# Helmville Valley Grazing Management TIP

Deer Lodge Field Office, Powell County

Josh Schrecengost

**TIP Summary**

This project goal is to improve Plant Productivity and Health on grazing land by increasing stock density and shortening the duration of grazing periods. This allows for longer periods of plant recovery and more trampling to increase soil organic matter and decrease bare ground. Grazing infrastructure will be used to facilitate increased grazing intensity.

The primary resource concern is Plant Productivity and Health. Secondary resource concerns include Inadequate livestock water quantity, quality, and distribution, and Soil organism habitat loss or degradation.

EQIP funds are requested for $880,000. The project will begin in 2023 and run through 2025.

**Geographic Focus**

The geographic boundary of this TIP is based on a portion of the Helmville Conifer Encroachment targeted implementation plan initiated in 2020. The conifer encroachment project addressed plant pest pressure on rangeland by mechanically removing Douglas Fir and Rocky Mountain Juniper to restore range conditions. NRCS and partners focused this TIP on an area where many acres have already been treated for conifer encroachment and increased management and infrastructure could further benefit Plant Productivity and Health. However, areas where conifer encroachment has not been treated or is not a resource concern are not excluded from participation in this TIP. Plant pest pressure has been or is being treated on many of these same acres and we can improve natural resources even further by also treating plant productivity and health. The geographic focus area encompasses private land in the Nevada Creek watershed downstream of Nevada Reservoir and the central Blackfoot River watershed from the confluence with the North Fork of the Blackfoot upstream to near the junction of Hwy's 141 and 200. Highway 200 from 141 to the West edge of Kleinschmidt Flat and the North Fork of the Blackfoot form the northern boundary. The Southern boundary cuts across the lower Douglas Creek Drainage. (See Figure 1)

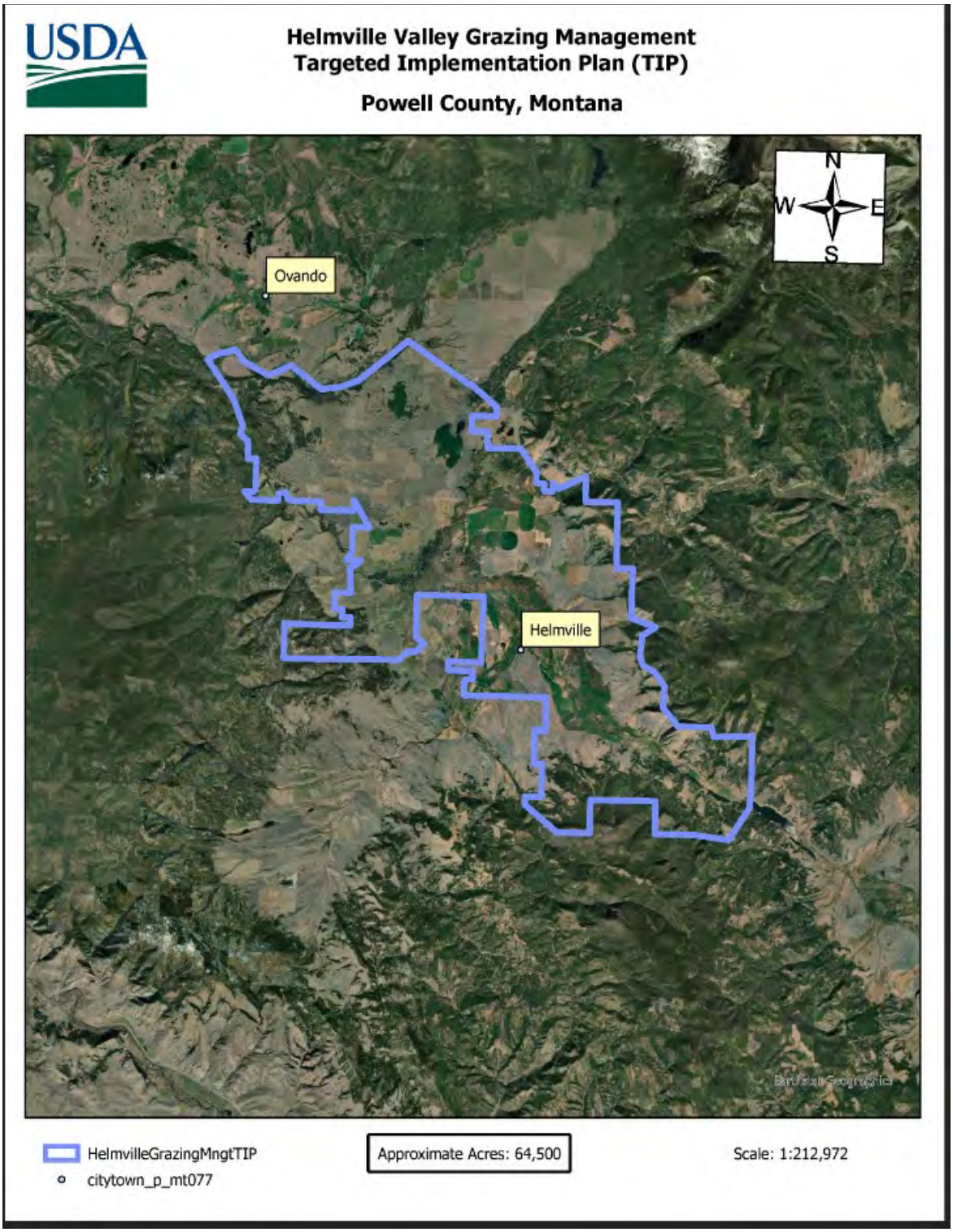


**Figure 1.** *Helmville Valley Grazing Management Boundary Map. The light blue outline encompasses approx 64,500 acres in the Nevada Creek and Blackfoot River watersheds.*

**Resource Concern**

Plant Productivity and Health is the primary resource concern being treated with this TIP. This resource concern was chosen because current management limitations in grazing rotation and intensity are negatively impacting plant productivity, vigor and quality. Secondary resource concerns include Inadequate livestock water quantity, quality, and distribution, and soil organism habitat loss or degradation. Pasture and Range improvements have been identified by the local work group as a priority on page 32 of the NRCS long range plan for Powell County.

Plant productivity and health is defined by NRCS as: Improper fertility, management or plants not adapted to site negatively impact plant productivity, vigor and/or quality. In the case of this TIP, plants not adapted to the site is not a concern. Improper *management* is the key component of this resource concern that will be addressed. Most of the grazing units enrolled in this TIP are managed in a rotation. However, the availability of stockwater greatly limits the rancher's ability to vary the duration and time of year that many of the units are grazed. Large units are often grazed early in the summer for several months because the current water source is only available during the wet portion of the year. This project will provide multiple alternative water sources that will allow for increased options in how and when a paddock can be grazed. This favors plant productivity and health because it maximizes the time that plants can recover and ensures that the plants in each unit are not grazed at the same time each year. Improper fertility does have a nexus to our resource concern because the plants on the site are not producing to their maximum potential. This is at least partially due to an attenuated nutrient cycle and soil microbial activity. Soil microbe activity and the processing of organic matter is at its highest capacity when all the principles of soil health are being addressed. These include minimizing disturbance of the soil, maximizing the time a living root is present in the soil, maximizing plant diversity, keeping the soil surface armored and covered, and incorporating livestock into the system.

The land we will be working on through this TIP has been grazed for decades and is dominated by perennial plants. This adequately addresses the soil health principles of incorporating livestock and maximizing the time a living root is in the soil. Plant diversity will be increased, which in turn increases microbial diversity, by reducing the duration of grazing and increasing stocking rate on each paddock. Longer grazing periods at low stocking rates allow grazing animals to be selective. Consequently, highly palatable plants are grazed more often and to a lower stubble height than plants that are less palatable. Over time, these plants (often referred to as "increasers") begin to dominate the site. Plant diversity and productivity will increase as we limit the ability of grazing animals to be selective. Soil disturbance will be minimized by shortening the amount of time grazing animals are present in a paddock. Longer grazing periods lead to bare ground and compaction on trails and around water sources. Shortened grazing periods will limit the damage done and allow for longer periods for plant recovery to take place. Increasing the stocking rate in a paddock will increase the number of plants that are trampled. Hoof action forces plant material into contact with the soil surface. This armors the soil against erosion and insulates it to moderate thermal fluctuations. Plant material in contact with the soil also feeds soil microbes and allows for increases in soil organic matter.

*Information Gathered to Substantiate the Concern*

Most of the grazing units that we are targeting with this TIP are not really "bad" in terms of production, but they are not producing to the highest potential. Several local producers have been experimenting with increased stocking rates and decreased duration of grazing in pastures and range units. They have

all noticed increases in plant productivity and vigor through observation and informal monitoring. These results mirror what producers throughout Montana are seeing as well as the rest of North America and other parts of the world. Shorter duration of grazing and longer plant recovery coupled with increased trampling action addresses the soil health principles of minimizing disturbance and keeping the soil covered. In some places it also results in increased plant diversity. These are foundational concepts of the regenerative agricultural movement. Distribution and availability of stockwater is one of the greatest limiting factors for grazing management. The use of any particular grazing unit is limited to the seasons when water is available. Because stockwater development is expensive in terms of capital and labor, many producers have developed only a few water sources in any portion of the ranch. This worked well when the production model for grazing was large paddock sizes and relatively infrequent moves. Now that producers are realizing the improved forage production, soil health, and livestock performance associated with increased grazing intensity there is a need for increased flexibility in infrastructure.

**Figure 2.** *Temporary electric fence is used on irrigated pasture to facilitate increased stock density and frequent rotations.*

This resource problem is common and widespread throughout grazing land in the western United States. The common model for conservation grazing on public land is a fantastic and disappointing example. For decades public land has been grazed at the same time of year at the same intensity and that has driven productivity and resilience in the vegetative community into a lower performing state.

This antiquated system of managing grassland is equally prevalent on private grazing land. In efforts to address many resource concerns we have focused on stocking rate alone but that only addresses a small portion of the complex equation of grazing land management. While stocking rate is important, it must be balanced with the duration of use, plant recovery, and the intended outcome of grazing impact. In this TIP, our goal is to increase grazing intensity by decreasing paddock size and duration of grazing events in order to maximize hoof action and plant recovery period. Increasing hoof action will result in a higher percentage of the soil covered by plant litter. Over time this will increase soil organic matter which provides food for soil microbes and increases soil water holding capacity and fertility. Shortened duration of grazing period results in more time for plants to recover when grazing occurs during the growing season. This will improve productivity and vigor of the plants and allow them to have well developed root systems. A plant with a large healthy root system is more drought resistant and more resilient to disturbance.

This problem is important to address now because productive plants and soil reduce the input costs for beef production. This stabilizes not only the local ranch based economy but also the national food supply and allows for sustainable agriculture to continue providing clean water, aesthetics, and wildlife habitat for an ever growing human population. Moreover, increased plant growth and decreased bare ground helps sequester carbon in the soil.

**Goals and Objectives**

The goal of this Targeted Implementation Plan is to increase total herbaceous plant productivity on the treated acres through grazing management, improved soil health, and improved stock water distribution. We expect that the improved productivity and management level on the contracted acres will have positive effects across the entirety of each ranch and the watershed as a whole. This is possible because increased intensity of use on the enrolled paddocks allows for increased rest and recovery on other paddocks during the growing season. We also expect that as ranchers see positive results on the contracted acres they are likely to adopt similar management on other portions of the ranch. One of the strengths of this TIP is the continuity of landowners who are participating. By concentrating stockwater development and subsequent grazing improvements among multiple neighboring landownerships, we expect to see compounded benefits within this part of the watershed.

**Alternatives**

Alternative 1 – Not Selected

Plant productivity and health could be addressed on pastureland by applying chemical fertilizer or by renovating pastures with tillage and reseeding them. These are the traditional ways that producers have tried to improve productivity. The problem with these methods is that it sacrifices soil health in the short term and takes a lot of time and labor. Improving rangeland has typically focused on reducing or eliminating grazing during the growing season. This is often beneficial to the existing plants but doesn't necessarily increase production. It also doesn't often shift the plant biomass from increasers to decreasers. This is because reduced stocking rate typically results in the most palatable plants being grazed multiple times when duration isn't significantly reduced. When stocking rate is low and duration is short, only the most palatable plants are grazed. In either case the less palatable plants receive less grazing pressure than the highly palatable plants. There is also little benefit to soil health.

Alternative 2 – Selected

Plant productivity and health can be improved by increasing the frequency of rotations and the Animal Units (AU) per acre while reducing the duration of grazing events. In order to achieve this, stock water distribution must be increased so that livestock have access to adequate water in each smaller grazing unit. Some permanent fence may also need to be installed to facilitate breaking large grazing units into smaller paddocks. Prescribed grazing management will be used to develop a plan for rotation, stocking rate, and monitoring. The payment rate for prescribed grazing will help offset the increased labor of frequent rotations and the additional infrastructure such as portable electric fence that is necessary. This alternative provides for management of non-selective grazing with a high amount of trampling and consistent manure and urine distribution in each grazing unit. The non-selective grazing with long recovery period allows for plants with the greatest fitness for the site to thrive. Typically, these will be deep rooted grasses and forbs adapted to grazing disturbance. This will increase plant productivity and health over time. Plant diversity can also sometimes increase under similar grazing regimes. Trampling of plants increases soil to litter contact, armors the soil, and allows soil organisms to consume and incorporate carbon.

Alternative 3 – No Action

There are no expected impacts to soil, water, air, plants, animals, or energy if there is no action.

**Figure 3.** *Two conservationists discuss the merits of high stock density in a pasture near Helmville, MT.*

**Conservation Practices** required for the chosen alternative include:

Prescribed Grazing (528) – this practice will be used to establish and guide management that includes proper stocking rate and rotation in balance with the available forage. It also establishes a method for tracking grazing records and monitoring of plant response to grazing utilization. We anticipate only contract prescribed grazing on the management units where grazing duration is shorter than typical for each ranch.

Water Well (642) – this is a hole drilled in the ground, then lined, and fitted with a pump to allow ground water to be used in watering facilities. Well reports in the area indicate that ground water is available at 350-400 feet. We anticipate preliminary testing of existing wells by the area engineering staff in summer of 2022. Well testing will be contracted as per NRCS policy.

Spring Development (574) – springs are available in portions of the grazing land. Some of these springs can be developed and gravity fed to multiple watering facilities. Evaluations will be conducted in summer of 2022 on potential spring development sites to assure NRCS policy will be met when springs are developed.

Livestock Pipeline (516) – pipelines are used to convey water from a source to a tank or trough. We anticipate burying many of the pipelines in this project below frost depth to increase the availability of each grazing unit throughout the dormant season for maximum versatility.

Livestock Watering Facility (614) – Livestock watering facilities will be installed to provide well distributed water sources throughout grazing land to facilitate increased frequency of rotation and stocking rate.

Fence (382) – permanent fence will be installed when necessary to facilitate dividing existing grazing units into smaller paddocks and to protect sensitive areas such as springs. This may include barbed wire or permanent electric fence. Portable electric fence will not receive direct financial assistance but may be facilitated by the prescribed grazing payment.

Pumping Plant (533) – used to transport water through pipelines when gravity is not sufficient. Also includes the required testing of wells.

*Resource data, analyzed to support the preferred alternative*

Professional observation and the opinions of local ranchers were used to assess the potential of pastures and range units that will be enrolled in this TIP. This grazing land is not in terrible shape. However, it is not performing at its highest potential. This TIP is not about correcting a horrible resource concern. This TIP is about not being content with mediocrity.

**Implementation**

Project funding will commence in 2023 with contract obligations through 2025. We anticipate funding 2-4 projects per year based on workload and availability of funds. Current cost estimates, based on the 2022 NRCS payment schedule, for infrastructure average $110,000 per project. Using the typical scenario for intensive prescribed grazing on rangeland for 3 years we anticipate grazing payments on each contract around $26,000.

**Table 1.** *Typical NRCS Contract scenario for the Helmville Grazing Management TIP*

| Practice Name | Practice Code | Estimated Amount | Unit Type | Unit Cost | Cost Estimate |
|---|---|---|---|---|---|
| Livestock Pipeline | 516 | 10,000 | feet | $2.15 | $21,500.00 |
| Watering Facilities (troughs) | 614 | 10,000 | gallon | $2.57 | $25,700.00 |
| Pumping Plant | 533 | 5 | horse power | $2,821.49 | $14,107.45 |
| Water Well | 642 | 400 | linear foot | $48.16 | $19,264.00 |
| Well Test | 533 | 16 | hr | $198.98 | $3,183.68 |
| Prescribed Grazing | 528 | 1500 | ac | $17.39 | $26,085.00 |
| | | | | Total Cost | **$109,840.13** |

**Table 2.** *Financial Assistance needed to complete the projects by fiscal year.*

| TIP Obligation Request | | |
|---|---|---|
| **Year** | **Contracted Projects** | **Obligation Requested** |
| 2023 | 2 | $220,000 |
| 2024 | 4 | $440,000 |
| 2025 | 2 | $220,000 |
| **Total** | | **$880,000** |
| | | |
| | | |

*Unique and Challenging Practices*

The most challenging aspect of this targeted implementation plan is the contracting of prescribed grazing. The inventory and analysis of range and pasture conditions creates a labor demand for the field office but it is not insurmountable. NRCS and the interested applicants have a goal in mind (increased plant productivity) and local trials suggest that it is obtainable. The challenging part is developing a grazing plan/rotation that is flexible enough to work well with the constant dynamics of running a ranch while meeting NRCS specifications. However, we believe that is possible with careful consideration. We will select a portion of the ranch where the increased intensity of management is certain to be achieved and design a prescribed grazing plan on those acres. We will consider the entirety of each ranch in the grazing plan in order to understand how the management unit works into the overall rotation, but prescribed grazing will only be contracted on the more intensive grazing unit(s).

*Projects/practices Prioritization and Sequence*

Priority for water development and prescribed grazing will be on acres that have already been treated for conifer encroachment either through NRCS programs or independently by the applicant or landowner. Areas within the TIP boundary where conifer encroachment has not been addressed or is not a concern will also be considered as long as plant productivity and health is identified as a resource concern that can be addressed with the practices identified in this TIP. Installation of stockwater

infrastructure in the first 1-2 years of the contract will be followed by 3 years of prescribed grazing and monitoring. Intensive range and pasture scenarios will be the priority and will require moves every 7 days or less.

*Implementation Coordination and Management*

Implementation efforts will be coordinated and managed by the NRCS field office staff in Deer Lodge, MT. Staff with the Blackfoot Challenge will also assist in inventory, communication, and monitoring.

*Marketing and Outreach*

Marketing and outreach began early in 2021 with discussions and meetings with local producers to discuss increased management intensity. By late fall of 2021 Blackfoot Challenge staff and the NRCS field office staff were conducting preliminary inventory on 6 potential ranches including mapping of existing grazing infrastructure and potential stock water development to facilitate grazing management. Additional outreach will rely primarily on word of mouth at a local level and may include additional public meetings.

**Outcomes**

Grazing unit inventories will be conducted in the summer of 2022 to establish baseline data for each applicant. Monitoring locations will be established in areas where production is less than desirable. These monitoring sites will a GPSed and staked 100' transect for photo monitoring with 5 set ground shots and landscape shots both ways along the transect. These sites will be monitored annually so that changes in productivity, vigor, and bare ground can be assessed between years by comparing the photos. We expect visually detectable decreases in bare ground and increases in plant vigor and productivity from the base line to the final year of each 3-5 year contract. Furthermore, increases in production will be monitored based on AUM's per acre taken prior to the unit reaching 50% utilization of key plants or minimum stubble heights. We will also calculate harvest efficiency of the grazing animals. Harvest efficiency is expected to increase with stocking rate as selectivity and time in a paddock decreases.

Planning criteria assessment tools for Plant Productivity and Health on range lean heavily on range trend as associated with the ecological site. Ecological site descriptions and state and transition models are useful for understanding many of the characteristics historically associated with range but that is not what we are trying to manage for in this situation. Our goal is to maximize the function of the soil and the productivity of diverse plants on each grazing unit. We do not wish to limit ourselves to any pre-defined allowable pounds per acre. A reference state for an ecosite is a snapshot of what was there in the past. It is absolutely worth considering but it sets the bar too low for what is possible.

**Why it matters**

So, why should this matter to the American tax payer? If you tell someone unfamiliar with agriculture that tax dollars were used to increase AUMs on a paddock from 0.2 to 0.3 per acre it seems pretty meaningless. Here is why it matters: Many of the ranches that we are working with direct or locally market at least some of their beef. For decades the United States has been seeing increased weakness in our food supply associated with limited availability of local slaughter facilities and uncertainties of the origin and quality of meat products available in our stores. When grazing land is more productive

ranches can be more profitable. This bolsters a model of locally sourced food that can be replicated throughout the country. It makes our markets more resilient to fluctuations in availability of labor and facilities and limits the national implications of natural disasters. Consequently, consumers see less volatility in the price of quality food. This aligns with USDA's goals of supporting community and urban agriculture.

**Figure 4.** *An example of post-graze trampling that helps increase soil organic matter by placing plant material in direct contact with the soil surface.*

Grasslands are one of the world's most prolific ecosystems; they are also some of the most threatened. Farming and housing development have already encroached on much of the grassland in the US and continue to do so at an unprecedented rate. When it comes to rangeland wildlife, soil carbon storage, or wide, open, spaces – the land base for all of these ecosystem values is declining daily. We need to better care for our remaining rangeland ecosystems to make up for their geographic decline. Not only is this an ecological requirement for a healthier planet, but it is a social need as well. We need society to see the critical services that livestock provide to humans and the planet. We need to rebrand cattle as the tool for ecological restoration that they are. However, we cannot do so if we are limited to overgrazing or undergrazing management. Current perspectives on livestock and the rise of fake meats threaten to remove the market for livestock, which would remove an essential tool for managing grassland health and the means in which to sequester large amounts of carbon into rangeland soils.

Livestock production on grazing land is highly sustainable. The healthy rangeland that is properly managed produces food and fiber and provides excellent wildlife habitat, filters precipitation ensuring clean water in our rivers, and sequesters carbon through increased soil organic matter and plant productivity. When the animals are processed and marketed locally the decreased shipping also results in a smaller carbon footprint. Consumer confidence is increased when they can buy a nutritious product that is environmentally friendly.

## Helmville Valley Grazing Management TIP Ranking Questions

Local Ranking Questions:

1. Has conifer encroachment been removed on at least a portion of the land units included in the application?
2. Does the application include a prescribed grazing scenario that requires livestock to be moved at least every 7 days?
3. Does the application include watering facilities that will provide an alternative to livestock watering directly out of surface water?