Improving Grassland Health & Little Bluestem Management

Through Livestock Water, Fence & Grazing Management

COTTONWOOD CREEK WATERSHEDS
WIBAUX COUNTY, MONTANA

USDA NRCS WIBAUX FIELD OFFICE

Contents

OVERVIEW

As part of Montana Natural Resource Conservation Service (NRCS)'s Focused Conservation efforts, this Targeted Implementation Plan (TIP) was developed to address priority resource concerns identified by the Wibaux County Local Work Group (LWG) and outlined in the Wibaux County Field Office's Long-Range Plan (LRP), pages 33 and 34.

The LWG identified Grassland Health and Little Bluestem Management on grazing lands as the second and third priority natural resource issues to address with conservation efforts in Wibaux County (LRP page 40). These two concerns are strongly interrelated and relate back to the NRCS resource concerns of plant productivity and health and plant structure and composition.

Through Emergency Conservation Program field visits, LWG meetings, outreach, and landowner phone calls it was determined that funding to address these resource concerns should be prioritized in the Cottonwood Creek sub-watersheds in northern Wibaux County (Figure 1). The project area extends beyond sub-watershed boundaries to include entire ranches of eligible land, as to not excluded portions of pastures or management units. The total areas of each of the three Cottonwood Creek sub-watersheds and approximate acres of rangeland are shown in Table 1.

Table 1 TIP Project Areas and Acres

SUB-WATERSHED	SUB-WATERSHED ACRES	PROJECT AREA ACRES	APPROXIMATE ACRES OF RANGELAND
North Fork Cottonwood Creek	15,653	27,580	17,927
South Fork Cottonwood Creek	38,526	68,065	36,544
Cottonwood Creek	27,581	89,197	28,895
TOTAL	81,760	184,842	83,366

In the future, similar proposals are expected to address the same resource concerns in other parts of the County. The determination to target the Cottonwood Creek sub-watersheds first was based on interest, with five producers in the area interested in seeking funding for livestock water and other practices that facilitate improved grazing land management.

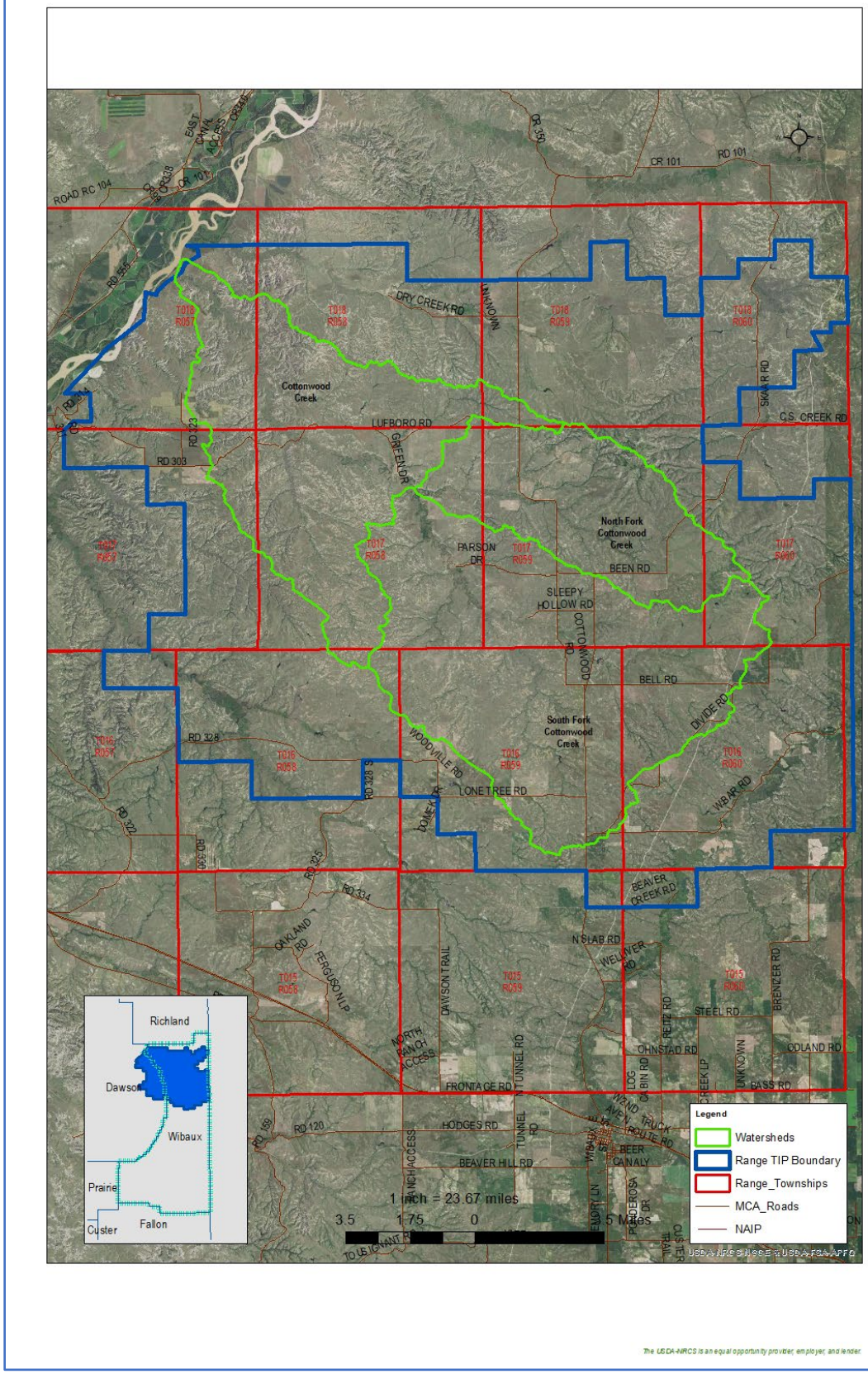

Figure 1 Map of Cottonwood Creek Sub-Watersheds

Natural resource and management concerns related to little bluestem (*Schizachyrium scoparium*) occurs on public and private rangeland in Wibaux, Richland, Dawson, Prairie and other counties in eastern Montana. Within Wibaux County, the north end of the county is the area most affected by little bluestem. According to Duval,

> "Little bluestem is a bunchgrass that is palatable to most livestock during the early growth period of the plant (May & June), but as the plant matures livestock will avoid it due to the decreased protein content and increased lignin content. If these areas are avoided for multiple growing seasons, the plant builds up a bunch of mature culms, resulting in a wolf plant which the cattle avoid. The bunch of old growth is less palatable for livestock unless they are properly stocked to manage little bluestem. Little bluestem is an increaser plant under season long grazing, but with high stock densities and a rotational grazing system can increase use of the plant. Prescribed burning has also been a way to manage little bluestem, by allowing the build-up of old growth to be decreased and palatable new growth to be available to livestock but is relatively resistant to fire. Other management efforts to alter the quality and palatability of little bluestem have included applying attractants such as molasses, fertilizing, haying, or feeding on little bluestem patches." (Duvall, 1970).

Little bluestem's defense against grazing are stiff, persistent stems that protect new growth from grazing animals. Cattle tend to avoid little bluestem when it is allowed to become wolfy. This puts more pressure on the other native species in the grazing area. If no changes are implemented, little bluestem will continue to be unpalatable, remain ungrazed and expand as neighboring plants are weakened through over-use by livestock. Patch grazing and overgrazing outside of the little bluestem stand are common, rangeland health and trend are significantly impacted, and risk of wildfire increases as fuel load build.

Grazing operations in the TIP area generally do not have the stock densities and grazing rotations in place to manage the little bluestem effectively. Pastures are too large and lack adequate water, fencing and grazing management flexibility. In addition, ranchers in this region have large areas of little bluestem within most of their pastures. Though over-grazed areas appear on some sites and near water sources, under grazed little bluestem and patch grazing are more of a concern over most of the grazing land within the TIP area.

PROBLEM STATEMENT

Livestock water developments and fences are the foundational facilitating practices for improving grassland health and little bluestem management. With the proper infrastructure in place, grazing can be used as a tool to improve ecological function and health, and the overall productivity and resiliency of the landscape. Agricultural operations in Wibaux County are lacking the basic infrastructure needed to implement a grazing system that can address Plant Productivity and Health and Plant Structure and Composition resource concerns. In the focus area, common consequences of

inadequate infrastructure and/or the lack of properly applied grazing management can be seen on the landscape in many ways. Including, but not limited to varying degrees of:

- Decreased rangeland health and productivity. Loss of productivity and increases in shortgrass dominated plant communities with fringed sagewort (Artemisia frigida), and clubmoss (Selaginella densa). Potential forage productivity of Silty ecological sites in the TIP area are over 2000 pounds per acre whereas degraded sites dominated by shortgrass species tend to produce less than 500 pounds per acre of forage. (MLRA 58A–Silty Ecological Site Description). Figures 2-4.
- Low stock densities result in patch grazing (overgrazing and under-grazing) within the same field, which leads to in plant structure and composition changes. Little bluestem is often avoided. Little bluestem patches become wolfy and expand over time as other native species are overgrazed. Overgrazed patches lose desirable species like western wheatgrass, bluebunch wheatgrass, and green needlegrass and shortgrass species begin to dominate. Figures 2 - 4.

Figure 2 – Shortgrass dominated plant community.

Figure 3 – Patch grazing. Un-grazed little bluestem, overgrazed overflow site.

Figure 4 - Patch grazing. Unused little bluestem in the background. Foreground – overgrazed cool season species.

- Decreased drought resilience because of increase in bare ground, impacted plant vigor, degraded soil health, and loss of taller statured deep-rooted perennials such as western wheatgrass and green needlegrass. Figures 5 and 6.

Figures 5 and 6 – Shortgrass dominated plant communities that will exhibit less resiliency to drought conditions due to short statured root systems, higher amounts of bareground, and overall declines in ecological function.

- Inadequate livestock water quality, quantity, and distribution. Figures 7 and 8.

Figure 7 – Riparian area on Cottonwood creek impacted by livestock use.

- Degraded pastureland health and productivity. Lack of infrastructure limits grazing during preferred seasons of use and proper utilization (Figure 9).

Many operations have areas of introduced pasture or expired CRP that are integral to the development of quality grazing plans within management units (Figure 9). Introduced pasture are considered as part of the LWG's priority of increasing Grassland Health. Therefore, conservation plans written for this TIP will include those lands.

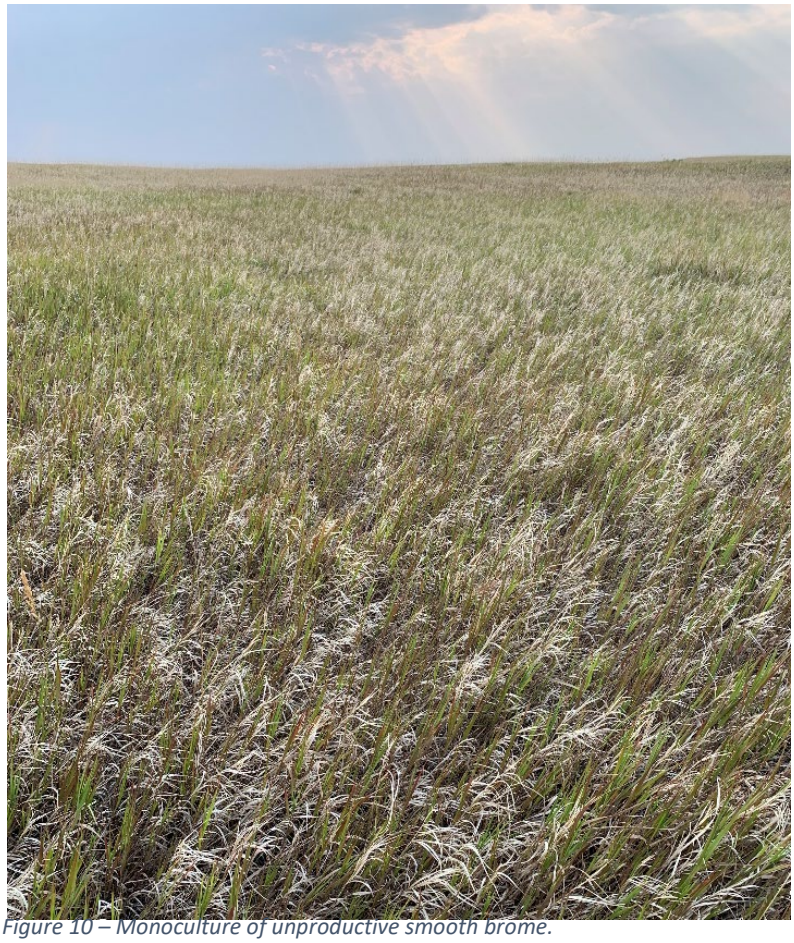

Figure 10 – Monoculture of unproductive smooth brome.

GOALS AND OBJECTIVES

Livestock operations are subject to countless impacts outside of the producers' control such as prices, markets, weather, and natural

disasters to name a few. However, if a ranch already has the necessary infrastructure, grazing land management is one thing that can be controlled. Managing grazing lands for productivity, health, and resilience is the single most important thing a livestock producer can do to keep their operation profitable and sustainable.

The ecological benefit of healthy grazing lands cannot be understated. Investing in conservation practices is foundational to the mission of the NRCS and its partners. The primary goal of this TIP has been taken directly from Wibaux County's Long-Range Plan. Its specifics are based on recent local input, being incorporated to make the goal the most timely and relevant to the producers in the TIP area.

Identified Grazing Land Activities:

Rangeland Health Monitoring

Designing Planned Grazing Rotations

Developing & Distributing Livestock Water

Controls Methods/Installing Cross-Fencing

Virtual Fence

To be successful on most operations, the producer will need to find ways to improve their control over forage utilization. Strategies will be determined upon site specific circumstances, but will likely include alternatives such as increasing stock density through the use of fence or combining herds and improving livestock distribution through water development, herding, mineral/salt placement. These strategies will be aimed at reducing patch grazing and achieving proper utilization of all key species within each field. Proper utilization paired with rotational grazing that provides adequate recovery time and reduces re-grazing of individual plants within a growing season should improve overall rangeland health of each field.

The overall goal of this TIP is that producers receiving NRCS technical or financial assistance through the TIP will have adequate livestock water and cross fencing or the alternative of virtual fence necessary to implement a grazing rotation that will improve the health, productivity, and resilience of both native rangeland and pastures. Ultimately their operations will become more profitable, economically viable, and resilient through drought (Figure 2) and natural disasters.

CONSERVATION PLAN OBJECTIVES

1. Rangeland: Create a positive rangeland trend on offered acres through improved grazing management and facilitating practices. Specific long-term goals and monitoring methods for each grazing unit will be developed based on benchmark conditions and planned management. Line-point intercept and photos are expected to be the most used monitoring tools.
2. Improve utilization of little bluestem. After the implementation of facilitating practices, incorporate grazing strategies that better utilize little bluestem, turning the species into an asset for the operation (high quality forage) instead of a liability (forage that is

avoided). By implementing management strategies that better utilize little bluestem, reduce pressure on other native species, so that overall rangeland health improves.

3. Pastureland: Improve the ecological function of the enrolled acres, demonstrated by a Pasture Condition Score (PCS) of 45 or higher on the offered acres, through improved grazing management and facilitating practices.
4. All Land Uses: Significantly improve grazing utilization within each grazing unit. Utilization mapping may be used to document and monitor results.

CONSERVATION EFFORT OBJECTIVES

Priority resource concerns Plant Productivity and Health and Plant Structure and Composition will be specifically addressed in each conservation plan. Additionally, most conservation plans will also address Inadequate Livestock Water Quality, Quantity, and Distribution, soil quality, soil erosion, and wildlife habitat concerns through the installation of basic infrastructure and grazing management.

1. **Enroll and Fund more than 5 Conservation Plans Covering Upwards of 25,000 acres:** Between LWG Meetings, outreach efforts and existing application, there are five producers interested in participating in the TIP. We aim to write conservation plans for at least 80% of those. Given the limited outreach efforts so far, known limitations to grazing rotations in the area, and partner interest in this project, this is an attainable goal if funding is available to support the effort.
2. **Leverage Funds with at least Two Partner Groups:** This TIP is expected to draw the interest of multiple partners including the Western Sustainability Exchange and the Northern Great Plains Joint Venture.
3. **Provide at least Two Educational Events:** Educational opportunities on new concepts and application of grazing management to improve grazing land health and ranch profitability will be shared with and/or provided to participants. Educational events could include speakers, tours, pasture walks and on-farm demonstrations.

Figure 10 – An example of inadequate water source; older reservoir without sufficient capacity to provide water through the grazing period or allow changes in season of use.

PROPOSED ALTERNATIVES AND ACTIONS

The chosen alternative includes the development of conservation plans that provide livestock water, adequate in quality, quantity, and distribution. Conservation plans may include cross fence necessary to implement a grazing rotation that improves the health, productivity, and resilience of the grazing lands. Ultimately making the operation more profitable and economically viable, even during droughts and natural disasters.

Grazing rotations in northern Wibaux County are limited by inadequate livestock water, rough terrain, land units comprised of mixed land uses and non-contiguous pastures. Taking all of these into consideration, a comprehensive view of the grazing rotation will be encouraged during planning. Opportunities will be sought to improve grazing management upon multiple land uses.

Technological advancements including solar-powered pumps for wells, chargers for electric fence and virtual fence will also provide opportunities to implement better grazing management in areas where it was previously difficult to do so. These will be included in conservation plans where appropriate. The conservation activities listed below will be available for financial assistance through this TIP. Livestock water and fences will be available as facilitating practices for prescribed grazing management. Obstruction Removal (Practice 500) may be used to remove fences that are not needed or need to be

replaced with a new cross fence in a different location to implement a prescribed grazing plan. Producers may elect to include Upland Wildlife Habitat Management (Practice 645) which allows for additional wildlife considerations. Conservation plans may include technical assistance for practices not included in the funding proposal, such as livestock shelters, herbaceous weed treatment, forage or range plantings, temporary electric fence, and upland wildlife management. Partners may be able to help plan and implement additional activities.

To accomplish the stated goal, management plans will be developed for each enrolled grazing unit. Management plans will include formal monitoring processes, drought contingency strategies, and wildlife considerations. Most importantly, educational events pertaining to grazing land management strategies and tools will be offered to TIP participants and the local ranching community. Practices offered through the TIP are shown in Table 2.

Table 2 – Environmental Quality Incentives Program Conservation Activities

Practice Code	Practice
382	Fence
500	Obstruction Removal
642	Water Well
614	Watering Facility
516	Livestock Pipeline
533	Pumping Plant
528	Prescribed Grazing

Alternative 2 – In the development of this TIP, an alternative that considered just using facilitating practices (fence, stockwater, etc.) on rangeland only and without formal grazing management plans was considered. This alternative was not chosen. Without prescribed grazing, the local work group goals of creating positive rangeland health could not be ensured. Without the inclusion of pasture, it was determined that comprehensive stockwater and grazing systems could not be developed and that the desired outcomes of the TIP would not be achieved on many of the operations.

Alternative 3 – No Action. If no action is taken to address the identified problems, resource concerns will remain on the landscape and conditions may continue to worsen.

PARTNERSHIPS

Partnerships are being developed to ensure that implementation of this TIP is a highly collaborative and successful effort. The Wibaux Conservation District will partner with the Field Office to bring outreach and education events to Wibaux County.

There is potential for some of these projects to include land owned by the State of Montana or managed by the Bureau of Land Management, as both agencies recognize the management issues and limitations producers are confronted with in this area. NRCS has a strong working relationship with both agencies in Wibaux County. Each agency may provide planning and additional funding for proposed projects.

As mentioned previously, electric fence provides more opportunities for grazing management, especially because of reduced costs and labor inputs. Although financial assistance is available for permanent electric fence, temporary electric fence is not eligible for financial assistance. Even so, temporary electric fence may be the better option in some instances, and this can be determined through the conservation planning process. We currently have interest in the virtual fence and what it has to offer in the planning area. VENCE has offered to provide educational workshops on the use virtual fence.

The Northern Great Plains Joint Venture (NGPJV) is interested and has the potential to provide additional cost-share for grazing management plans, fencing, prescribed burning, or native grass reseeding if those practices were of interest to enrolled landowners. NGPJV funding is available through the Northern Grasslands Restoration Incentive Program (N-GRIP).

Western Sustainability Exchange can provide technical assistance, grazing plan development and post treatment monitoring. They are in the process of developing a producer friendly monitoring dashboard that could be used to measure outcomes.

IMPLEMENTATION AND OUTREACH

This TIP will offer signups in 2023 and 2024. The need for a third year will be evaluated in 2024. Contract lengths are expected to be no more than five years, but in some cases, agreements with larger stock water systems or land area may take more than five years to implement.

Much of the input necessary to develop this TIP was gathered through initial outreach efforts. Currently, five ranches have shown interested in the project. Follow-up meetings will be scheduled with each of these and any others that maybe interested. Planning efforts and rangeland inventories will be started inthe summer of 2022.

Once TIP funding is approved, flyers, press releases, and word of mouth are expected to generate more interest among the approximate 40 other landowners in the TIP area. Outreach specific to the five ranches will be initiated and an educational event will be organized prior to the signup as initial implementationof the education goal, to bolster outreach, and provide more information as to the intent of the plan. We will then plan more outreach for additional landowners in the Cottonwood Creek watershed areas. We can plan field days with the ranches that will be in the first sign-up and invite surrounding neighbors to spur additional participation.

BUDGET

Though narrow in focus, conservation plans for this TIP may vary widely based on the complexity of individual grazing systems. Based on outreach and recent EQIP contracts in the county it is estimated that the average conservation plan for the TIP will require around $110,000.00 (Table 3). An estimated $1,700,000 will be required to reach the goal of funding 15 to 20 conservation plans through the TIP (Table 4).

Table 3 – Cost estimate for an average contract.

Practice	Cost Per Unit	Unit	Extent	Cost Per Practice
Fence: Barbed/Smooth Wire	$2.20	Ft	9240	**$20,328**
Fence: Power	$1.55	Ft	3960	**$6,138**
Obstruction (Fence) Removal	$0.87	Ft	2640	**$2,296**
Pumping Plant: Electric	$2,821.00	HP	1.0	**$2,821**
Pumping Plant: Well pump test	$198.98	Hours	20	**$3,980**
Watering Facility: 1,480-gallon tanks (2)	$2.37	Gal	2960	**$7015**
Watering Facility: Storage tank	$1.00	Gal	3000	**$3,000**
Livestock Pipeline: Frost Free Buried	$2.15	Ft	7920	**$17,028**
Water Well: Typical Well, 100 to 600 ft depth	$48.16	Ft	500	**$24,080**
Prescribed Grazing – Range Standard (3 years)	$3.35	Acre	1920	**$19,296**
Prescribed Grazing – Pasture Standard (3 yrs.)	$5.82	Acre	300	**$5238**
Total				**$111,220**

Table 4 – EQIP funds required by fiscal year.

Fiscal Year	Expected Contracts	Expected Acres Treated	Average Expected Cost/Contract	Total Request Funds
2023	5	20,000	$111,000	**$555,000**
2024	8	20,000	$111,000	**$888,000**
2025	3	10,000	$111,000	**$333,000**
Total	**16**	**50,000**		**$1,776,000**

There are Historically Underserved funding scenarios available for all the above-mentioned practices for qualified applicants. Information about the definitions of Historically Underserved categories, qualification criteria and The Financially Limited Farmer/Rancher self-determination tool are available from the NRCS at: Historically Underserved Producers | NRCS (usda.gov)

PROGRESS EVALUATION AND OUTCOMES

Successful implementation of this TIP will be determined over the long term by the improvement of grassland health and ranch profitability. Short term outcomes include improved livestock distribution, improved utilization of little bluestem and better control over grazing utilization across plant communities and within grazing units. NRCS can evaluate improvements in Plant Productivity and Health and Plant Structure and Composition by:

1. **Rangeland.** Conduct a rangeland inventory prior to implementation to record plant community state/phase, establish benchmark Rangeland Health Assessment and Rangeland Trend. During implementation establish site-specific long-term goals and monitoring methods for each grazing unit.Line-point intercept and photos are expected to be the most used monitoring tools. Goal: create a positive rangeland trend on offered acres.

2. **Pastureland.** Evaluate the enrolled pastureland before and during implementation using Pasture Condition Score (PCS). Goal: PCS of 45 or higher on the offered acres, through improved grazing management and facilitating practices. A PCS score of 45 will illustrate that the site no longer has resource concerns relating to ecological function. It will have good ground cover, no soil erosion, high plant productivity, health and vigor. The stand will be of adequate diversity to provide high quality forage nutrition. Soil health is at a level in which the carbon, mineral, and water cycles are properly functioning.

3. **All Land Uses.** Pre- and post-treatment utilization mapping or documented observations to show changes in grazing distribution/utilization within each grazing unit.

4. **Education.** Provide education events to interested and enrolled participants. Evaluate the success of the education events through participant feedback.

APPLICATION RANKING SUMMARY

Select one of the following:

1a	Does the application include Prescribed Grazing on all enrolled grazing land acres?	Yes	
1b	Does the application include Prescribed Grazing on a portion of the enrolled grazing land acres?	Yes	
1c	Does the application NOT include Prescribed Grazing?	Yes	

Select all that apply. Does the application include:

2a	Expiring CRP or expired CRP?	Yes	
2b	Pastureland with a PCS of less than 30?	Yes	
2c	Native rangeland with negative rangeland trend?	Yes	
2d	None of the above	Yes	

3	Does the application include practices specifically planned to improve little bluestem management?	Yes	
		No	

4	Does the application include practices specifically planned to improve wildlife habitat?	Yes	
		No	

Bibliography

Duvall, V. L. (1970). *Manipulation of Forage Quality: Objectives, Procedures, and Economic Considerations .*

Technical Guide. MLRA 58A – Ecological Site Description – Rangeland. Silty, 10-14" MAP.