USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

HORSESHOE HILLS LANDSCAPE RESTORATION INITIATIVE

FY 2024-2028

Bozeman Field Office

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An explosive increase in pinyon-juniper acreage has been observed across the western United States in the last 100 years. Historic grasslands and sagebrush steppe have been encroached at un-precendented rates, putting the functionality of entire ecosytems at risk and presenting threats to the health and safety of the current residents. While conifer encroachment is a natural process and an important step in succession, the issue lies with the lack of distrubance events on the landscape. A secondary succession disturbance event includes things such as severe weather, insects and disease outbreaks, avalanches, fire, and even human caused disturbances. Fire has played an important role in the history of ecosystem processes and function to maintain a healthy and productive landscape.

Humans first arrived in Montana roughly 7,000 years ago and European explorers arrived in the early 1800's (McNamee 2021). Although there is little evidence of the actual impact that these early humans had on the landscape we know that they lived off of the land and in some cases used fire to drive prey, clear underbrush and provide pastures for native wildlife (McNamee 2021). In addition to human caused fire, naturally occuring fire has been a part of these ecosystems and has shaped the ecology of many species that are present today. As these areas were colonized over the last 200 years and railroads were built the likelyhood and occurance of human caused fire increased greatly

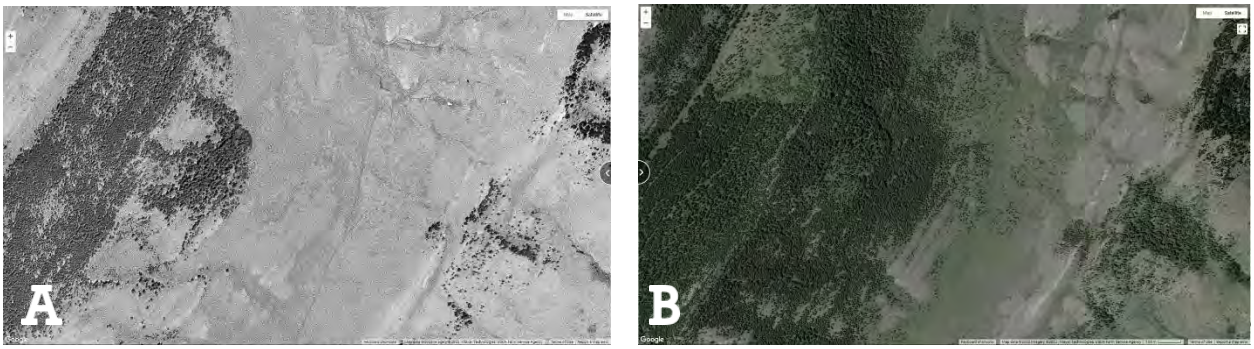


FIGURE 1: Image A is taken in a selected area within the Horseshoe Hills in the mid 1900's while image B was taken in 2021. You can see the expansion of forested area into historic grass and sagebrush fields.

In 1910 an event occurred known as "The Big Blowup" where roughly 3 million acres burned in a matter of days fuel by hurricane force winds and killed 78 fire fighters (Roos 2020) . Fires were no longer seen as a positive ecosystem process but a danger to public and private resources. This resulted in a doubling down of fire suppression efforts across the US in an attempt to protect lives and resources. In reality the supression of fires over the past 100 years has only increased the issue at hand by allowing excessive conifer encroachment into areas that historically would have burned on regular intervals setting back succession (Figure 1). The Horseshoe Hills are no exception to this and have seen large scale conifer expansion into historic grasslands.

Figure 1 on the previous page shows the stark difference in the vegetation quantity and distribution on the landscape. Most of the high elevation meadows have filled in and conifers have expanded into historic rangeland. Due to fire suppression and favorable growing conditions, the Horseshoe Hills have been overrun by Rocky Mountain Juniper and Douglas Fir. The overabundance of young densely growing conifers has greatly increased the fuel loading on the landscape and has increased the risk to humans and property in the event of a wildfire.

The overstocked nature of the encroaching woodlands can lead to fires that will burn substantially hotter and longer than historically observed. This has the potential to damage the soils and seed source present on the site, especially that of Mountain Big Sagebrush which is a fire sensitive species. As a result, areas can take decades to return to a healthy state and due to a changing climate, some areas may never recover. The fires that are shown in figure 2 have mostly been human caused. With an increasing population there will be a greater risk of ignition.

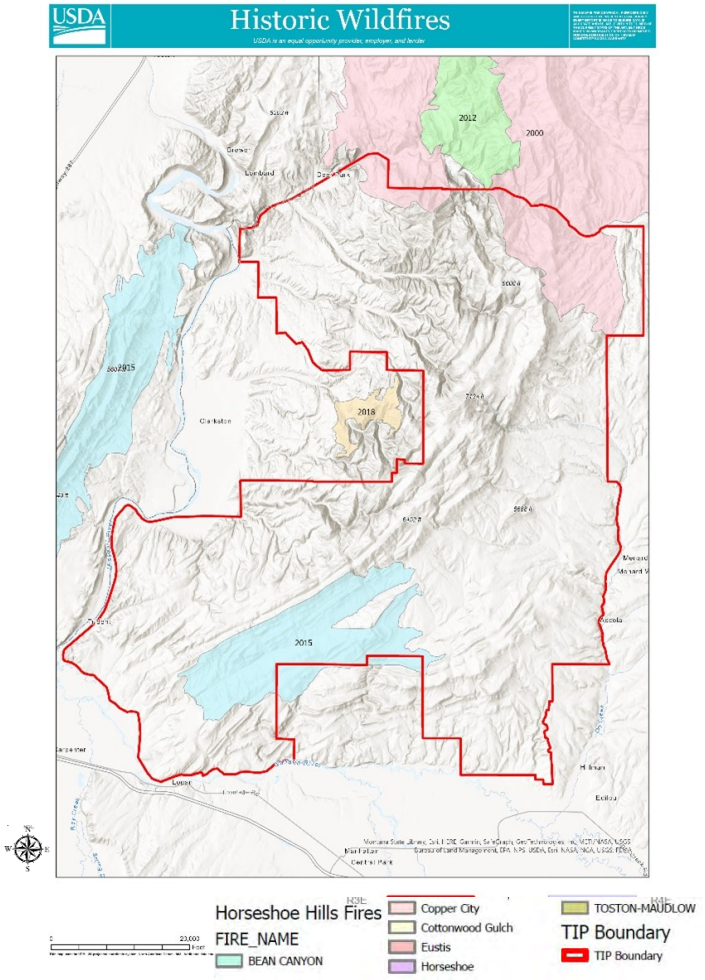


FIGURE 2: Five large fires have occurred in the past 23 years within the horseshoe hills begging the question of when the next fire occur

"Several authors recommended that priority for conifer removal be given to mountain big sagebrush sites in the early stages of woodland succession, before trees become dominant, because communities at this stage are likely to be more resilient, and restoration to mountain big sagebrush dominance is more likely to be successful than on sites in later stages of woodland succession."

Example of a Headcut

In addition to degredation of the rangeland biotic integrity, hydrologic function has suffered as well due to decreased soil stability, improper grazing, soil compaction, and invasive plant species. Increased water runoff has resulted in gully and soil erosion in draws and other areas that collect water. Channel incision and headcutting are the two most common forms of gully erosion in ephemeral and perennial waterways. Channel incision reduces the ability for a stream to access the natural floodplain, resulting in loss of hydrologic function over hundreds or thousands of acres over the length of a stream. Headcuts are created where there are abrupt changes in slope allowing for water to plunge off of a ledge and then begins scouring out a pocket of eroding soils and debris. Water is transported off site at a faster rate through the channelization of streams and draws not allowing for flora and fauna to take advantage of the scarce resource.

RESTORATION OF RARE AND DECLINING NATURAL COMMUNITIES

"The hydrological and ecological function of many riparian and meadow areas have been degraded by gully erosion, channel incision, and lowered water tables. Causes are varied but often include current and past land uses, such as, improper grazing, soil compaction by livestock and wildlife trailing, roads, historic flooding events, and invasive plant species. Given the scale of the problem, restoration techniques that are relatively simple, cost-efficient, and effective are needed in the toolbox to allow more conservationists and landowners to engage in implementation."

-Maestas Et. al.-

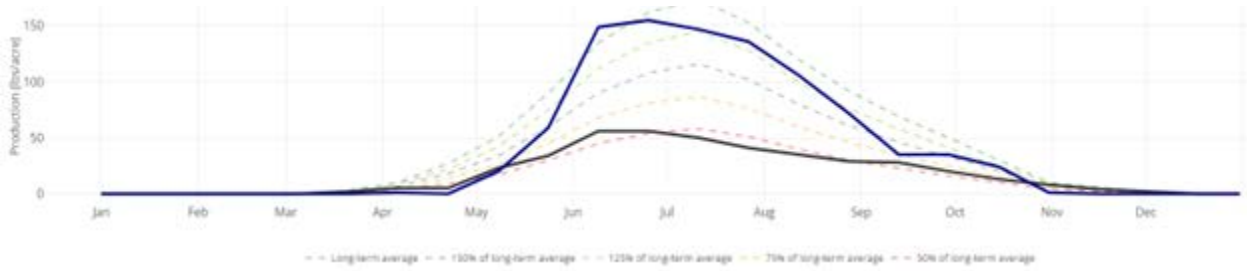
Picture was sourced from the Utah State University Restoration Consortium publication on Low-Tech Process-Based Restoration of Riverscapes

Herbaceous Production Lost to Woody Encroachment

Another side effect of conifer encroachment into rangeland is a potential loss in forage quantity and quality. Sunlight, Water, and nutrients are the three main building blocks plants are competing for. When conifers start to encroach on the rangeland, they inevitably outcompete the grass and forbs species causing extensive losses in the amount of forage available on the landscape. Figure 4A and 4B shows an exponential decline once the encroachment takes hold.

Annual 16 Day Production Data *(Figure 4A)*

The graph below shows 16-day estimates of herbaceous vegetation production for 1986 (Black) and 2021 (Blue) compared to the long-term averages for the site.



Cumulative Production *(Figure 4B)*

The graph below shows the cumulative estimates of herbaceous vegetation production for 1986 (Black) and 2021 (Blue) compared to the long-term averages for the site.

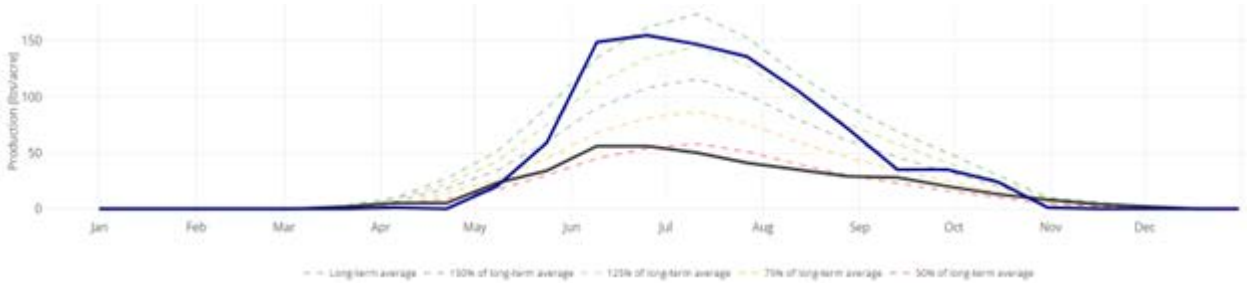
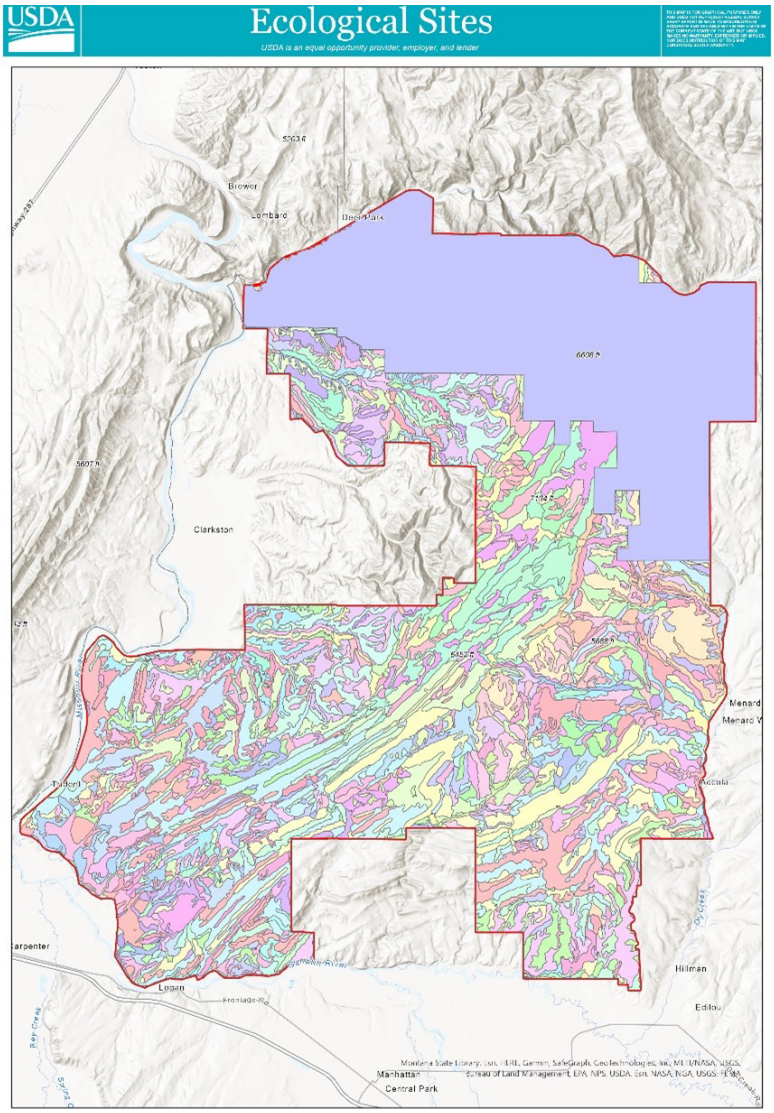
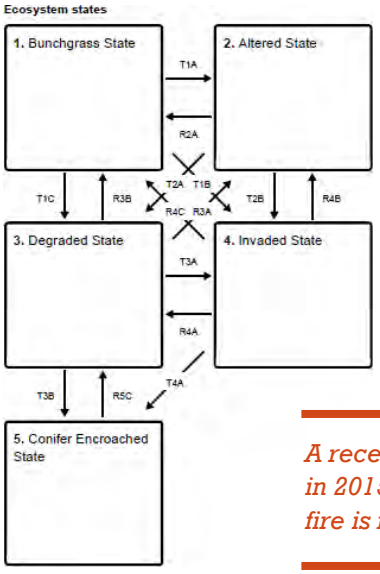


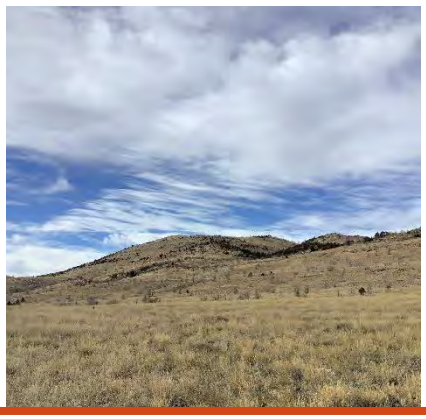
Figure 4A and 4B: The selected polygon was chosen from the TIP boundary to highlight an area recently invaded by conifers. The average herbaceous production has been cut almost in half by the invasion of Douglas Fir into the historic meadow. This data is very useful in modeling the potential benefits of the removal of undesirable species. This data was derived from a tool developed by a team at the University of Montana in Missoula to help land managers estimate the amount of production lost from conifer encroachment.

Ecological Sites

The map to the right shows the different ecological sites that are located within the TIP boundary. The area in the northern portion of the TIP boundary is left unclassified due to lack of access. There are five main Ecological Sites represented within the TIP boundary, **Droughty Steep subset A and B, Shallow Limy, Loamy Steep, and Limy**. The reference state for these ESD's consists of 2 known potential plant communities 1.1 Mid-stature Bunchgrass community and 1.2 Mixed Bunchgrass community. These are generally characterized by a mid-stature, cool season grass community with limited shrub production. Restoration efforts will be focused on the altered and degraded plant communities that have been invaded by conifers due to poor grazing management and fire suppression. As you can see on the right there is a graphic showing the ecosystem states for a selected ESD within the TIP boundary. The end goal is to use management tools to alter the ESD back to the reference state shown in the graphic.







A recent burn scar from the Cottonwood Gulch Fire in 2015 showing the return to reference state when fire is reintroduced to the landscape.

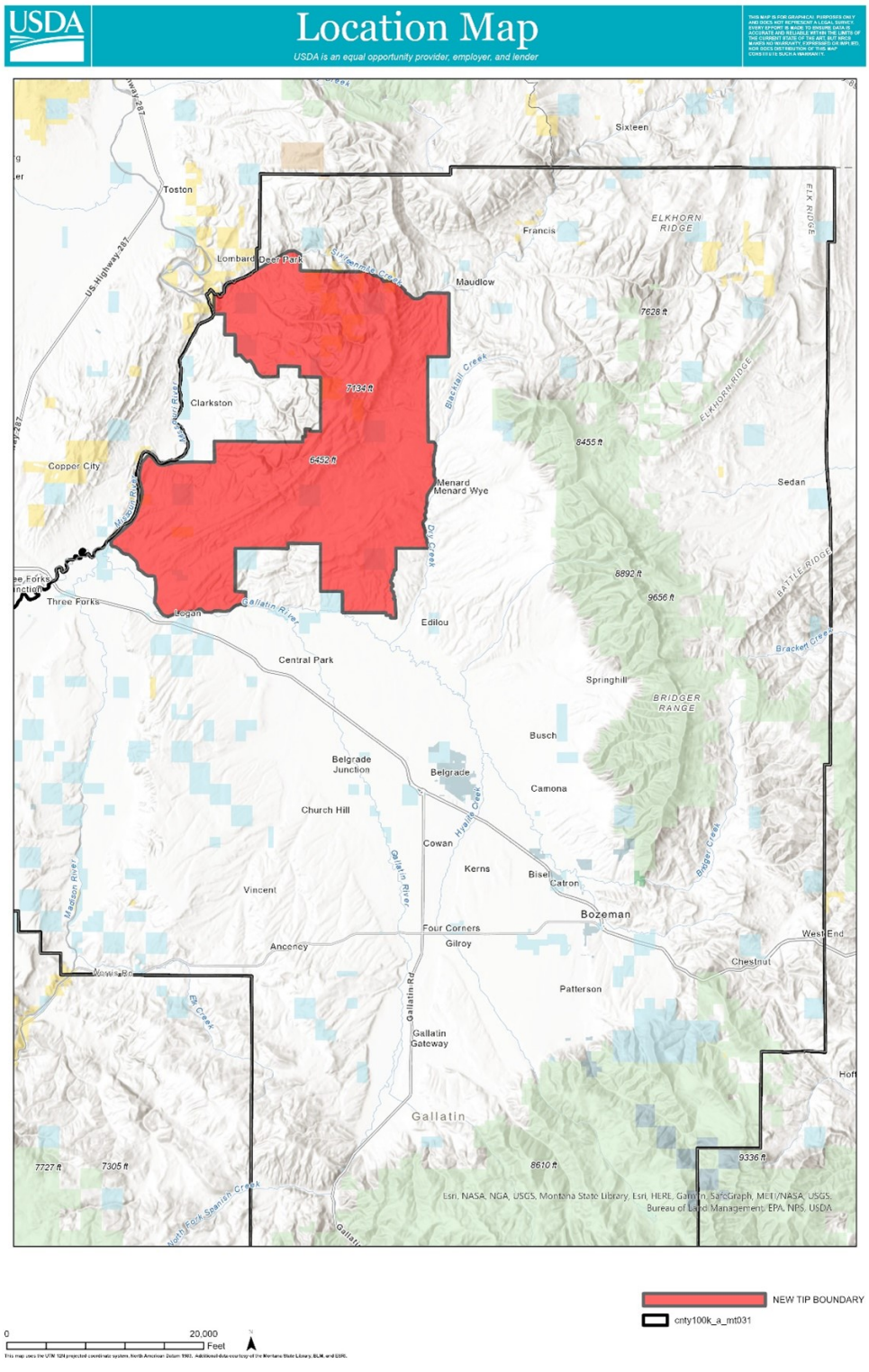


FIGURE 5: PROJECT AREA HIGHLIGHTED IN RED WITH ADDITIONAL PUBLIC AND PRIVATE LAND OWNERSHIP IDENTIFIED

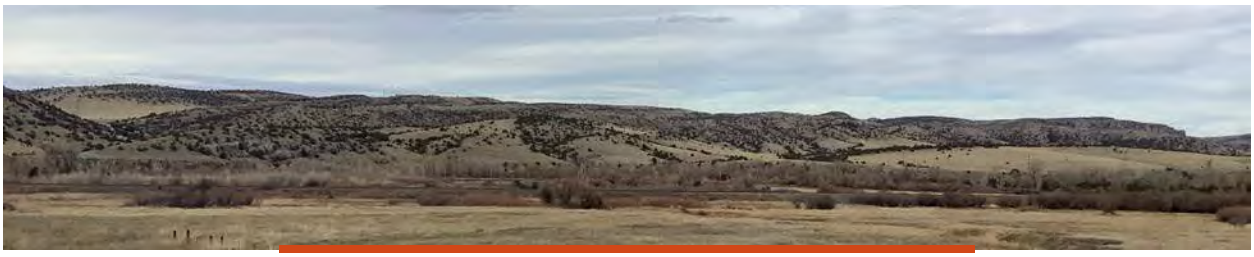
Geographic Focus

Canopy closure occurring on a heavily invaded slope

The total acreage of the project area is 83,110 acres and will include a majority of the southern portion of the Horseshoe Hills. The western boundary is lined by the Missouri River and the small town of Clarkston, MT. The southern boundary is formed by the East Gallatin River and the Gallatin Ranch Subdivision, which is approximately six thousand acres, and home to around 70 people. The eastern boundary is Dry Creek Road and the foothills of the Bridger Mountain Range. To the north the boundary is by Sixteenmile Creek with the northeast corner being the small town of Maudlow, MT. The boundary is intended to protect the communities of Clarkston, Gallatin River Ranch, and Maudlow in the event of a catastrophic wildfire. In addition, areas within the boundary have seen significant land use change due to the encroachment of conifers. Large areas of previously open grasslands have been invaded by Rocky Mountain Juniper and Douglas Fir. The lowest elevation within the project area is near the confluence of the East and West Gallatin at 4,000 ft to the highest point within the horseshoe hills at around 7000ft.

Goals and Objectives/Resource Concerns

The primary goal of this project is to restore ecosystem function of the historic rangelands within the Horseshoe Hills project area that has been lost through the encroachment of conifer species. This goal will be accomplished through the removal of conifers and restoring ecosystem function by using the following practices: 10,000 acres of Brush Management, 500 acres of Prescribed Burning, 450 acres of Forest Stand Improvement, 900 acres of Herbaceous Weed Treatment, at least 20 Zeedyk structures and 50 Beaver Dam Analog/Post Assisted Log Structures (BDA/PALS) structures over the next 5 years. Specific resource concerns have been identified within the Gallatin County 2022 Local Working Group identifying the priority resource concerns for the Horseshoe Hills. The identified resource concerns are **plant structure and composition**, **wildfire hazard from biomass accumulation**, and **naturally available moisture use**. Plant structure and composition will be the primary resource concern addressed through the implementation of this TIP with the latter two being secondary resource concerns.



Pictured above are the Horseshoe Hills looking north over the East Gallatin River

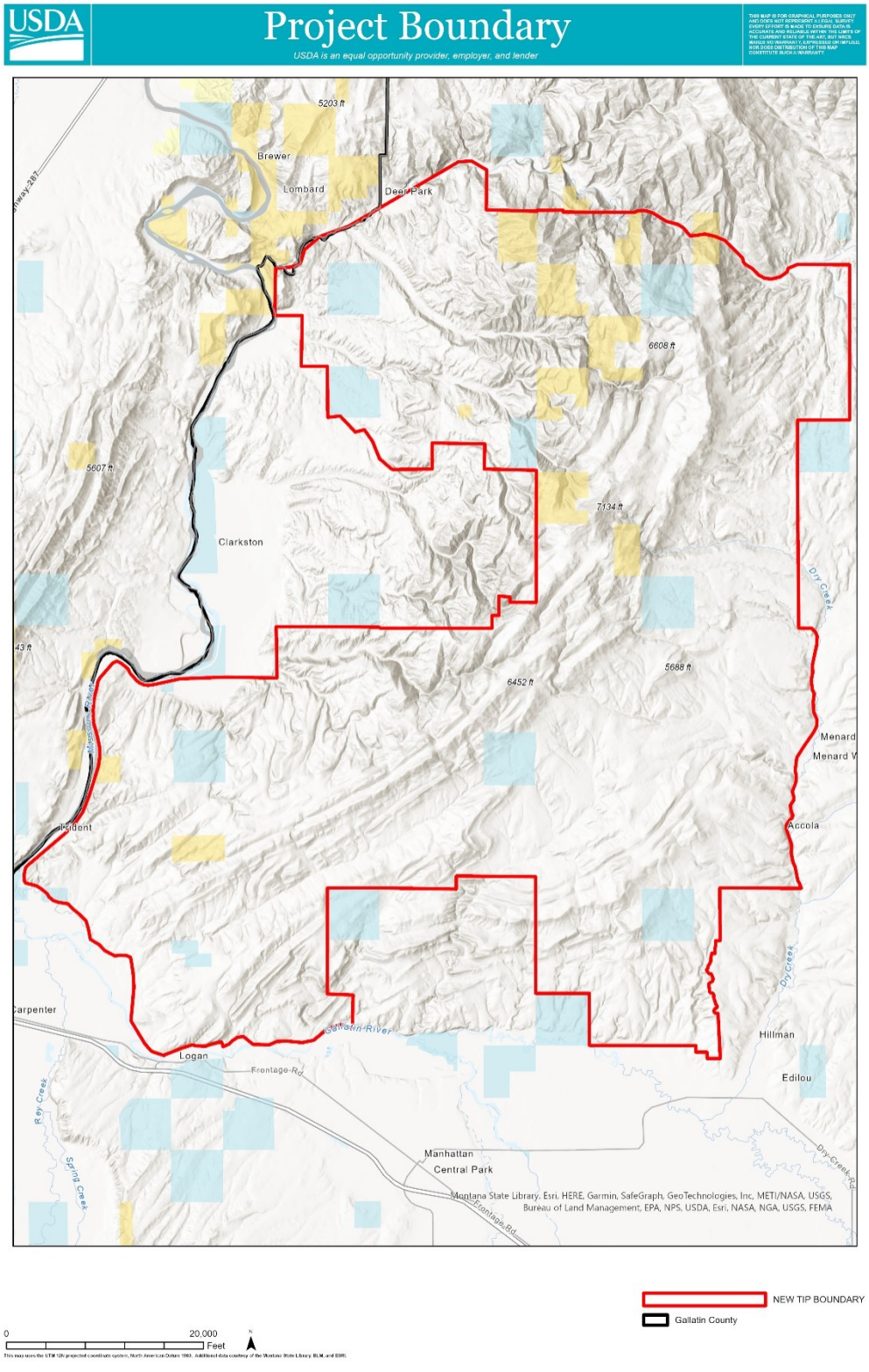


FIGURE 6: THIS PROJECT AREA RUNS FROM THE BANKS OF THE MISSOURI RIVER TO THE FOOTHILLS OF THE BRIDGER MOUNTAINS IN NORTHWESTERN GALLATIN COUNTY.

Alternatives

There are three alternatives to be considered:

1. No action
2. Landscape restoration utilizing mechanical treatment only
3. Landscape restoration utilizing prescribed fire, mechanical control and slash treatment, herbaceous weed treatment and utilization of Zeedyk and Beaver Dam Analogs/Post Assisted Log Structures

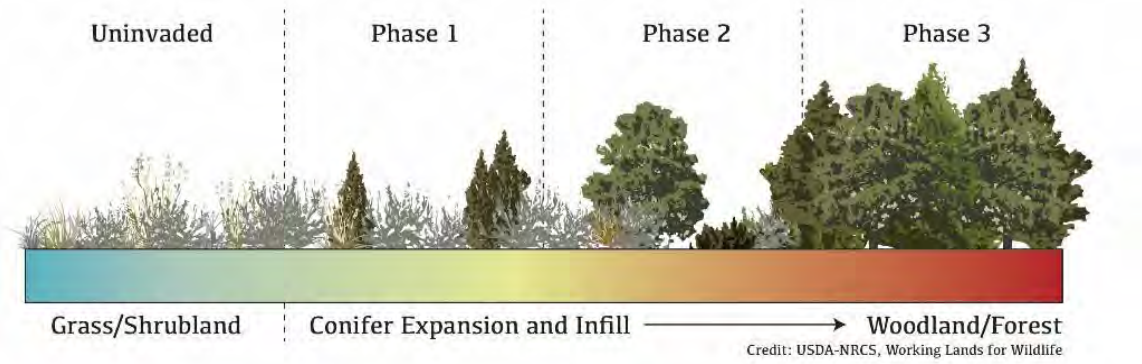


Figure: 7 *Diagram* showing the progression of juniper encroachment in grass/shrubland communities in the absence of natural disturbance. Categories serve as a course surrogate for woodland expansion phase: treeless/early phase 1 (0-1%), phase 1 (2-10%), phase 2 (11-20%), and phase 3 (>=21%).
Phase information was pulled from https://www.wlfw.org/sagebrush/woodland-expansion/

1. **No Action**: Under the no action alternative, no changes would be made to the current land management practices. If the no action alternative is selected, the expected impacts include continued expansion of Rocky Mountain juniper and Douglas Fir in the upland grass and shrub communities, as well as into the riparian habitat. Juniper would likely encroach into areas where it is not currently found and would continue to increase in areas where it exists, transitioning from phase 1 and 2 stands (light and moderate density) to phase 3 stands (high density requiring wood residue treatment) (Fig. 7). As juniper expands, it will continue to suppress desirable species resulting in reduced forage for livestock and wildlife, increased bare ground, surface runoff and erosion, reduced infiltration and water quantity, impaired water quality, and increased noxious weed infestations. This unaltered state will contribute greatly to the risk of a catastrophic wildfire.

2. **Mechanical Treatment:** this alternative will utilize mechanical treatment to control conifer encroachment. Herbaceous weed control will reduce the potential of noxious weeds from invading recently disturbed treatment areas. Conifers will be cut down using either chain saws, feller-bunchers, shearers, or masticators. Slash will then be

disposed of by chipping, piling, and burning, or lopping and scattering. The benefits of the mechanical control alternative are that conifers can be removed with greater control and precision than with the use of fire and with minimal impacts to non-target woody species. This alternative will result in improved forage productivity and vigor, increased browse for a variety of wildlife species, increased infiltration, and reduced surface runoff. In certain cases, Zeedyk structures and BDA/PALS may be utilized to reduce erosion and restore some of the hydrologic functions of the drainage.

3. **Mechanical and Prescribed Fire Treatment**: is the selected alternative and will utilize mechanical treatment to control phase 3 and some phase 2 conifer encroachment while utilizing Rx fire to treat phase 1 and 2 encroaching stands and reduce fuel loading post mechanical treatment. Mortality is expected on trees smaller than 3' tall while utilizing Rx fire. Herbaceous weed control will reduce the potential of noxious weeds from invading recently disturbed treatment areas. This alternative will result in improved forage productivity and vigor, increased browse for a variety of wildlife species, increased infiltration, and reduced surface runoff. In certain cases, Zeedyk structures and BDA/PALS may be utilized to reduce erosion and restore some of the hydrologic functions of the drainage.

Pictured above is conifer encroachment creeping out of a dense draw and invading the open rangeland

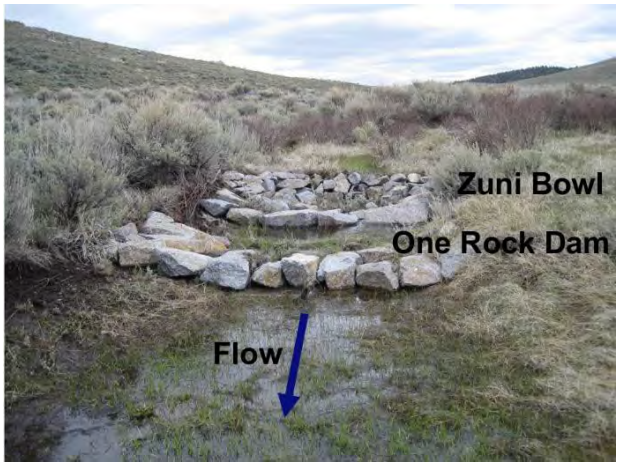
The primary NRCS conservation practices that will be used include:

1. **Brush Management** (314) will be implemented by mechanical control methods to cut or shear the trees within 4-inches of the ground surface. Cutting with chain saws will be the most common method used
2. **Woody Residue Treatment** (384) will be utilized for chipping and/or piling cut trees and slash to reduce fuel loads in treatment units. Slash piles will be burned within two years, chips will not exceed 4-inches in depth
3. **Forest Stand Improvement** (666) will be used to thin forests that are overstocked where trees are competing for resources
4. **Herbaceous Weed Treatment** (315) will be used to control noxious weeds within the project area if present

5. **Restoration of Rare or Declining Natural Communities** (643) BDA/PALS and Zeedyk structures will be utilized in areas with some moderate gully erosion and where adequate supplies of materials necessary for construction are locally available
6. **Prescribed Burning** (338) will be implemented to control areas of light conifer encroachment. Low density units will be broadcast burned under proper conditions to achieve adequate mortality and consumption of target species
7. **Firebreak** (394) will be used to set containment lines around the planned prescribed burning area
8. **Range Planting** (550) will be utilized to establish desirable grasses, forbs, and legumes, and shrubs
9. **Prescribed Grazing (528)** will be included within the TIP to address resource concerns associated with the removal of vegetation exceeding 25% canopy cover under the practice Brush Management (314) and deferment of grazing following Rx burn

Figure 8: Below left are two examples of Zeedyk Rock structures that will be implemented across the project area to reduce erosion and increase water holding potential

Below is an example of a Beaver Dam Analogue aerial view



Implementation

Coordination is underway with the NRCS biology staff to assist with the implementation of the Restoration of Rare or Declining Natural Communities. Collaboration with the Park, and Broadwater County NRCS field offices will be crucial for successful implementation of the TIP. Both counties have prior experience with the available practices associated with the project.

Implementation will occur starting in 2024 and the final year of contracting will occur in 2028 with individual contract items will be complete within the 5-year contract limitation. Herbaceous weed treatment will be scheduled on properties with associated resource concerns both pre and post implementation to reduce the prevalence of noxious weeds prior to ground disturbing practices and protect the vulnerable soils left from the removal of conifers. Implementation will vary based on the property and contractor availability, but

priority will be ordered starting with addressing phase 1 and 2 conifer encroachment and moving towards the heavier densities. This will allow more acres to be treated and a greater impact with limited time and funding.

The total financial contribution that NRCS will be investing into the project area is $670,842.48 in the first year, $772,010.86 annually for years 2-4, and $542,936.48 for the final year for a total of $3,529,811.54 over the length of the project. Below is a table breaking down the total NRCS financial contribution along with the number of acres expected to be treated annually. It is estimated that we will have 3-5 contracts per year.

Table 9

Year 1

Annual Payment Calculations				
Practice	**Extent**	**Type**	**Payment Rate**	**Total**
Brush Management Mechanical, Large woody vegetation, High Density (314)	300	ac	$339.18	$101,754.00
Brush Management Mechanical, Large Woody vegetation, Light Density (314)	1500	ac	$238.86	$358,290.00
Prescribed Burning Understory (338)	120	ac	$106.26	$12,751.20
Fire Break Constructed, Light Equipment (394)	5000	ft	$3.18	$15,900.00
Woody Residue Treatment (384)	250	ac	$405.50	$101,375.00
Forest Stand Improvement (666)	80	ac	$580.77	$46,461.60
Herbaceous Weed Treatment Chemical, spot treatment (315)	150	ac	$94.97	$14,245.50
Range Planting (550) Native, Standard Preparation	50	ac	$90.29	$4,514.50
Prescribed Grazing (528) Range Standard less than 2,500 acres	2000	ac	$3.35	$6,700.00
Restoration of Rare or Declining Natural Communities Rock Structures (643)	4	cu yd	$581.67	$2,326.68
Beaver Dam Analogues or Post-Assisted Log Structures (643)	200	Ln ft	$32.62	$6,524.00
			Total:	**$670,842.48**

Year 2-4

Annual Payment Calculations				
Practice	**Extent**	**Type**	**Payment Rate**	**Total**
Brush Management Mechanical, Large woody vegetation, High Density (314)	400	ac	$339.18	$135,672.00
Brush Management Mechanical, Large Woody vegetation, Light Density (314)	1600	ac	$238.86	$382,176.00
Prescribed Burning Understory (338)	100	ac	$106.26	$10,626.00
Fire Break Constructed, Light Equipment (394)	5000	ft	$3.18	$15,900.00
Woody Residue Treatment (384)	300	ac	$405.50	$121,650.00
Forest Stand Improvement (666)	100	ac	$580.77	$58,077.00
Herbaceous Weed Treatment Chemical, spot treatment (315)	200	ac	$94.97	$18,994.00
Range Planting (550) Native, Standard Preparation	50	ac	$90.29	$4,514.50
Prescribed Grazing (528) Range Standard less than 2,500 acres	2000	ac	$3.35	$6,700.00
Restoration of Rare or Declining Natural Communities Rock Structures (643)	8	cu yd	$581.67	$4,653.36
Beaver Dam Analogues or Post-Assisted Log Structures (643)	400	Ln ft	$32.62	$13,048.00
			Total:	**$772,010.86**

Year 5

Annual Payment Calculations				
Practice	**Extent**	**Type**	**Payment Rate**	**Total**
Brush Management Mechanical, Large woody vegetation, High Density (314)	200	ac	$339.18	$67,836.00
Brush Management Mechanical, Large Woody vegetation, Light Density (314)	1300	ac	$238.86	$310,518.00
Prescribed Burning Understory (338)	60	ac	$106.26	$6,375.60
Fire Break Constructed, Light Equipment (394)	2500	ft	$3.18	$7,950.00
Woody Residue Treatment (384)	200	ac	$405.50	$81,100.00
Forest Stand Improvement (666)	60	ac	$580.77	$34,846.20
Herbaceous Weed Treatment Chemical, spot treatment (315)	150	ac	$94.97	$14,245.50
Range Planting (550) Native, Standard Preparation	50	ac	$90.29	$4,514.50
Prescribed Grazing (528) Range Standard less than 2,500 acres	2000	ac	$3.35	$6,700.00
Restoration of Rare or Declining Natural Communities Rock Structures (643)	4	cu yd	$581.67	$2,326.68
Beaver Dam Analogues or Post-Assisted Log Structures (643)	200	Ln ft	$32.62	$6,524.00
			Total:	**$542,936.48**
			Grand Total:	$3,529,811.54

PRODUCER INTEREST

Figure 10: Postcards were sent to all available addresses within the TIP boundary to gauge the current interest within the TIP area. We received responses from 7 landowners that represent the control of 37,659 acres of deeded land that are interested in submitting applications. With the total TIP area being 83,110 that represents almost half of the eligible acres within the treatment area already expressing interest. Public land is a small component within the Horseshoe Hills and only consist of 6,672 acres in the entire project area between the Bureau of Land Management and the State of Montana. The BLM has the largest majority with 3,446 acres of the public pie while the state has 3,226 acres. It is assumed that more landowners will express interest once implementation begins.

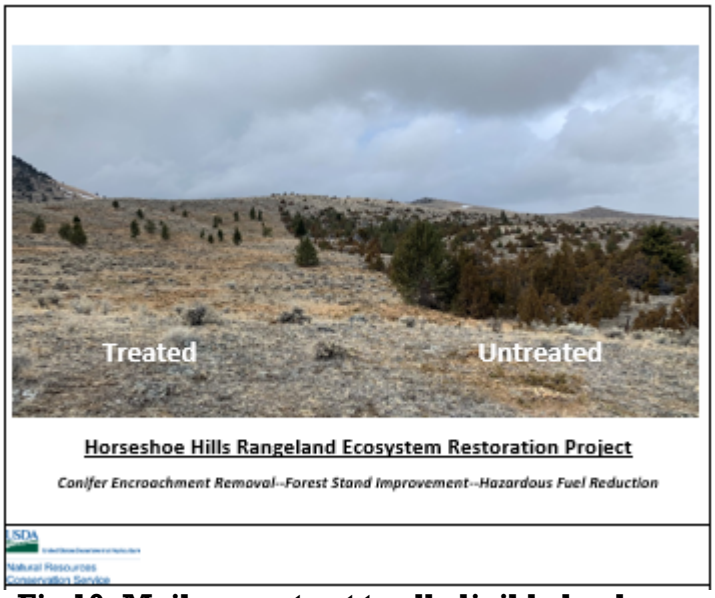


Fig 10: Mailers sent out to all eligible landowners in the project area

One potential challenge to implementation could be the current fire risk that could limit the ability of contractors to perform the work. Efforts will be made to operate outside of peak fire season if snow depth allows contractors to reach the lowest live branch, which is crucial to the control of conifer species. Another potential issue is having enough NRCS Field Office staff time to plan and implement the project, additional staff time will be requested through the Bozeman NRCS Area Office.

NRCS is the lead agency for the project, but there are many partners who share similar goals and will provide additional support, these include the Gallatin Watershed Council, the Gallatin Conservation District, Gallatin Watershed Council, Gallatin County Weed District, Montana Department of Environmental Quality, Gallatin County Local Water Quality District, Department of Natural Resource Conservation, Bureau of Land Management, Trout Unlimited, Montana Outdoor Science School, along with the community of Clarkston and The Gallatin River Ranch.

PARTNERSHIPS

Gallatin Conservation District (GCD)

GCD will provide outreach assistance to inform private landowners of the NRCS and other partner programs that are available in Gallatin County. The GCD will market the program through newsletters and social media. Site visits may be completed with NRCS assistance, and a robust monitoring program will be implemented to determine if flows in Dry Creek have been affected by juniper removal. Currently the conservation district has a cost share program which could be utilized to offset some of the costs to the participants.

Gallatin Watershed Council (GWC)

GWC has completed several restoration projects on Dry Creek and is an active partner in trying to address issues related to water quality and water quantity, especially in the area of the East Gallatin. The importance of tributaries to the East Gallatin in diluting the nutrient levels related to the water treatment plant cannot be overstated. GWC is committed to promoting juniper removal within the TIP area to increase stream flows and to address fire risk which could result in the degradation of water resources. Where appropriate and with permissions GWC may assist with implementation of beaver-dam analog (BDA) or Zeedyk demonstration projects, to the extent that they are practical and part of the landowner's overall conservation goals.

Gallatin County Weed District (GCWD)

The Gallatin County weed district has an ongoing program to treat noxious weeds within the project boundary. The weed district will continue to promote their program with an emphasis on treating additional acres on properties that participate in TIP to remove juniper. Continued education and outreach activities will occur within the TIP boundary

Montana Department of Environmental Quality (MTDEQ)

MTDEQ has selected the Lower Gallatin watershed as their next focus watershed. This means that MTDEQ will commit up to $500,000 per year for three years for projects in the Lower Gallatin beginning in 2023. This announcement is part of an ongoing effort to address water quality on impaired streams, with the specific intent to increase water quality on the East Gallatin as it relates to the water treatment plant. Flow monitoring on Dry Creek along with water quality samples will be ongoing. This work increases the knowledge base and provides a baseline to work off when assessing outcomes of the TIP.

Department of Natural Resource Conservation (DNRC)

The local management forester with the State mentioned that they will have an active logging project going on in the next year on a section of state land within the boundary of the TIP. Discussion has commenced around providing financial assistance to the leasee of the state land to improve grazing opportunities as well as improve the health of the forest. DNRC has suggested that they could provide resources for implementing Rx fire on BLM owned land.

Bureau of Land Management (BLM)

Partnership with the BLM Butte Field Office (BFO) is being forged in an attempt to work across jurisdictional boundaries, in order to treat vegetation at the landscape scale. The BFO assesses and monitors the health of BLM-administered public lands based off their "Planning Area Process & Land Health Assessment Schedule". The Horseshoe Hills are included in the BFO's Park/Gallatin Planning area, currently scheduled to be evaluated in 2024.

Trout Unlimited (TU)

Trout Unlimited has done some preliminary stream health assessments to prioritize portions of Dry Creek that are the most imperiled. In addition, they have included recommendations for installation of beaver dam analog structures across a majority of Dry Creek to attempt to reduce erosion, encourage riparian growth, and store water in the floodplain which will result in colder water in Dry Creek at base flow. Trout Unlimited will also provide expertise on installation of BDA PALS structures.

Montana Outdoor Science School (MOSS)

MOSS has expressed interest in providing volunteers to help implement Zeedyk and BDA/PALS structures within the TIP boundary.

Gallatin County Emergency Management (GCEM)

GCEM will be working to implement funding from FEMA near Clarkston and the surrounding areas to reduce hazardous fuel loading close to structures.

National Wild Turkey Federation (NWTF)

The NWTF area forester will assist with the writing and implementation of forest management plans that are required under NRCS policy for forestry practices.

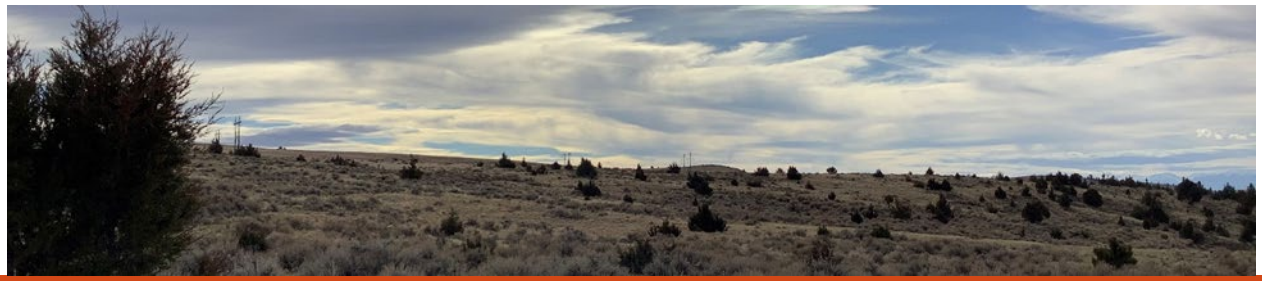
OUTCOMES

Measurable outcomes that will be monitored will include transect monitoring of plant communities pre and post treatment. Permanent photo points will also be utilized to show the change in vegetation that has occurred from the treatment. In addition, the number of treated acres will be tracked and compared to the total acres included in the TIP. The results of this TIP will be very clear and easy to observe. A successfully implemented project will be safer in the event of a wildfire, create a properly functioning ecosystem, and increase the availability of water and nutrients available to desirable flora and fauna.

Pictured above is a densely invaded slope on state land within the tip boundary

Additionally, the Gallatin Conservation District will collect flow monitoring data on Dry Creek to compare with pre-project data to evaluate hydrologic response to conifer removal in the watershed. It is estimated that there will be up to 5% increase in late season flows on Dry Creek (Aug – Sept 15th) with the completion of TIP. This will contribute additional flows to the Upper Missouri River Watershed. Another tool that will be used to assess the potential and observed outcomes of the TIP is the Rangeland Analysis Platform Production Tool. The Bozeman Field Office will use this tool to model the estimated range production increase from the removal of conifers pretreatment, then use field collected data to verify the results.

Observable outcomes from this TIP include a more secure food supply, habitat stability for fish, wildlife and livestock, and an improved way of life for the ranching families on the landscape. In addition, the climate resiliency for the TIP boundary and surrounding area will be increased due to the reduction of competition to native and desirable species as well as increase availability of water and nutrients. Additional resources will allow the plants and animal resist and adapt to stress event more easily.



Phase 1 Conifer Encroachment

Ranking Questions

1. Does the project include any Climate Smart Ag or High Priority Practices?
   No climate smart ag or high priority practices included.

2. Does this application address phase 1 and 2 of the conifer expansion model?
   Application does not address phase 1 and 2 of the conifer expansion model

3. Does this application address conifer encroachment within 1/2 mile of a residential building?

   Application does not address conifer expansion within ½ mile of a residential building

4. Is the project located directly adjacent to other fuels reduction or conifer encroachment projects?

   Project is not located directly adjacent to other fuels reduction or conifer encroachment projects

Above is Round Mountain located in the southern portion of the Horseshoe Hills looking to the west

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