

Cayuse Hills West Drought Resistance & Resilience Targeted Implementation Plan



USDA-NRCS

Big Timber Field Office

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Cayuse Hills West
Drought Resistance & Resilience
Targeted Implementation Plan
Sweet Grass County, Montana

Goal Statement:

The goal of the Cayuse Hills West Targeted Implementation Plan (TIP) is to help landowners and operators in the western portion of the Cayuse Hills area develop drought-resistant livestock water and enhance forage resources to better withstand drought and help speed plant recovery. This is the third and final phase of the overall Cayuse Hills Drought Resistance & Resilience project.

Overview/Background Information:

The Cayuse Hills are uplands and foothills north of the Yellowstone River in Sweet Grass County, forming the broad divide between the Yellowstone and Musselshell drainages. The landscape is dominated by rangeland, with some introduced-species pastures also present. Due to the hydrology, geology, and terrain which define this area, numerous springs are present, which are heavily relied on as livestock and wildlife water sources. Flow rates vary, averaging 1-3 gallons per minute or less in normal years.

Problem Statement:

Priority Resource Concern: Inadequate livestock water quantity, quality, and distribution
Associated Resource Concern: Plant productivity and health

In recent years, weather patterns have become more extreme, including drought. Drought cycles will continue to occur, and it seems they may be more severe and/or sudden. It makes economic and natural resource sense for producers to prepare in advance for upcoming drought. Developing adequate, reliable livestock water sources and effective grazing plans and drought contingency plans are important for natural resource and animal health and the continued viability of ranching operations in the Cayuse Hills area.

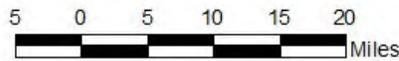
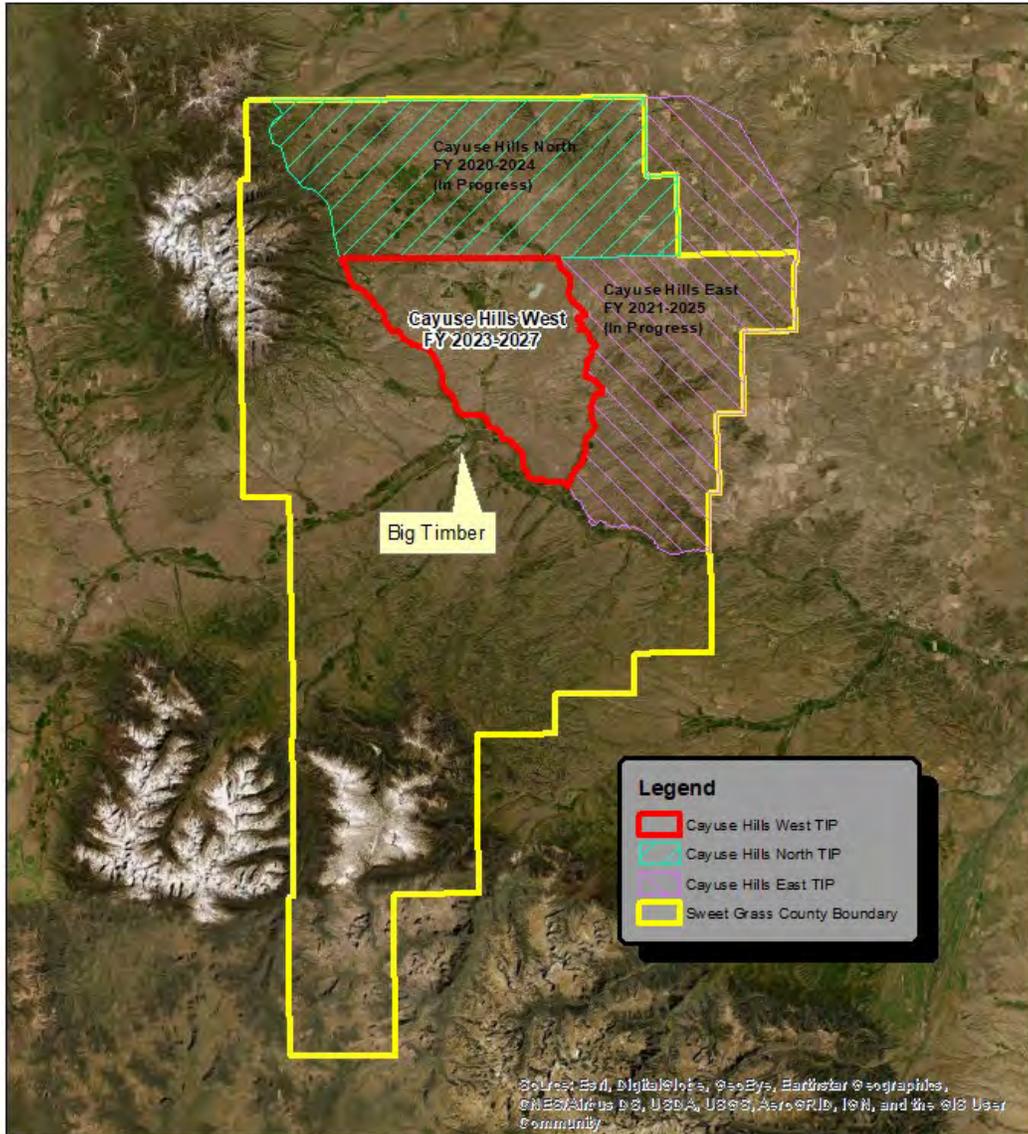
In Sweet Grass County, inadequate livestock water is most common in the Cayuse Hills area north of the Yellowstone River. During periods of drought, the flows of the springs either decrease or dry up. Grazing rotations are seriously disrupted when available water is significantly diminished, forcing operators to leave pasture gates open so livestock can seek out enough water in multiple pastures. This in turn causes livestock to concentrate in pastures with water sources, which causes overgrazing and significantly impacts grazingland health and productivity, as well as riparian area condition. Many producers haul water daily to their livestock, often for weeks at a time, which is expensive, labor-intensive, and impractical to do for more than a few weeks. These conditions occurred during the

Cayuse Hills West Drought Resistance & Resilience TIP

Date: 11/10/2021

District: SWEET GRASS CONSERVATION DISTRICT

Field Office: BIG TIMBER FIELD OFFICE
Agency: USDA - NRCS
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Prepared with assistance from USDA-Natural Resources Conservation Service

Figure 1. Proposed Cayuse Hills West Drought Resistance & Resilience TIP Area. (Cayuse Hills North and Cayuse Hills East are in progress).

1998-2006 drought, when livestock were often observed drinking muddy water out of their hoofprints to get water, which unfavorably impacted livestock health, stream condition, riparian areas, springs, and wetlands.

Springs have long been preferred as the primary livestock water sources in the Cayuse Hills. This is because they provide continuous gravity-flow water with no required energy or mechanical devices, such as pumps or generators, which can fail. The major problem is that many of the springs are undependable in dry years or even in the late summer or fall of average years when dry conditions occur.

Noxious weeds and invasive plants increase during drought periods. When it is dry, native forage grasses' root systems decrease, causing a corresponding decrease in above-ground biomass and an increase in the amount of bare ground available for colonization by noxious weeds and invasives. These effects can be evident for years after the end of a drought period. In the Cayuse Hills area, the manifestation of this has been dramatic increases in weedy annuals like cheatgrass, Japanese brome, and yellow alyssum, and the spread of noxious weeds like diffuse and spotted knapweeds.

Good grazing management before and during drought is crucial to mitigate negative effects of drought and speed recovery once it begins to wane (drought resilience). Decreasing bare ground by maximizing desirable plant population density and vigor is essential. In dry times, it is especially important to maximize forage recovery periods and keep the ground sheltered from sun and wind by leaving enough residual cover to conserve moisture and minimize soil surface temperatures. Adequate, reliable livestock water is the foundation for good grazing management.

This TIP has been developed to address natural resource concerns and priorities identified by landowners and other interested stakeholders through the Local Working Group (LWG) process. The LWG identified inadequate livestock water, riparian area health, and noxious/invasive plants as high priorities; these issues will be improved by implementation of this TIP. The long-range plan for Natural Resources Conservation Service (NRCS) in Sweet Grass County addresses these resource concerns and supports this TIP (see "Sweet Grass County Long-range Plan", sections II.E.3, page 12, and IV.C, page 27).

Since the Cayuse Hills covers over 500,000 acres, this area has been divided into three sub-areas that are being addressed by separate TIP proposals: Cayuse Hills North – 208,000 acres; Cayuse Hills East – 229,000 acres; and Cayuse Hills West – 121,000 acres. This TIP proposal covers only Cayuse Hills West, which includes roughly 25% of the Cayuse Hills area and has been selected as the third sub-area for potential TIP funding based on producer interest. Approximately 102,000 acres in the Cayuse Hills West area are rangeland and 19,000 acres are introduced-species pasture. Of those acres, it is estimated that 70,000 acres need treatment. To meet the objective, this TIP needs to treat approximately 56,000 acres. The Cayuse Hills North TIP had a successful start in Fiscal Year (FY) 2020 with five applications and Cayuse Hills East TIP started in FY 2021 with 15 ranches interested, demonstrating strong agricultural producer support and the need to address these targeted resource issues in the Cayuse Hills area. Four Environmental Quality Incentives Program (EQIP) contracts have been obligated in these two TIP areas so far, with many more in planning stages.

Goals and Objectives:

In the spring of 2021, the Secretary of Agriculture outlined his top five priorities, including focus on changing climate and improving agricultural resiliency. This TIP specifically addresses these two priorities by helping ranchers protect their land from increasing frequency and severity of drought, and by providing the infrastructure and tools to bounce back from drought periods.

The following are desired future conditions in the Cayuse Hills treatment area:

- Adequate volume of reliable livestock water, even during drought
- Strategically-located watering facilities that enable adoption or enhancement of sound grazing systems, long-term
- Increased rangeland similarity indexes and health
- Improved introduced-species pasture health and production
- Improved riparian area condition
- Improved soil health by increasing native plant productivity and vigor
- Decreased extent and severity of invasive species and noxious weed infestations

None of the above goals can be achieved in a meaningful, lasting way without reliable livestock water and prescribed grazing.

The following actions that involve structural practices can reasonably be achieved over a 3-5 year period:

- Drill and conduct pumping tests on 10-20 new wells in the treatment area to provide reliable off-stream water
- Conduct pumping tests on 5-10 existing wells to determine potential for expansion of watering systems
- Install new livestock pipeline systems or expand existing systems to deliver water to approximately 20-30 watering facilities in strategic locations (water sources may include wells or perennial streams)
- Develop and implement prescribed grazing systems with 8-12 producers on 60-90,000 acres to get rangeland health in an upward trend in the short-term and significantly increase similarity indexes long-term; these systems will include drought contingency plans and rangeland health monitoring components
- Improve riparian area conditions to a “Sustainable” rating or the high end of “At Risk”, at minimum, through prescribed grazing systems and woody species regeneration

Alternatives:

1) No Action

The “No Action” alternative would leave grazing operations in the Cayuse Hills area vulnerable to future droughts due to lack of reliable water sources, affecting their economic viability. Existing grazing practices would continue to be disrupted by drought or seasonal dry periods, causing further decline of rangeland health, riparian areas, and wildlife habitat. Areas with

reliable water sources will continue to be heavily impacted by livestock concentration when other sources aren't available. Marginal natural springs (seeps) will continue to be developed or re-developed as they have been for decades, but still won't provide reliable water for livestock or wildlife in dry periods.

2) Develop Reliable Water Resources

Utilizing existing or new wells or pumping water from perennial streams and installing livestock water systems, without using Prescribed Grazing as the foundation for long-term positive changes in rangeland and riparian health, could cause resource damage, especially during drought.

3) Develop Reliable Water Sources and Use Prescribed Grazing to Build Drought-Resistance and Resiliency

Developing dependable livestock water by utilizing existing or new pumping-tested wells, pumping from perennial streams, or using exceptional springs will provide water that can be counted on year in, year out for many years. Reliable water, together with Prescribed Grazing, can positively affect livestock distribution patterns, allow greater flexibility for grazingland management, increase plant diversity, and open many possibilities for maximizing vegetative recovery periods. It is very important to require good grazing management practices to complement water development. Without it, developing water can lead to overgrazing areas that weren't overgrazed before. Working with producers to develop a grazing system that meets their goals and the needs of their natural resources, based on sound range ecology principles, helps ensure that grazingland and soil health will improve and that the improvements will be long-term. Together, these practices can build up drought-resistance and resilience and profoundly benefit the entire ecosystem.

Proposed Solutions and Actions

Alternative 3, "Develop Reliable Water Sources and Use Prescribed Grazing to Build Drought-Resistance and Resiliency", provides the most flexibility when working with different operations' resource needs and by far the best outcomes, considering landowner objectives, financial feasibility, and long-term adoption of practices.

NRCS Conservation Practices available through this TIP:

- (642) Water Well
- (533) Pumping Plant
- (516) Livestock Pipeline
- (614) Watering Facility
- (382) Fence
- (528) Prescribed Grazing

The following measures will aid the decision-making process and contribute to short- and long-term success:

- Prescribed Grazing Plan: This is a grazing plan that meets the producer’s objectives and needs of the natural resources. Basic principles include:
 - Forage supply is in balance with the requirements of livestock and wildlife present
 - 45 days or less grazing period per grazing unit (“pasture”)
 - Periods of use (early, mid, late) on native rangeland are changed from one year to the next to aid plant recovery and reproductive success

For a prescribed grazing plan to achieve optimum results and provide drought resiliency, several influencing factors must be evaluated: either stocking rates must be adjusted, or the grazing plan must be changed to accommodate the year’s seasonal shortfalls and unanticipated disasters, while still preparing for the subsequent year.

Implementation of Prescribed Grazing will achieve the stated goal of improving soil health by meeting all of the five basic principles of soil health:

- 1) Cover the soil- Prescribed will allow different season of use and increase recovery for native plants. This will increase vigor and productivity allowing native plants to cover the soil.
 - 2) Minimize soil disturbance- Overgrazing is a biological disturbance. Prescribed grazing plans will decrease the incidence of overgrazing particularly with drought contingencies.
 - 3) Keep living roots in the ground- As native plant diversity increases the time period where a living plant is on the range will increase.
 - 4) Diversify plant communities- Continuous grazing over long periods decreases plant diversity and in contrast, implementing prescribed grazing will increase plant diversity.
 - 5) Integrate livestock
- Monitoring: Placement of monitoring sites will be at locations that are the most vulnerable, or those places that show the greatest opportunity for recovery. Both photo monitoring and line transect data (cover) methods will be used. Photos will be taken each year and line transect data will be gathered at the beginning and end of the project. As photos are taken, the indicators of rangeland health described in “Interpreting Indicators of Rangeland Health” (T.R. 1734-6) will be used to evaluate the site stability, hydraulic function, and biotic integrity of the site. When used in conjunction with photos, this is a powerful tool to determine overall rangeland health, drive effective management decisions, and help determine if resiliency objectives are being met.
 - Drought Contingency Plan: A plan for adjusting livestock management practices for drought periods will be developed with each ranch. NRCS staff will work with participants to help them see the importance of contingency plans, develop an action plan to follow, and identify their “trigger points” to begin implementing their plan. A

contingency plan includes visual tools and cues, and NRCS will provide plan worksheets and multiple reference live links (Climate Engine, Montana Drought Tool, and Ventusky), along with livestock and land evaluations to make effective management decisions.

Partnerships and Other Funding Sources

- Sweet Grass Conservation District (SGCD) – local input, outreach
- Crazy Mountain Stockgrowers Association– local input, outreach
- Sweet Grass County/Montana State University (MSU) Extension – consultation, outreach, and education assistance

Implementation

- Project approval is being sought for FY 2023, but in order for quality planning to take place with applicants, no EQIP funds will be sought until FY 2024
- Signups will be held each year in 2023-2026 for FY 2024-2027 contracts
- Initial applicant signup will be held in March 2023 (tentative)
- Planning will be done with eligible applicants as soon as possible after prioritization
- Contracts will be obligated as soon as possible after ranking and preapproval in FY 2024-2027
- Implementation of individual contracts will take 3-5 years (all scheduled practices will be completed and certified within 5 years maximum)
- Years 1-3 of a contract will focus on installation of structural practices
- Prescribed Grazing may be contracted for up to 3 years, beginning in years 1-3 of the contract
- The amount of NRCS Staff assistance needed will depend on number of applications received, but will include three Big Timber Field Office staff (District Conservationist, Rangeland Management Specialist and Soil Conservationist), a Livingston Work Unit Soil Conservation Technician, and Bozeman Area Office staff (Rangeland Management Specialist, Biologist, and Engineering Technician)
- Environmental evaluations will be completed that include cultural resources and threatened and endangered species reviews.
- NRCS often assists producers with all aspects water developments from surface and groundwater sources, including adherence to Montana water rights regulations

Table 1. Example of Expected EQIP Cost per Contract (based on FY 2022 EQIP Payment Schedule):

Practice Code	Practice	Scenario Name	Amount	Payment Rate	Total
642	Water Well	Typical Well, 100-600 ft. depth, with 4" Casing	300 ft.	\$48.16	\$14,448.00
533	Pumping Plant	Aquifer Flow Test	10 hours	\$198.98	\$1,989.80
533	Pumping Plant	Photovoltaic-Powered Pump, 251-400 ft. total head	1 ea.	\$5,686.95	\$5,686.95
516	Livestock Pipeline	Below Frost HDPE or PVC	3,000 ft.	\$2.15	\$6,450.00
516	Livestock Pipeline	Adverse Conditions	1,500 ft.	\$5.24	\$7,860.00
614	Watering Facility	Permanent Drinking with Storage, 1,000 to 5,000 gal.	3 ea. x 1,700 gal	\$2.37	\$12,087.00
614	Watering Facility	Storage Tank	10,000 gal.	\$1.00	\$10,000.00
382	Fence	Barbed/Smooth Wire	5280 ft.	\$2.20	\$11,616.00
528	Prescribed Grazing	Range, Standard, ≥ 2500 acres	8,500 ac. x 3 years	\$1.46	\$37,230.00
528	Prescribed Grazing	Pasture, Standard	945 ac.	\$5.82	\$5,499.90
Total					\$112,867.65

Table 2. Total Estimated Financial Assistance Needed by Year:

EQIP Funds				
Fiscal Year	Contracts (no.)	Acres Treated (total)	Average Expected Cost per Contract	Total
2023	0	0	\$0	\$0
2024	2	18,890	\$112,867.65	\$225,735
2025	4	37,780	\$112,867.65	\$451,471
2026	2	18,890	\$112,867.65	\$225,735
2027	2	18,890	\$112,867.65	\$225,735
Totals	10	94,450		\$1,128,676

Outreach

- 1) Invite all producers in TIP area to an informational meeting sponsored by NRCS and SGCD and present TIP proposal information in January 2023 to further gauge interest
- 2) Promote TIP using the SGCD newsletter and/or Facebook page
- 3) Follow up with interested producers, provide application with specific deadline
- 4) Conduct field visits with interested applicants (after prioritization, but prior to ranking)

Progress Evaluation and Assessment

Field Office Applied and Reported Conservation Measures (6.90 Conservation Applied to Improve Environmental Quality)

- Progress acres will be reported for installed, field-certified practices
- Grazing records and evaluations will provide reportable Conservation Technical Assistance (CTA) progress on acres for contracts without (528) Prescribed Grazing contracted

Progress Evaluation by Field Office and Producer

- Photo monitoring records where 528 or other monitoring practices are contracted
- Evaluation of grazing plans and contingency plans on an annual basis
- Feedback from SGCD, Local Working Group, and participants

Outreach and Education

- Brief technical assistance (attendees at first outreach meeting)
- Informational meetings, technical and TIP outreach events (Big Timber)
- Focused event to help screen interested participants

Monitoring

Monitoring of installed projects for effectiveness will be done on-site by Field Office staff with participants through annual contract reviews and by Area or State Office staff if selected for Quality Assurance Reviews. The Range Analysis Platform model (RAP) will be used for annual monitoring of the entire project area to help determine results over time.

Ranking

1. Select one of the following:
 - Will Prescribed Grazing (528) be contracted on all grazing land acres?
 - Will Prescribed Grazing (528) be contracted only for land units with contracted water developments?
 - Will Prescribed Grazing (528) not be contracted?
2. Will Prescribed Grazing (528) be contracted for three years?
3. Will the proposed livestock Watering Facilities (614) be installed at least 1/4 mile from (or be fenced out from) riparian areas?
4. Will springs or existing spring developments be fenced out to protect them from livestock impacts?
5. Will introduced-species (“tame”) pastures be fenced off from native rangeland for improved grazing management?

Outcomes

The following outcomes are expected as a result of this TIP implementation, stemming from the identified resource concerns, goals, objectives, and proposed solutions:

- Adequate volume of reliable livestock water, even during drought
- Strategically-located watering facilities that enable adoption of sound grazing systems long-term
- Improved location of livestock water sources will result in livestock traveling ½ to 1 mile or less for water, compared to greater than 1 mile pre-project
- Cost savings of approximately \$21,000 per ranch per drought year will be achieved by no longer having to haul water. USDA Farm Services Agency uses an average cost of \$0.06 per gallon of water hauled. Calculation: 200 head of lactating cattle x 30 gallons/day/head (July and August consumption rate) x 60 days x \$0.06 = \$21,600. (this doesn't include the opportunity cost of not being able to do other needed ranch work due to hauling water, which is significant)
- 5-10% reduction of bare ground, resulting in more moderate soil temperatures, improved soil health and fewer sites for invasive plants to establish
- 50 lbs./acre increase annually in forage production, resulting in approximately \$15,500 savings per ranch per year compared to leasing pasture or buying hay (Calculation: 50 lbs./acre forage production increase x 9445 acres average operation size = 472,250 lbs. additional forage production; 472,250 lbs. ÷ 915 lbs. dry matter/Animal Unit Month (AUM) = 516 AUMs of forage; 516 AUMs x \$30/AUM (market value per AUM) = \$15,484)
- Savings of \$60.00/acre for potential herbicide treatment of invasive annual grasses, such as cheatgrass
- Annual reduction of greenhouse gas emissions equivalent to 133 passenger vehicles or a single passenger vehicle driven 1,535,564 miles (estimates derived from NRCS COMET-Planner and Environmental Protection Agency's Greenhouse Gas Equivalencies Calculator tools – (see Figure 2 below).

Greenhouse gas emissions from



Carbon sequestered by



CO₂ emissions from



Figure 2. Greenhouse gas emission reduction comparisons from implementing Prescribed Grazing on 11,000 acres of irrigated pasture and 60,000 acres of rangeland.