*Photo credit: Justin Meissner 3/31/2020*

# CONIFER ENCROACHMENT REMOVAL
# CANYON FERRY WEST

Improve riparian and rangeland plant structure and composition by removing Rocky Mountain juniper encroachment in the Canyon Ferry West geographical area, Broadwater County, Montana. FY 2021-2024

USDA United States Department of Agriculture

**Justin Meissner**
NRCS
Broadwater/Gallatin
District
Conservationist

**Aaron Clausen**
Pheasants Forever
Partner Biologist

## OVERVIEW AND BACKGROUND

Increased fire suppression and poor grazing management during the late 1800s to present have resulted in the expansion of Rocky Mountain juniper (*Juniperus scopulorum)* (RMJ) beyond its historic range throughout much of Broadwater County. Juniper expansion has resulted in significant reduction of upland grass, forb, brush and aspen communities, reduction of riparian habitat along the Missouri River and its tributaries, a decrease of nesting habitat and winter range for a variety of wildlife species, and loss of forage production for livestock.

Recently, there has been a concerted effort by the Whitehall, Helena, and Townsend NRCS field offices to address juniper encroachment on rangeland and overstocked unhealthy forests. This effort has been noticed by non-government organizations, partner agencies, and local landowners. This Targeted Implementation Plan (TIP) is a direct result of that effort. In the fall of 2019, a core group of landowners approached the Townsend NRCS field office with a proposal to expand the Capital 360 and Elkhorn Cooperative Management Range Health and Conifer Removal (ECMA) TIP effort in removing Rocky Mountain juniper from rangeland and the riparian area of Beaver Creek. These landowners provided names of their neighbors that might be interested and have volunteered to host "town hall" meetings in their neighborhoods. This will allow the NRCS and Broadwater Conservation District to provide educational workshops in the community where this TIP will occur.

In the absence of natural disturbance events (i.e. periodic fires, flooding, intensive grazing) Rocky Mountain Juniper can out-compete desirable perennial, herbaceous, shrub, and tree species. Over time, this decreases the extent and diversity of ecologically and hydrologically significant structural and functional plant groups. Encroaching juniper can also increase the risk of soil erosion and invasive weeds and decrease water quality and quantity. Continued juniper expansion into once healthy range, riparian, and forest sites degrades forage production, quality, and wildlife habitat value. Unchecked expansion of juniper can cause fir, pine, aspen, and cottonwood to decrease in forest and riparian sites, as well as bunchgrasses to be replaced with undesirable invasive annual grass species on rangeland sites. This replacement of mid-late successional desirable native species with invasive RMJ and exotic weed species increases soil erosion, decreases effective available soil moisture, and results in an upland plant community that lacks plant diversity and structure contributing to reduced forage and riparian forest production, as well as degraded wildlife habitat.

Encroachment of RMJ was identified in both 2016 and 2019 by the Broadwater County Local Working Group as one of the primary resource concerns to be addressed in all watersheds in Broadwater County. In 2019, NRCS prepared a Natural Resource Long Range Plan for Broadwater County, with considerable input from conservation partners. In section three (Natural Resources Analysis), section four (Natural Resource Concerns), and section five (Prioritization of Natural Resource Problems and Desired Outcomes) conifer encroachment is identified as a high risk to rangeland, forest, and riparian ecological function.

## PROBLEM STATEMENT

RMJ is a native species which has occupied its current geographic range for several thousand years since the recession of the glaciers at the end of the last ice age approximately 12,000 years ago. However, over the past 130 years, RMJ has proliferated to an unnatural degree, occupying ecological sites where it suppresses succession and other plant species, and rapidly encroaches into neighboring plant communities. The expansion of RMJ is attributed to several factors, including; the introduction of improper livestock grazing, increased levels of atmospheric $CO_2$, and decreased fire frequency. Of these factors, decreased fire frequency is the most important factor.

RMJ encroachment is a concern because as it expands into other plant communities it causes changes in composition, structure and biodiversity. As RMJ increases, other woody species – including sagebrush, aspen, willow, cottonwood, and others – are suppressed and can eventually be eliminated from the site. With time, RMJ also outcompetes the herbaceous plant component, significantly reducing the ground cover and increasing erosion

with the exposure of bare soil. Effective available moisture is reduced, while surface runoff, sheet and rill erosion increases. This causes soil loss and sedimentation into adjacent streams.

***Figures 1 and 2**. Light density Rocky Mountain juniper encroachment, Broadwater County.*
*Photo credit: Justin Meissner*

Juniper is a very efficient water user, with both a deep taproot and shallow lateral roots allowing it to access moisture throughout the soil profile. There is both anecdotal evidence and empirical research which suggests that juniper encroachment leads to reduced stream flows and the loss of springs and seeps.

Because mule deer, white tail deer, and moose diets consist heavily of deciduous woody vegetation and forbs, habitat changes that reduce the quality or quantity of these plants usually have a negative impact to wild ungulate populations. Numerous factors have contributed to loss, fragmentation, and degradation of wildlife habitat by altering the plant communities that form the basis of those habitats. These factors include historic fire suppression, improper grazing, conifer encroachment, and invasion of non-native vegetation. Over time, this has led to decadent riparian plant communities, and uplands with reduced bunch grass and forb components.

***Figures 3 and 4**. Beaver Creek riparian area light density RMJ encroachment (l).*
*Upper Beaver Creek riparian area high density RMJ encroachment (r).*

Aspen stands and riparian communities are important wildlife habitat, providing cover and nutritious forage at key times throughout the year. They also play important ecological roles for the landscape by virtue of their location at the bottom of watersheds, regulating water quality, providing critical habitats for fish and wildlife, and often playing a central role in recreational opportunities. Over the past century the condition of these areas has declined due to lack of grazing management and a lack of fire or flood disturbance, which in turn has contributed to conifer encroachment. Conifers – including juniper – are native to these areas. However, left unchecked by a lack of

periodic disturbance, they proliferate to occupy much larger areas than are observed under natural conditions. In areas exhibiting this trend for several decades (Figs. 1 – 4), juniper simultaneously occupy both younger riparian landforms and older ones. The resulting effect on plant community development is the inhibition of pioneer species establishment on the sandbars and streambanks, as well as the displacement of understories and woody species regeneration on riparian floodplain and terrace sites.

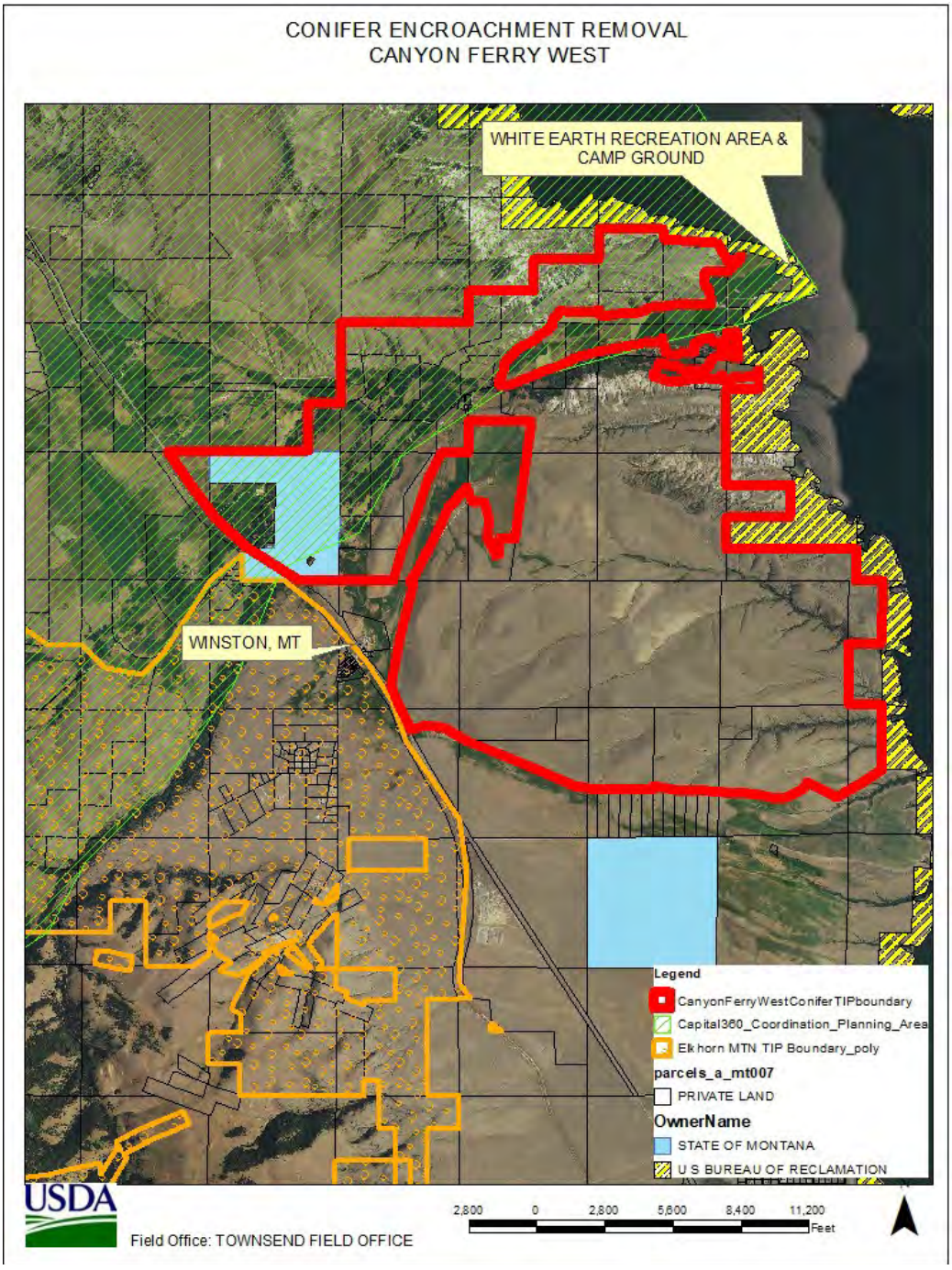


***Figure 5:*** *Geographical extent of Canyon Ferry West TIP*

## GOALS AND OBJECTIVES

The goals of TIP 1 are to improve rangeland and riparian plant structure and composition, maintain wildlife habitat, and increase effective available soil moisture through removal of conifer trees on 5,000 acres in the TIP area over a four- year period. This will result in treatment of 60% of the private land acres in the TIP boundary and over 75% of the acres inventoried as being affected by conifer encroachment. (Figure 5).

These goals will be accomplished in a two-phase implementation strategy. TIP 1 will address degraded plant structure and composition by removing conifer encroachment from years 2021 to 2023 with Brush Management (314), Woody Residue Treatment (384), and Herbaceous Weed Control (315) conservation practices. Once TIP 1 has been implemented a second TIP will be proposed. TIP 2 will improve range and riparian plant productivity health and vigor through upland and riparian fencing, off-stream water, and a coordinated noxious weed control effort in partnership with the Broadwater County Weed District from years 2024 to 2026. During TIP 2, Tree and Shrub Establishment (612) may also be offered; this will be on a case specific basis where the Pheasants Forever (PF) Partner Biologist or Bozeman Area Biologist identifies a need for additional treatments to enhance the existing riparian forest recovery.

This TIP area is comprised of multiple watersheds, including the terminal reach of Beaver Creek, a 21,000-acre drainage stretching from the eastern Elkhorn Mountains to Canyon Ferry Lake. This reach of Beaver Creek contains many plant community and wetland types, several of which are impaired by the unchecked proliferation of juniper. The proposed juniper treatments will enable early successional species to more easily take hold and will release pressure in the understory of older cottonwood-centric communities, making way for native forbs, grasses, and shrubs to return. This will increase forage availability and quality for both wildlife and livestock.

This project area also includes several ephemeral waterbodies and seasonal wet meadows, some of which are now supplemented with irrigation diverted near Winston, MT (Figure 6).

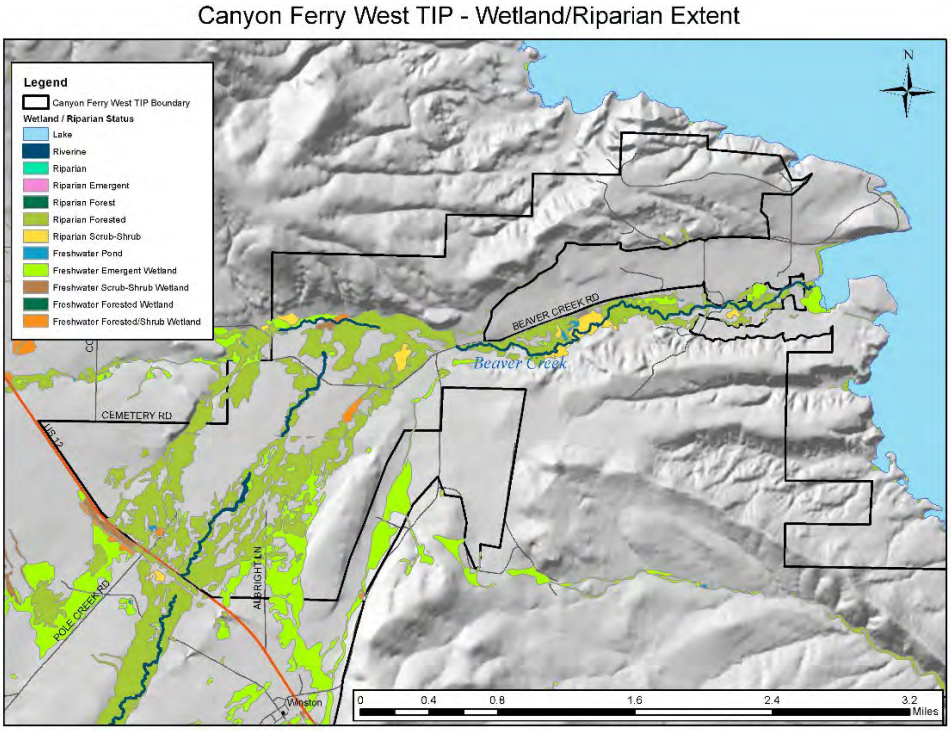


***Figure 6:*** *Wetland and Riparian Areas within the Canyon Ferry West TIP Boundary*

Juniper removal in the uplands will enable the restoration of grass and shrub components which have been suppressed in recent history, this will improve these sites for occupancy by long-billed curlews (*Numenius americanus*), a species of concern which have been documented in the project area. Another species of concern, the hoary bat (*Aeorestes cinereus)*, has been observed near White Earth Campground near Canyon Ferry Lake and will benefit from restoration of riparian plant communities and cottonwoods, the latter of which are frequently used as roost sites (Montana Natural Heritage Program (http://fieldguide.mt.gov/speciesDetail.aspx?elcode=AMACC05030).

This TIP ties in with the southeast boundary of the Joint Chief's Landscape Restoration Partnership - Capital 360 and the Elkhorn Cooperative Management Area Range Health and Conifer Encroachment Removal TIP where an additional 4,240 acres of conifer encroachment were removed in 2019 and 2020 (Figure 5).

OBJECTIVE 1/TIP 1: Treat 5,000 acres of Rocky Mountain juniper encroachment and 500 acres of noxious weeds on private riparian and upland range units. This effort has been landowner driven, with a core group approaching the Townsend NRCS Field Office asking for assistance in addressing conifer encroachment in the Canyon Ferry West geographical area in Broadwater County.

OBJECTIVE 2/ ((Subsequent) TIP 2): Reduce seasonal livestock access to Beaver Creek and critical riparian habitats by constructing 4 miles of riparian and upland fence, associated off stream stock water developments, and wide scale coordinated noxious weed effort. This phase will also be landowner and partner driven as two of the livestock producers in Phase A have begun contacting small-acre landowners, in their neighborhood to establish leases to graze these 20 – 40-acre parcels. This will improve the desirable plant species health and vigor on the small-tract riparian areas that are becoming overgrown with introduced grass species.

## ALTERNATIVES

There are three alternatives to be considered:

1. No action
2. Juniper management with facilitating practices.
3. Juniper management with mechanical control, woody residue treatment, and herbaceous weed treatment.

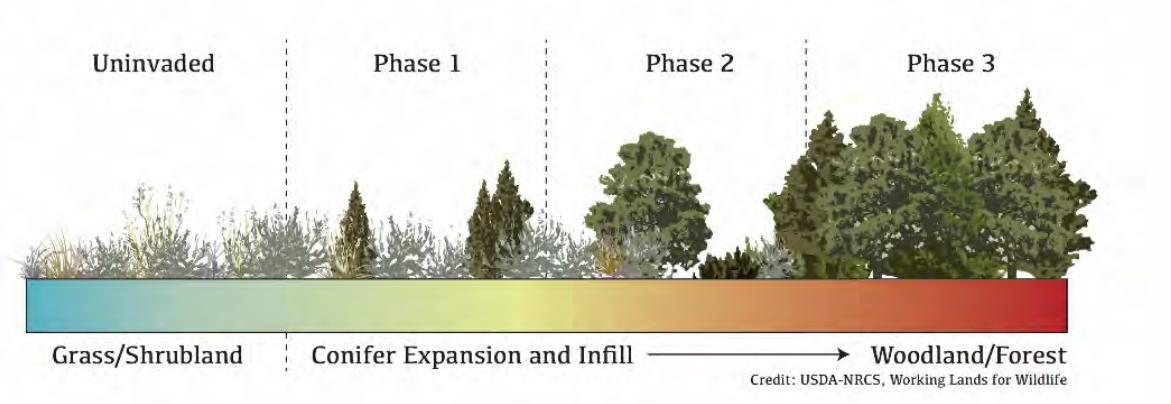


***Figure 7:*** *Diagram showing the progression of juniper encroachment in grass/shrubland communities in the absence of natural disturbance.*

### ALTERNATIVE 1 – NO ACTION

Alternative 1 is the no action alternative. 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 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.

### ALTERNATIVE 2 – JUNIPER MANAGEMENT WITH FACILITATING PRACTICES

Alternative 2 is a combination TIP 1 and TIP 2 into one resource management plan. This would remove all conifer encroachment from uplands and riparian areas, develop off stream and upland water, improve riparian pastures, implement rotational deferred grazing systems and conduct wide scale coordinated noxious weed management. Use of this alternative would meet the resource management system requirements for range, pasture, and forest land uses.

### ALTERNATIVE 3 – JUNIPER MANAGEMENT WITH MECHANICAL CONTROL, WOODY RESIDUE TREATMENT, AND HERBACEOUS WEED MANAGEMENT

Alternative 3 is to utilize mechanical control and woody residue treatment to control Rocky Mountain juniper encroachment. RMJ 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 juniper can be removed with greater control and precision than with the use of fire and with minimal impacts to non-target woody species. This will result in improved herbaceous forage productivity and vigor, increased deciduous browse for a variety of wildlife species, increased infiltration, and reduced surface runoff.

## PROPOSED SOLUTION AND ACTIONS

The proposed solution is Alternative 3 – Juniper Management with Mechanical Control, Woody Residue Treatment and Herbaceous Weed Management. This alternative was selected by the group of core landowners since it directly addresses the primary resource concern of degraded plant condition – plant structure and composition caused by RMJ encroachment. This will remove the increased competition and shading caused by RMJ, as well as stop the advancement and increasing severity of the encroachment.

Rocky Mountain juniper will be removed from private land in and around the Beaver Creek riparian area and upland range and forest sites in the TIP boundary. Juniper will be removed by cutting using chainsaws or heavy equipment designed to cut trees (i.e. feller-bunchers, shearers, masticators). The slash will be treated by lopping and scattering, chipping, or piling and burning depending on site conditions. The boles of the juniper trees may be removed as firewood or posts and poles. The primary NRCS conservation practices that will be used include:

- 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.

- 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. Herbaceous Weed Control (315) may be used to control noxious weeds within the project area.

NRCS will focus on Phase 1 and 2 juniper stands in the uplands leaving major draws and drainages for wildlife security cover. Phase 3 juniper stands will only be treated within 1/2 mile of Beaver Creek to reduce fire hazard within the riparian area and to maximize the riparian communities' ability to trap sediment from the upland in the event of a wildfire.

As with any projects involving NRCS technical and financial assistance, National Environmental Policy Act (NEPA) concerns will be addressed through environmental evaluations that include cultural resources and threatened and endangered species reviews.

## PARTNERSHIPS AND FUNDING SOURCES

NRCS is the lead agency for the project. Other partners or potential partners include Montana Fish Wildlife and Parks (MT-FWP), Broadwater Conservation District (BCD), Pheasants Forever (PF), and National Wild Turkey Federation (NWTF).

NRCS is seeking $535,000 dollars in financial assistance through the Environmental Quality Incentives Program (EQIP) over the four-year targeted implementation plan. Table 1 shows the financial allocation.

***Table 1.*** *Participation Cost Estimates 2021 -2024*

| COST ESTIMATE Canyon Ferry West Geographic Area (Phase A) CONIFER ENCROACHMENT REMOVAL TIP - **2021-2024** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Code** | **Component Description** | **TIP TOTAL EXTENT** | **Unit Type** | **Unit Cost** | **Year 1** | **Year 2** | **Year 3** | **Year 4** |
| **314** | Brush Man.- Light Density | 4,019 | AC | $40.00 | $35,560 | $113,800 | $8,960 | $2,440 |
| | Brush Man.- Moderate Density | 436 | AC | $104.03 | $10,403 | $28,816 | $3,225 | $2,913 |
| | Brush Man.- High Density | 374 | AC | $308.18 | $25,517 | $59,479 | $24,654 | $5,547 |
| **384** | Woody Residue Treatment | 402 | AC | $347.63 | $28,784 | $67,093 | $29,896 | $13,905 |
| **315** | Herb. Weed Con. Spot Treatment (3 Yr Total) | 717 | AC | $90.31 | $22,578 | $18,965 | $17,610 | $5,599 |
| | Herb. Weed Con. Ground Application | 220 | AC | $43.48 | $3,261 | $4,348 | $1,739 | $217 |
| **Canyon Ferry West Geographic Area Phase I TIP "Conifer Removal 2021-2024"** | | | | | $126,103 | $292,501 | $86,085 | $30,622 |
| **Canyon Ferry West Geogrpahich Area Phase A Tip Request + 10% Inflation** | | | | | | **$535,310** | | |

NRCS

NRCS will provide financial and technical assistance (approximately 600 staff hours) to private landowners in Broadwater County, with an emphasis on improving riparian function and rangeland resiliency by removing rocky mountain juniper encroachment.

### BROADWATER CONSERVATION DISTRICT (BCD)

BCD will provide outreach assistance to inform private landowners of the NRCS and other partner programs that are available in Broadwater County, assist landowners with the application process as appropriate, and conduct flow monitoring of lower Beaver Creek for 5 years post project. Flow monitoring data will be analyzed and compared to pre-project data collected from 2016 to present. This will determine success of the riparian treatments in improving hydrologic function in the lower Beaver Creek drainage. It is estimated that BCD will contribute 100 staff hours ($2,100) to accomplish the outreach and monitoring portion of this TIP.

BCD is currently applying for a Ranching for Rivers ($3,000) and a DNRC 223 grant ($10,000) to provide education, outreach and technical assistance as well as financial assistance for tree protection of existing cottonwood, willow, and aspen stands using NRCS practice codes (382) Protection of Sensitive Areas and (612) Tree/ Shrub Establishment (hand planting of trees / shrubs with tube protection) where needed.

### PHEASANTS FOREVER (PF)

Pheasants Forever staff will provide 80 hours of technical assistance for environmental assessments, inventory, habitat recommendations for wildlife species, project implementation, and monitoring. If applicable, PF local chapters may be engaged to provide additional capital inputs for specific landowner projects where upland bird habitat is both desired and locally limited. PF staff will assist with inventory and monitoring of wildlife species and plant communities – particularly riparian areas and conifer-encroached grasslands – using aerial drones at their disposal.

PF will assist with implementation of beaver-dam analog (BDA) demonstration projects, to the extent that they are practical and part of the landowner's overall conservation goals.

### NATIONAL WILD TURKEY FEDERATION (NWTF)

NWTF will assume the role of technical assistance with the help of the National Forestry Initiative (NFI) Forester to monitor and evaluate the success of cottonwood regeneration and overall riparian forest health. In addition, the NFI Forester will monitor all projects to ensure they are complying with Montana's Forestry Best Management Practices. It is estimated that the NWTF will contribute staff hours during the TIP.

### BROADWATER COUNTY WEED DISTRICT (BCWD)

BCWD will provide education and outreach on noxious weed identification and treatment options in the Canyon Ferry West geographical area for the next 4 years. BCWD has an existing Cooperative Weed Management Plan in place for the Winston area. This plan is to treat invasive noxious weed species on private land and work cooperatively with public land holders. There exists a strong and committed group of landowners who have already been awarded $15,000 from Montana Noxious Weed Trust fund for 2020-2022 and the area is included in the Elkhorns Wildlife Habitat Improvement Program (WHIP) that will be funded for $422,429. Both projects are within the TIP boundary and BCWD can also apply for further funding for targeted noxious weed control in the drainage to further complement the goals of both phases of this TIP.

## IMPLEMENTATION

Implementation of this TIP will occur over a 4-year period, beginning in fiscal year 2021. The goal is to improve 5,000 acres of private riparian, upland range, and forest lands in the Canyon Ferry West Geographic Area by the end of 2024. A higher priority will be placed on treatment within ¼ mile of Beaver Creek and associated wetlands, with a goal of treating 250 acres of cottonwood understory. Private lands outside of the Beaver Creek riparian zone will receive a second priority with an objective of treating 4,750 acres. If these two objectives are met, NRCS and our partners will have treated 60% of the private land acres in the TIP boundary and over 70% of the acres needing treatment. State lands (445 acres) and dense draws left for wildlife cover (140 acres) constitute approximately 20% of the untreated acres.

NRCS has contacted 10 landowners to-date in the TIP boundary that have expressed interest in participating over the next 4 years. NRCS & BCD will continue to conduct outreach through news releases and educational events to recruit additional landowners to increase the success of this TIP.

NRCS & BCD will provide technical and financial assistance through EQIP and grant opportunities. Where BCD can provide financial assistance, NRCS will provide technical assistance through job sheet development and certification.

## EVALUATION AND OUTCOMES

The success of this TIP will be monitored using a phased approach alongside the phases described in the Goals and Objectives section. During TIP 1, plant communities will be monitored in the conifer removal areas using transects and photo monitoring points to demonstrate reduced fire hazard, and other changes in plant communities responding to the removal. This monitoring will highlight anticipated positive responses in species diversity and plant community structure, which will have implications for wildlife habitat quality and wildlife occupancy. Wildlife habitat assessments will be conducted before and after the project to evaluate specific changes as pertains to wildlife use. Mesic areas will be monitored using Normalized Difference Vegetation Index (NDVI), low level aerial imagery (with participant consent), and ground transects to demonstrate impacts of water retention on plant community structure and distribution. This will show real time, qualitative plant community changes within the riparian corridor. It is expected that a 90% reduction in conifer encroachment, a 40% reduction in noxious weed infestations, and a 5% increase in desirable riparian woody vegetation will be achieved at the completion of TIP 1. Additionally, the Broadwater Conservation District will continue to collect flow monitoring data on Beaver Creek to compare to 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 (Aug – Sept 15) with the completion of TIP 1.

Based on observations and monitoring data collected during TIP 1, the Canyon Ferry West TIP 2 will be proposed. TIP 2 will focus on key areas of Beaver Creek where additional conservation activities are needed to facilitate the overall objective of improved riparian function.

LOCAL RANKING QUESTIONS (200 POINTS)

1 **Does this application address conifer encroachment within a riparian zone or wetland?**

2 **Does this application address conifer encroachment within 1/4 mile of a riparian zone or wetland?**

3 **Does this application address conifer encroachment on rangeland?**

4 **Does this application include herbaceous weed management within the riparian area in the Beaver Creek Watershed?**