technologies</li> <li>• Use electronically-controlled or managed chemical spray application technology</li> </ul>	1) Atmospheric Resource Quality Management (370) 2) Nutrient Management (590) 3) Pest Management (595)

<b>Resource Concern</b>	<b>Enhancement</b>	<b>Associated Practice (Code)</b>
<b>Plants</b>	<ol style="list-style-type: none"> <li>1) Establish pollinator habitat (nectar and pollen producing plants) in non-cropped areas</li> <li>2) Renovate a windbreak or shelterbelt for wildlife habitat</li> </ol>	<ol style="list-style-type: none"> <li>1) Upland Wildlife Habitat Management (645)</li> <li>2) Windbreak / Shelterbelt Renovation (650)</li> </ol>
<b>Animals</b>	<ol style="list-style-type: none"> <li>1) Defer crop production on temporary or seasonal wetlands until after spring migration</li> <li>2) Extend existing buffers <ul style="list-style-type: none"> <li>• Filter strips</li> <li>• Riparian areas</li> <li>• Field borders</li> </ul> </li> <li>3) Manage non-forested riparian zones to achieve stream side cover and vegetative diversity and structure</li> <li>4) Manage forested riparian zones to achieve stream side cover and vegetative diversity and structure</li> <li>5) Manage upland vegetation to improve wildlife habitat and/or protect nesting/brooding wildlife: <ul style="list-style-type: none"> <li>• Improve the plant diversity and structure of non-cropped areas for wildlife food and habitat</li> <li>• Harvest hay in a manner that allows the wildlife to flush and escape from the field and avoid injury from equipment</li> <li>• Harvest crops using a combine with a stripper header to leave residue at least 18" tall</li> <li>• Establish wildlife corridors</li> <li>• Manage silvopastures to promote plant diversity for wildlife habitat</li> </ul> </li> <li>6) Construct, manage or renovate small, shallow wetland sites to encourage water to remain seasonally</li> <li>7) Manage soil/surface water depth to provide seasonal wildlife habitat</li> </ol>	<ol style="list-style-type: none"> <li>1) Wetland Enhancement (659)</li> <li>2) Filter Strip (393), Riparian Herbaceous Cover (390), Riparian Forest Buffer (391), Field Border 386)</li> <li>3) Riparian Herbaceous Cover (390)</li> <li>4) Riparian Forest Buffer (391)</li> <li>5) Upland Wildlife Habitat Management (645), Silvopasture Establishment (381)</li> <li>6) Wetland Wildlife Habitat Management (646)</li> <li>7) Drainage Water Management (554)</li> </ol>
<b>Energy</b>	<ol style="list-style-type: none"> <li>1) Use renewable energy – solar or wind - to power a pumping plant for irrigation, drainage or wildlife</li> <li>2) Reduce field operations to achieve a fuel savings of 20 percent or greater</li> <li>3) Recycle all lubricants used on the farm</li> <li>4) At least 85% of nutrients needed for crops come from sources within 100 miles of the farm, and products from the farm are marketed within 100 miles of the farm</li> </ol>	<ol style="list-style-type: none"> <li>1) Pumping Plant (533)</li> <li>2) Conservation Crop Rotation (328)</li> </ol>

## Possible Pasture Enhancements

Resource Concern	Enhancement	Associated Practice (code)
<b>Soil Erosion</b>	1) Establish conservation cover on culturally significant sites to protect cultural resources	1) Conservation Cover (327)
<b>Water Quality</b>	1) Use biological suppression techniques to manage brush 2) Use biological suppression techniques to manage herbaceous weeds 3) Provide additional management of livestock: <ul style="list-style-type: none"> <li>• Rotate supplementation and feeding areas to improve livestock distribution and reduce localized areas of disturbance</li> <li>• Manage livestock access to water bodies</li> </ul> 4) Manage nutrient application: <ul style="list-style-type: none"> <li>• Apply only slow-release or controlled-release formulations of nitrogen</li> <li>• Use precision application technology to apply nutrients to fit the variations in site-specific conditions found within fields</li> </ul> 5) Use high level Integrated Pest Management to reduce pesticide environmental hazard and only apply the lowest hazard pesticide available when an economic threshold has been exceeded 6) Field apply only manure that has been treated to stabilize nutrients and reduce odors and pathogens 7) Produce at least 70% of the operation's nitrogen needs through the use of cover crops or the manure 8) Grow at least 75% of feed for livestock on the farm and use manure from the livestock to supply at least 50% of N, 90% of P and K for crops grown on the farm	1) Brush Management (314) 2) Herbaceous Weed Control (315- <i>new</i> ) 3) Prescribed Grazing (528) 4) Nutrient Management (590) 5) Pesticide Hazard Mitigation (596- <i>new</i> ) 6) Waste Utilization (633) 7) Cover Crops (340), Nutrient Management (590), Waste Utilization (633)
<b>Water Quantity</b>	1) Implement a high level of irrigation water management: <ul style="list-style-type: none"> <li>• Use flow measurement devices to quantify irrigation water use and control number of applications and amount of water applied</li> <li>• Monitor soil moisture and crop evapotranspiration to schedule application</li> <li>• Use a soil moisture monitoring system with remote access to download soil moisture data</li> <li>• Implement GPS guided variable rate irrigation or other innovative automation technologies that allow application based on variable site conditions within a field</li> <li>• Use data from a regional weather network to improve irrigation scheduling</li> </ul> 2) Perform an evaluation of an existing irrigation pumping plant and implement items needed to improve efficiency of pumping	1) Irrigation Water Management (449) 2) Pumping Plant (533), Irrigation Water Management (449)

<b>Resource Concern</b>	<b>Enhancement</b>	<b>Associated Practice (code)</b>
<b>Air Quality</b>	<ol style="list-style-type: none"> <li>1) Use dust control treatment on unpaved roads and heavy use areas to control PM emissions</li> <li>2) Use nitrification inhibitors</li> <li>3) Reduce pesticide hazard to non-target organisms and habitats: <ul style="list-style-type: none"> <li>• Use drift reducing technologies</li> <li>• Use electronically-controlled or managed chemical spray application technology</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1) Atmospheric Resource Quality Management (370)</li> <li>2) Nutrient Management (590)</li> <li>3) Pest Management (595)</li> </ol>
<b>Plants</b>	<ol style="list-style-type: none"> <li>1) Establish pollinator habitat (nectar and pollen producing plants) in non-cropped areas</li> <li>2) Monitor key grazing areas to determine if meeting management goals and objectives</li> <li>3) Renovate a windbreak or shelterbelt for wildlife habitat</li> </ol>	<ol style="list-style-type: none"> <li>1) Upland Wildlife Habitat Management (645)</li> <li>2) Prescribed Grazing (528)</li> <li>3) Windbreak / Shelterbelt Renovation (650)</li> </ol>
<b>Animals</b>	<ol style="list-style-type: none"> <li>1) Incorporate native grasses and /or forbs into 15% or more of pasture/hayland forage base</li> <li>2) Extend existing buffers <ul style="list-style-type: none"> <li>• Filter strips</li> <li>• Riparian areas</li> <li>• Field borders</li> </ul> </li> <li>3) Manage non-forested riparian zones to achieve stream side cover and vegetative diversity and structure</li> <li>4) Manage forested riparian zones to achieve stream side cover and vegetative diversity and structure</li> <li>5) Manage upland vegetation to improve wildlife habitat and/or protect nesting/brooding wildlife: <ul style="list-style-type: none"> <li>• Improve the plant diversity and structure of non-cropped areas for wildlife food and habitat</li> <li>• Harvest hay in a manner that allows the wildlife to flush and escape from the field and avoid injury from equipment</li> <li>• Establish wildlife corridors</li> </ul> </li> <li>6) Implement a grazing management plan that will allow for rest periods to provide adequate residue for nesting/fawning cover and increase diversity of vegetation structure</li> <li>7) Manage silvopastures to promote plant diversity for wildlife habitat</li> <li>8) Use prescribed burning to create patches of different vegetation structure and species composition</li> <li>9) Construct, manage or renovate small, shallow wetland sites to encourage water to remain seasonally</li> <li>10) Retrofit existing watering facilities to allow for escape of wildlife</li> <li>11) Apply results of decision support system NUTBAL PRO to improve livestock-forage balance</li> </ol>	<ol style="list-style-type: none"> <li>1) Pasture and Hayland Planting (512)</li> <li>2) Filter Strip (393), Riparian Herbaceous Cover (390), Riparian Forest Buffer (391), Field Border 386)</li> <li>3) Riparian Herbaceous Cover (390)</li> <li>4) Riparian Forest Buffer (391)</li> <li>5) Upland Wildlife Habitat Management (645)</li> <li>6) Prescribed Grazing (528)</li> <li>7) Silvopasture Establishment (381)</li> <li>8) Prescribed Burning (338)</li> <li>9) Wetland Wildlife Habitat Management (646)</li> <li>10) Watering Facility (614)</li> <li>11) Prescribed Grazing (528)</li> </ol>

<b>Resource Concern</b>	<b>Enhancement</b>	<b>Associated Practice (code)</b>
<b>Energy</b>	<ol style="list-style-type: none"> <li>1) Replace electric fence charging system with solar powered system</li> <li>2) Use a renewable energy source to power a pumping plant; replace a non-renewable energy source for a pumping plant with a renewable source</li> <li>3) Recycle all lubricants used on the farm</li> <li>4) At least 85% of nutrients needed for livestock come from sources within 100 miles of the farm, and products from the farm are marketed within 100 miles of the farm</li> </ol>	<ol style="list-style-type: none"> <li>1) Fence (382)</li> <li>2) Pumping Plant (533)</li> </ol>

## Possible Range Enhancements

<b>Resource Concern</b>	<b>Enhancement</b>	<b>Associated Practice (code)</b>
<b>Soil Erosion</b>	1) Establish conservation cover on culturally significant sites to protect cultural resources	1) Conservation Cover (327)
<b>Water Quality</b>	1) Use biological suppression techniques to manage brush 2) Use biological suppression techniques to manage herbaceous weeds 3) Provide additional management of livestock: <ul style="list-style-type: none"> <li>• Rotate supplementation and feeding areas to improve livestock distribution and reduce localized areas of disturbance</li> <li>• Manage livestock access to water bodies</li> </ul> 4) Use high level Integrated Pest Management to reduce pesticide environmental hazard and only apply the lowest hazard pesticide available when an economic threshold has been exceeded	1) Brush Management (314) 2) Herbaceous Weed Control (315- <i>new</i> ) 3) Prescribed Grazing (528) 4) Pesticide Hazard Mitigation (596- <i>new</i> )
<b>Air Quality</b>	1) Use dust control treatment on unpaved roads and heavy use areas to control PM emissions	1) Atmospheric Resource Quality Management (370)
<b>Plants</b>	1) Establish pollinator habitat (nectar and pollen producing plants) in non-cropped areas 2) Monitor key grazing areas to determine if meeting management goals and objectives	1) Upland Wildlife Habitat Management (645) 2) Prescribed Grazing (528)
<b>Animals</b>	1) Extend existing buffers <ul style="list-style-type: none"> <li>• Filter strips</li> <li>• Riparian areas</li> </ul> 2) Manage non-forested riparian zones to achieve stream side cover and vegetative diversity and structure 3) Manage forested riparian zones to achieve stream side cover and vegetative diversity and structure to improve fish and wildlife habitat 4) Implement a grazing management plan that will allow for rest periods to provide adequate residue for nesting/fawning cover and increase diversity of vegetation structure 5) Establish wildlife corridors 6) Use prescribed burning to create patches of different vegetation structure and species composition 7) Construct, manage or renovate small, shallow wetland sites to encourage water to remain seasonally 8) Retrofit existing watering facilities to allow for escape of wildlife 9) Apply results of decision support system NUTBAL PRO to improve livestock-forage balance	1) Filter Strip (393), Riparian Herbaceous Cover (390), Riparian Forest Buffer (391) 2) Riparian Herbaceous Cover (390) 3) Riparian Forest Buffer (391) 4) Prescribed Grazing (528) 5) Upland Wildlife Habitat Management (645) 6) Prescribed Burning (338) 7) Wetland Wildlife Habitat Management (646) 8) Watering Facility (614) 9) Prescribed Grazing (528)

<b>Resource Concern</b>	<b>Enhancement</b>	<b>Associated Practice (code)</b>
<b>Energy</b>	1) Replace electric fence charging system with solar powered system 2) Use renewable energy – solar or wind - to power a pumping plant for irrigation, drainage or wildlife 3) Recycle all lubricants used on the farm 4) At least 85% of nutrients needed for livestock come from sources within 100 miles of the farm, and products from the farm are marketed within 100 miles of the farm	1) Fence (382) 2) Pumping Plant (533)

### **Possible Non-Industrial Forest Enhancements**

<b>Resource Concern</b>	<b>Enhancement</b>	<b>Practice (code)</b>
<b>Soil Erosion</b>	1) Establish conservation cover on culturally significant sites to protect cultural resources	1) Conservation Cover (327)
<b>Water Quality</b>	1) Use biological suppression techniques to manage brush 2) Use biological suppression techniques to manage herbaceous weeds 3) Provide additional management of livestock: <ul style="list-style-type: none"> <li>• Rotate supplementation and feeding areas to improve livestock distribution and reduce localized areas of disturbance</li> <li>• Manage livestock access to water bodies</li> </ul> 4) Use high level Integrated Pest Management to reduce pesticide environmental hazard and only apply the lowest hazard pesticide available when an economic threshold has been exceeded	1) Brush Management (314) 2) Herbaceous Weed Control (315- <i>new</i> ) 3) Prescribed Grazing (528) 4) Pesticide Hazard Mitigation (596 – <i>new</i> )
<b>Air Quality</b>	1) Use dust control treatment on unpaved roads and heavy use areas to control PM emissions	1) Atmospheric Resource Quality Management (370)
<b>Plants</b>	1) Establish pollinator habitat (nectar and pollen producing plants) in non-cropped areas 2) Monitor key grazing areas to determine if meeting management goals and objectives 3) Pre-treat vegetation and fuels with mechanical/manual methods to facilitate future treatment with prescribed fire 4) Apply prescribed fire to restore native forest condition 5) Manipulate species composition, structure, and canopy cover to maintain a desired native plant community	1) Upland Wildlife Habitat Management (645) 2) Prescribed Grazing (528) 3) Forest Stand Improvement (666) 4) Prescribed Burning (338) 5) Multi-Story Cropping (379)

<b>Resource Concern</b>	<b>Enhancement</b>	<b>Practice (code)</b>
<b>Animals</b>	1) Extend existing buffers <ul style="list-style-type: none"> <li>• Riparian Herbaceous Cover</li> <li>• Riparian Forest Buffer</li> </ul> 2) Manage forested riparian zones to achieve stream side cover and vegetative diversity and structure to improve fish and wildlife habitat           3) Establish wildlife corridors           4) Manage silvopastures to promote plant diversity for wildlife habitat           5) Use prescribed burning to create patches of different vegetation structure and species composition           6) Increase snags, den trees, and coarse woody debris on forest floor           7) Retrofit existing watering facilities to allow for escape of wildlife	1) Riparian Herbaceous Cover (390), Riparian Forest Buffer (391) 2) Riparian Forest Buffer (391)  3) Upland Wildlife Habitat Management (645) 4) Silvopasture Establishment (381) 5) Prescribed Burning (338)  6) Forest Stand Improvement (666) 7) Watering Facility (614)
<b>Energy</b>	1) Replace electric fence charging system with solar powered system 2) Recycle all lubricants used on the farm 3) At least 85% of nutrients needed for crops and/or livestock come from sources within 100 miles of the farm, and products from the farm are marketed within 100 miles of the farm	1) Fence (382)