# FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

*All sections must be addressed, or the application will be considered invalid*

## I. APPLICANT INFORMATION

A. Applicant Name: Lower Clark Fork Watershed Group (LCFWG)

Mailing Address: P.O. Box 1329

City: Trout Creek State: MT Zip: 59874

Telephone: (406) 203-4725 E-mail: brita@lcfwg.org

B. Contact Person (if different than applicant): Brita Olson

Address:

City: State: Zip:

Telephone: E-mail:

C. Landowner and/or Lessee Name (if different than applicant): Multiple (Stein, Nye, Warrington, Ross, etc.) - see attached letters of support, landowner summary table and map

Mailing Address:

City: State: Zip:

Telephone: E-mail:

## II. PROJECT INFORMATION

A. Project Name: Restoring Riparian Function in the Bull River Watershed

River, stream, or lake: Bull River and East Fork Bull River

Location: Township: 27N Range: 33W Section: 11,12

Latitude: 48° 6'41.48"N Longitude: 115°48'36.06"W *Within project (decimal degrees)*

County: Sanders

B. Purpose of Project:

The purpose of this project is to restore the ecological integrity, fish habitat and health of the Bull River and East Fork Bull River through restoration of native riparian vegetation and suppression of non-native reed canarygrass.

C. Brief Project Description (attach additional information to end of application):

This project seeks to continue a long-term program of planting native woody riparian vegetation, including western white pine, Engelmann spruce, western red cedar as well as native willow, red osier dogwood chokecherry, Wood's rose and other native flower shrub species, to stabilize banks that have been eroding and depositing sediment into the Bull River and East Fork Bull River. These species grow roots that help bind the soil and reduce the sloughing of the banks that is commonly occurring throughout the watershed in areas where the riparian vegetation is dominated by reed canarygrass. The effects will not be immediate as it takes years to return the riparian vegetation to native plants. But over time the banks will become more stable, the trees will provide more shade, and eventually even add large woody debris to these streams through natural events. The total impact in terms of stream miles, provided below, reflects the stream-length running through the Stein, Nye, Ross and Warrington ownerships – these landowner commitments are reflected in attached letters of support.

We plan to work with these four identified landowners (and possibly more – see landowner summary table) along the mainstem and East Fork Bull rivers to develop revegetation plans, purchase containerized plants and plant them along the Bull River's stream and floodplain areas. The methods used will be pocket plantings of individual trees, and then protecting them from browsing beaver, deer and other wildlife with fencing. The materials used are gallon-sized containerized plant stock, matting to suppress reed canarygrass, and browse protection provided by 14-gauge, welded wire secured with T-posts. The Lower Clark Fork Watershed Group (LCFWG) has established over 900 of these riparian plantings throughout the Bull River Valley in the last five years and maintains revegetation sites to ensure the new plants are protected until they are mature enough to withstand browse and encroaching reed canarygrass without protection. Survival rates using this technique in 2021 was over 99%. Mortality replacement plantings are completed as stock is available and partners expect to establish a plant at every site within five-ten years. At that point, weed matting and fencing (if continued browse is not a concern) is removed.

Much of the focus of the project will be to continue planting efforts on properties protected by perpetual conservation easements where the LCFWG has ongoing landowner relationships, past plantings to maintain, and further opportunity to address impairments and improve resiliency of the Bull River watershed overall. By concentrating efforts on these properties, LCFWG will be able to observe and monitor past plantings and conduct maintenance (including fence repair, weeding, and eventual removal of matting and fencing). This creates efficiency for the overall project, saving money, materials and time.

The long-term nature of this effort requires an approach that maintains relationships with existing landowners and grows partnerships with new landowners, while making good on promises to maintain and grow healthy plant communities that can provide aesthetic and practical benefits to their properties and the river system. This proposal is one of multiple funding proposals designed to provide ongoing funding for this important work. Over time, these planted trees will provide stability for the banks, cover for fish, shade that suppresses reed canarygrass and promotes natural succession, and a source of large woody debris to improve instream habitat for fish.

D. What was the cause of habitat degradation and how will the project correct the cause?

The primary cause is the monoculture of reed canarygrass that dominates the watershed. Reed canarygrass was introduced in the valley as a hay grass, but has persisted and spread along the banks of the Bull River, outcompeting native plants. The dominance of reed canarygrass has reduced the overall structural diversity of the riparian zones along the river, including wetlands. Reed canarygrass has shallow roots – extending only 12-18 inches into the soil – providing very little bank stability or shade compared to native trees or shrubs. This has led to excessive streambank erosion and elevated sediment levels, which negatively impacts fish by obscuring food sources, silting spawning gravels, smothering eggs, and clogging gills. The work described above will stabilize the banks, reduce sedimentation, and increase shade. Over time, the planted trees will naturally propagate, as has been observed with plantings over the last 20 years.

E. Length of stream or size of lake that will be treated (project extent): 2.35 miles; combined stream length through Warrington, Ross, Stein, and Nye properties (see attached letters of support)

Length/size of impact, if larger than project extent (e.g., stream miles opened): 2.35 miles

F. Project Budget Summary:

| | | |
|---|---|---|
| **Grant Request (Dollars):** | **$** | 30,000 |
| Matching Dollars: | **$** | $125,300 |
| Matching In-Kind Services:* | **$** | |

**salaries of government employees are not considered matching contributions*

| | | |
|---|---|---|
| Other Contributions (not part of this app) | **$** | 79,334 |
| **Total Project Cost:** | **$** | $234,634 |

G. Attach itemized (line item) budget – *see budget template*

H. Attach project location map(s) that include:

- [X] Extent of the project, including context (relation to major landmark or town)
- [X] Indication of public and private property
- [ ] Riparian buffer locations and widths (if applicable) and grazing locations

I. Attach project plans:

- [X] Detailed sketches or plan views with the location and proposed restoration
- [X] Pre-project photographs (GPS location strongly recommended)
- [ ] If water leasing or water salvage is involved, attach a supplemental questionnaire (*https://myfwp.mt.gov/getRepositoryFile?objectID=36110*)

J. Attach letters or statements of support (e.g., landowner consent, community or public support, and fish biologist support). List any other project partners:

In addition to the landowners, and agency partners who provided letters of support, LCFWG has the ongoing support of Avista, which through the Clark Fork Settlement Agreement has provided annual funding for LCFWG to coordinate projects and address past project maintenance needs in the Bull River watershed. Our partnership with Green Mountain Conservation District (GMCD) will allow us to increase our capacity by providing in-kind labor for project implementation and coordination from GMCD staff and through a Big Sky Watershed Corps member who can assist with project implementation, outreach and recruitment of volunteers.

**III. MAINTENANCE AND MONITORING** (attach additional information to end of application):

A. A 20-year maintenance commitment is required*. Please confirm that you will ensure this protection and describe your approach. Attach any relevant maintenance plans.

| Yes | No |
|---|---|
| X | |

**If it is a water leasing project, describe the length of the agreement.*

One of the lessons learned in the last 20 years of growing trees in the Bull River Valley is that maintenance is essential to success. Our approach is to return annually to planting sites to inspect them and conduct maintenance, including repairing fencing, weeding, and removing matting and fencing when trees are established enough to withstand browse and non-native plant encroachment. Our project locations include land where previous revegetation work has occurred, so as we plant new trees, we can also inspect our previous plantings, which increases our efficiency, saving time, money and resources. Furthermore, the majority of sites where this project is ongoing are protected from subdivision and development by conservation easements, ensuring protection of this investment beyond what the 20-year landowner agreement can achieve.

B. Will grazing be part of or adjacent to the project? If so, describe or attach land management plans, including short term and long term grazing regimes. If the landowner is not the applicant, please describe their involvement in the project. *If you want assistance with grazing plan development, note your need.*

N/A. Most sites where work will take place are protected by conservation easements, most of which restrict grazing and agricultural uses to protect streamside and wetland habitats. There is no known grazing to occur within or near proposed project sites.

C. Will the project be monitored to determine if goals were met? If so, what are the short-term and long-term plans to assess benefits and lessons learned? Were pre-project data collected? Will monitoring information be shared with FWP?

Yes, our monitoring includes: 1) Plant Survival – planting sites are visited annually to verify survival and determine if mortality replacement planting is needed. Data will be kept on the survival rates of each seasons' planting; 2) Photo Points – LCFWG staff will take pre-implementation photos on each of the properties involved in the project, and develop photo points for the individual plantings upon initial planting. Each photo point will be repeated approximately every 1, 3, 5 and 10 years. The results of these photos will provide us with a longer-term indication as to the success of this project. Other data (such as Bank Erosion Hazard Index) to assess efficacy of project in reducing erosion and sedimentation may be collected in coordination with Montana Department of Environmental Quality. All data collected will be shared with FWP.

## IV. PROJECT BENEFITS (attach additional information to end of application):

A. What species of fish will benefit from this project?

Native coldwater species: Bull Trout, Westslope Cutthroat Trout and Mountain Whitefish.

B. How will the project protect or enhance wild fish habitat?

This project will reduce erosion and sedimentation in Bull River mainstem and East Fork Bull River, which are important Bull Trout migratory and spawning tributaries of the Lower Clark Fork River. The Bull River provides critical habitat for the federally listed Bull Trout and other native species, which also rely on the river for multiple life stages. Among the current threats to the habitat are the decline in the water quality, and the river is listed under the Clean Water Act as not meeting the beneficial use of providing quality aquatic life conditions due to sediment and physical substrate alterations. The replacement of reed canarygrass with native trees and shrubs will reduce sedimentation, provide allochthonous inputs from streamside vegetation, and increase shade to the river over time. In addition, as the trees mature, the potential for the recruitment of large woody debris will increase. All of these factors will improve habitat for native coldwater fish by providing cleaner, colder and more complex conditions, giving these fish species more opportunities to thrive.

C. What is the expected improvement to fish populations, both short term and long term? How might the project translate to angler success?

In the short term, improvements to fish populations are difficult to measure. This project is a continuation of a long-term effort to provide ecosystem and habitat improvements throughout the Bull River watershed. MFWP, as well as biologists at Avista, monitor fisheries populations in the drainage in both the mainstem and East Fork Bull River. There are numerous other factors that affect the abundance of native fish in the drainage, most significantly competition from non-native fish and the Cabinet Gorge Dam, which presents a fish passage barrier between Lake Pend Oreille and the Bull River. Project proponents anticipate that in the long-term, this project will improve the resilience of the drainage and the fish habitat that it provides. An angler fishing a stretch of the river that migrates through well-vegetated streambanks and floodplains would benefit from more instream complexity and fish habitat.

D. Will the project increase public fishing opportunity for wild fish and, if so, how? Is public fishing allowed onsite? If not, describe how the public would access the project benefits.

Public fishing is allowed along the Bull River with ready access off U.S. Highway 56, which cuts through the Bull River Valley. The river is popular with drift boat and other paddle craft users and is frequented by a local outfitter/guide. A popular public access is at the Eight-mile Bridge. A relatively new access location is five miles downstream on property recently acquired by Avista. All properties where revegetation projects would occur along the mainstem are easily accessible for boat fishing from public access sites. While much of the river is lined by private property, the Avista-owned “Wood duck” property, about a mile upstream of the Eight-mile bridge, also provides many opportunities to fish from the shore away from the road and is a potential site where further revegetation efforts may occur. The East Fork Bull River runs through U.S. Forest Service lands, which also provides public access opportunities. The project should improve fishing opportunities as the native vegetation matures and the habitat improves.

E. Aside from angling, what local or large-scale public benefits will be realized from this project?

This project will contribute to improving the overall water quality of the river and the general ecosystem health of the area. In addition, the maturing riparian vegetation will provide habitat for other species, helping to sustain a diverse and resilient wildlife population.

F. Will the project interfere with water or property rights of adjacent landowners? (explain):

No, this project will only occur on properties with willing landowners and will not have impacts outside the project area, other than beneficial impacts to the waterway.

G. Will the project result in the development of commercial recreational use on the site (including paid access)? Explain:

No, however it should benefit local fishing guides who use this river.

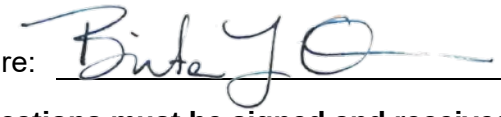
H. Is this project associated with the reclamation of past mining activity?

No

**Each approved project applicant must enter into a written agreement with Montana Fish, Wildlife & Parks specifying terms and duration of the project. The applicant must obtain all applicable permits prior to project construction. A competitive bid process must be followed when using State funds.**

## V. AUTHORIZING STATEMENT

I (we) hereby declare that the information and all statements to this application are true, complete, and accurate to the best of my (our) knowledge and that the project or activity complies with rules of the Future Fisheries Improvement Program.

Applicant Signature:  Date: November 15, 2022

Submittal: **Applications must be signed and received on or before November 15 and May 15 to be considered for the subsequent funding period**. Late or incomplete applications will be rejected.

| | | | |
|---|---|---|---|
| Mail to: | FWP Future Fisheries<br>Fish Habitat Bureau<br>PO Box 200701<br>Helena, MT 59620-0701 | Email: | Future Fisheries Coordinator<br>FWPFFIP@mt.gov<br>(electronic submissions must be signed)<br>For files over 10MB, use https://transfer.mt.gov and send to mmcgree@mt.gov |

# Bull River Riparian Function Restoration

## BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

Both tables must be completed or the application will be returned

| PROJECT COSTS | | | | | CONTRIBUTIONS | | | |
|---|---|---|---|---|---|---|---|---|
| **WORK ITEMS (Itemize by Category)** | **NUMBER OF UNITS** | **UNIT DESCRIPTION *** | **COST/UNIT** | **TOTAL COST** | **FUTURE FISHERIES REQUEST** | **MATCH (Cash or Services)**** | **OTHER (Not part of this application)** | **TOTAL** |
| **Personnel***** | | | | | | | | |
| | | | Sub-Total | $ - | $ - | $ - | $ - | $ - |
| **Travel** | | | | | | | | |
| Mileage | 12000 | miles | $0.63 | $ 7,500.00 | | 7,500.00 | | $ 7,500.00 |
| Per diem | | | | $ - | | | | $ - |
| | | | Sub-Total | $ 7,500.00 | $ - | $ 7,500.00 | $ - | $ 7,500.00 |
| **Construction Materials****** | | | | | | | | |
| 175 cu. In. containerized plants from the DNRC Conservation Seedling Nursery | 1500 | plants | $14.00 | $ 21,000.00 | 7,000.00 | 14,000.00 | | $ 21,000.00 |
| Browse protection: 14-gauge, welded wire provided in-kind, reused salvage from past projects. 5,000' needed, costs approx. $2/ft new. | 15000 | feet | $2.00 | $ 30,000.00 | | 30,000.00 | | $ 30,000.00 |
| Browse protection: 6.5' posts. 500 minimum needed, costs approx. $5/post new. | 1500 | posts | $5.00 | $ 7,500.00 | | 7,500.00 | | $ 7,500.00 |
| 4' x 4' mats, costs approx. $2/mat. | 1500 | mats | $2.00 | $ 3,000.00 | 500.00 | 2,500.00 | | $ 3,000.00 |
| Miscellaneous tools and supplies (pliers, fence clips, landscape staples, TBD) | 1 | lump | $1,000.00 | $ 1,000.00 | | 1,000.00 | | $ 1,000.00 |
| | | | Sub-Total | $ 62,500.00 | $ 7,500.00 | $ 55,000.00 | $ - | $ 62,500.00 |
| **Equipment, Labor, and Mobilization** | | | | | | | | |
| Contract labor (MCC crew or Big Sky Watershed Corps member host site fee) | 6 | MCC crew | $6,000.00 | $ 36,000.00 | 18,000.00 | 18,000.00 | | $ 36,000.00 |
| Volunteer labor | 240 | hours | $25.00 | $ 6,000.00 | | 6,000.00 | | $ 6,000.00 |
| LCFWG/GMCD staff labor - 2023 | 160 | hours | $35.50 | $ 5,680.00 | 1,500.00 | 4,180.00 | | $ 5,680.00 |
| LCFWG/GMCD staff labor - 2024 | 400 | hours | $35.75 | $ 14,300.00 | 1,500.00 | 12,800.00 | | $ 14,300.00 |
| LCFWG/GMCD staff labor - 2025 | 400 | hours | $36.25 | $ 14,500.00 | 1,500.00 | 13,000.00 | | $ 14,500.00 |
| LCFWG/GMCD staff labor - 2026 | 240 | hours | $36.75 | $ 8,820.00 | - | 8,820.00 | | $ 8,820.00 |
| | | | Sub-Total | $ 85,300.00 | $ 22,500.00 | $ 62,800.00 | $ - | $ 85,300.00 |
| | | | **TOTALS** | $ 155,300.00 | $ 30,000.00 | $ 125,300.00 | $ - | $ 155,300.00 |

**OTHER REQUIREMENTS:**

**All of the columns in the budget table and the matching contribution table MUST be completed appropriately or the application will be invalid.** Please see the example budget sheet for additional clarification.

*Units = feet, hours, inches, etc. Do not use lump sum unless there is no other way to describe the costs.

**Can include in-kind materials. Justification for in-kind labor (e.g. hourly rates used). Do not use government salaries as match. Describe here or in text.

***The Review Panel suggests that design and oversight costs associated with a proposed project not exceed 15% of the total project budget. If design and oversight costs are in excess of 15%, applications must include a justification or minimum of two competitive bids for the cost of undertaking the project.

****The Review Panel recommends a maximum fencing cost of $1.50 per foot. Additional costs may be the responsibility of the applicant and/or partners.

Additional details: Budget reflects implementation period from July 1, 2023 thru June 30, 2026, to match funding request made to the DEQ 319 program. Match funding may vary slightly depending on timing of implementation relative to contract periods as will rage rates - as these are set annually by LCFWG and GMCD boards. A larger budget includes accounting for project planning, landowner agreements, project maintenance, project monitoring, and education and outreach.

Bull River Riparian Function Restoration

**BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS**

## APPLICATION MATCHING CONTRIBUTIONS

(do not include requested funds or contributions not associated with the application)

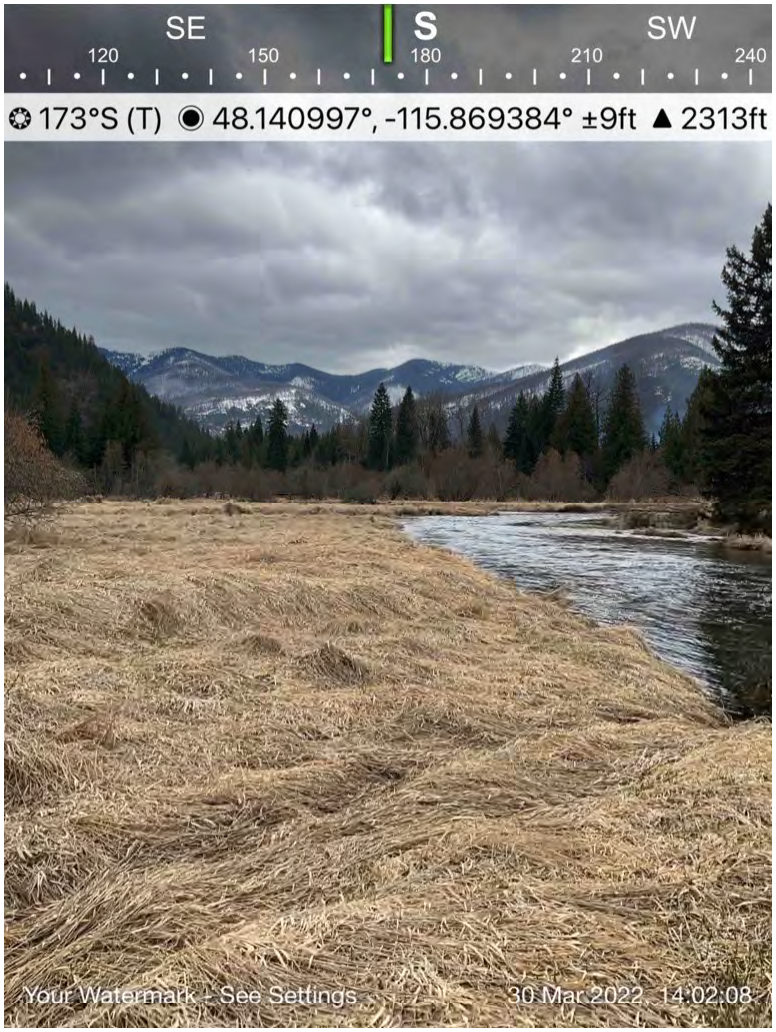
| CONTRIBUTOR | IN-KIND | CASH | TOTAL | Secured? (Y/N) |
|---|---|---|---|---|
| Volunteers | $ 6,000.00 | $ - | $ 6,000.00 | N |
| NRCS EQIP Contract - Stein | $ - | $ 11,392.00 | $ 11,392.00 | Y |
| NRCS EQIP Contract - Warrington | $ - | $ 11,392.00 | $ 11,392.00 | Y |
| NRCS EQIP Contract - Nye (submitted and pending) | $ - | $ 17,088.00 | $ 17,088.00 | N |
| NRCS EQIP Contract - TBD | $ - | $ 17,088.00 | $ 17,088.00 | N |
| DEQ 319 Program (submitted and recommended for full funding by 319 agency review panel) | $ - | $ 58,360.00 | $ 58,360.00 | N |
| DNRC Conservation Districts Project Grant | $ - | $ 3,980.00 | $ 3,980.00 | N |
| | $ - | $ - | $ - | |
| | $ - | $ - | $ - | |
| **TOTALS** | $ 6,000.00 | $ 119,300.00 | $ 125,300.00 | |

## OTHER CONTRIBUTIONS

(contributions not associated with the application)

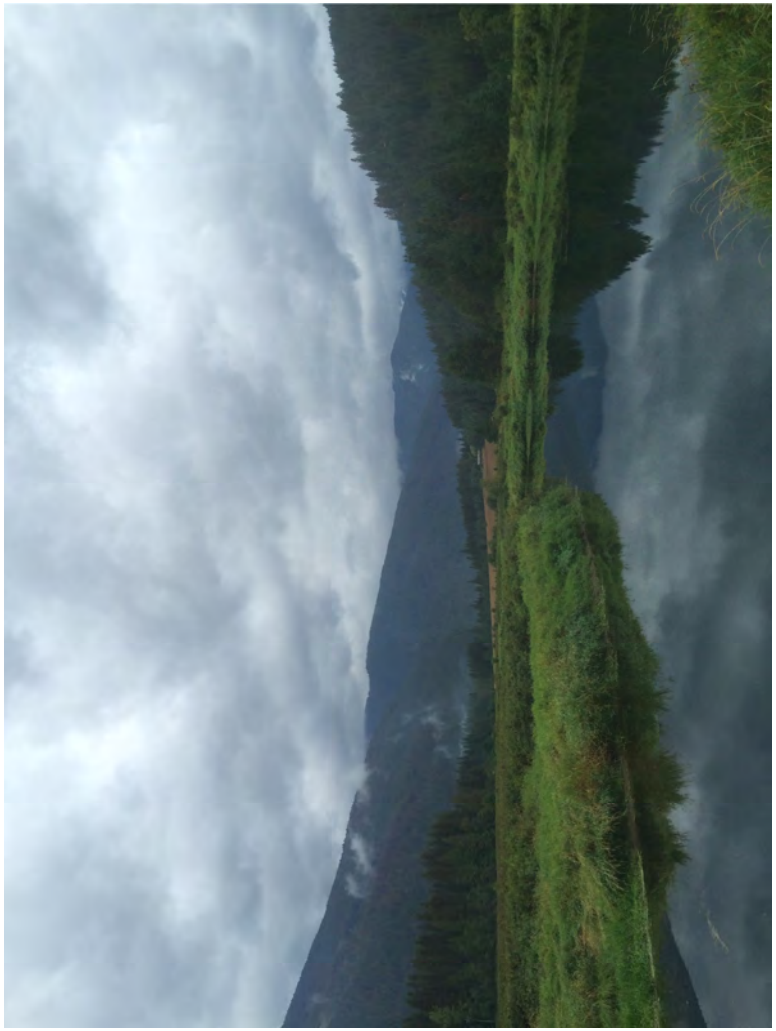
| CONTRIBUTOR | IN-KIND | CASH | TOTAL | Secured? (Y/N) |
|---|---|---|---|---|
| DEQ 319 Program (Education and Outreach) | $ - | $ 5,000.00 | $ 5,000.00 | N |
| DNRC Conservation Districts Project Grant (Project ASCENT internship, project coordination and oversight) | $ - | $ 5,832.00 | $ 5,832.00 | N |
| Avista's Clark Fork Settlement Agreement (Project coordination and maintenance) | $ - | $ 67,502.00 | $ 67,502.00 | |
| DNRC Watershed Management Grant (Project Development and Landowner Agreements) | $ - | $ 1,000.00 | $ 1,000.00 | |
| | $ - | $ - | $ - | |
| | $ - | $ - | $ - | |
| | $ - | $ - | $ - | |
| | $ - | $ - | $ - | |
| **TOTALS** | $ - | $ 79,334.00 | $ 79,334.00 | |

Project Pre-Photos



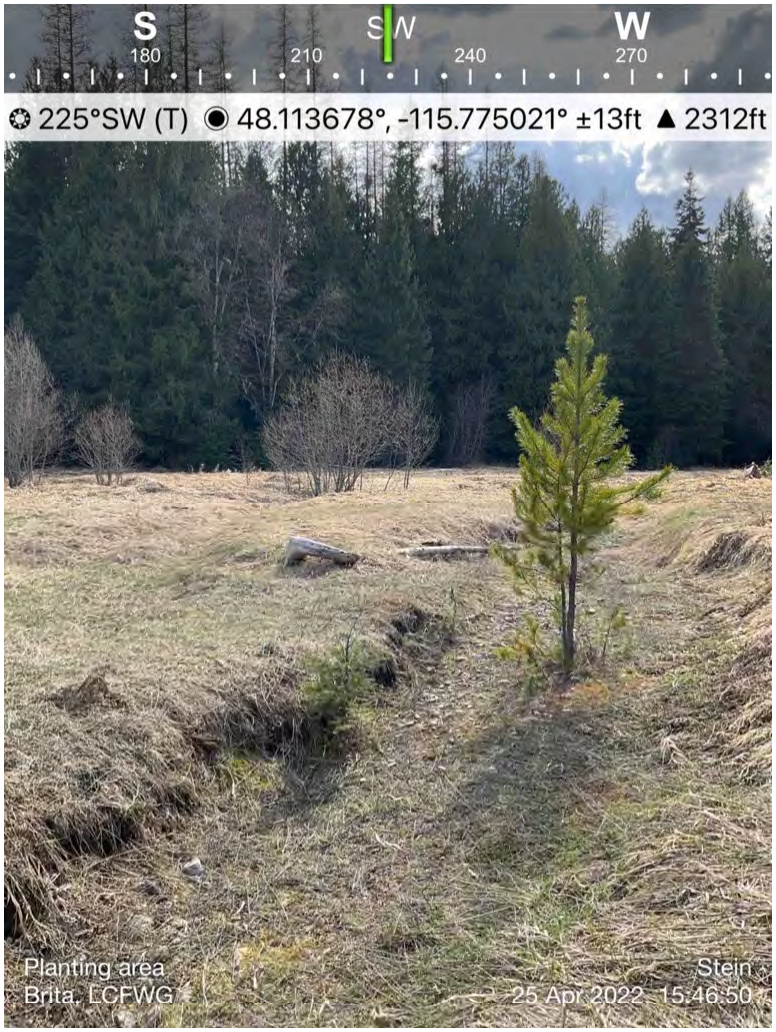

Warrington 1


Edwards 1



Ross 8mile during 2015 fire (GPS photo to be taken)


Stein 1



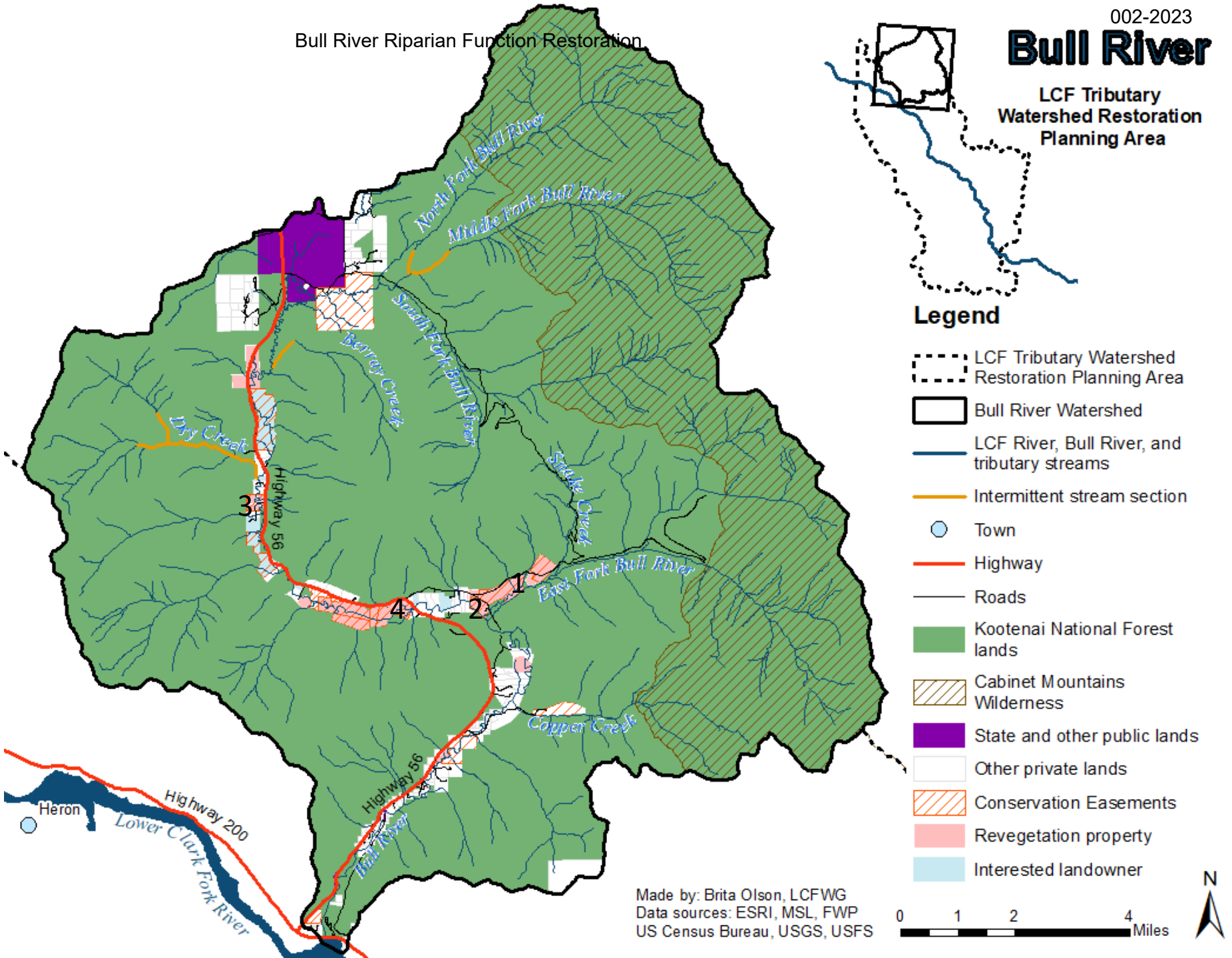

Stein 2


Warrington 1

Bull River Riparian Function Restoration

002-2023

1 – Stein
2 – Edwards / Nye
3 – Warrington
4 – Ross

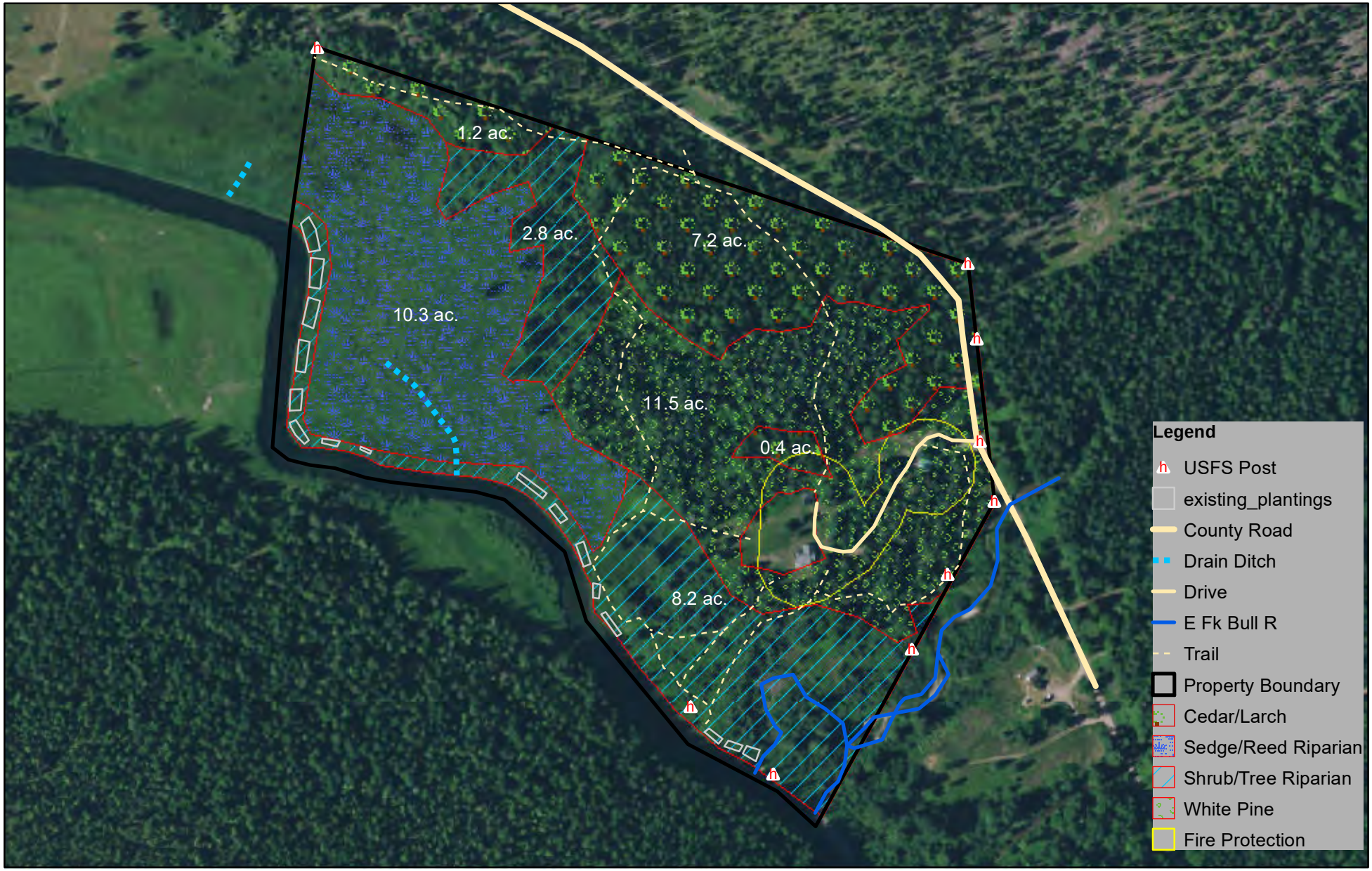


# Bull River Riparian Function Restoration

Customer(s):Don Edwards
District: Green Mountain CD
Approximate Acres: 43
Legal Description: Sec.12, T27N R33W

## 2019 Aerial Photo

Date: 2/25/2022
Field Office: Plains Field Office
Agency: USDA - NRCS
Assisted By: TROY HIDY
State and County: MT, Sanders




USDA

240 0 240 480 720 960 Feet

1:3,960
330 Feet/Inch

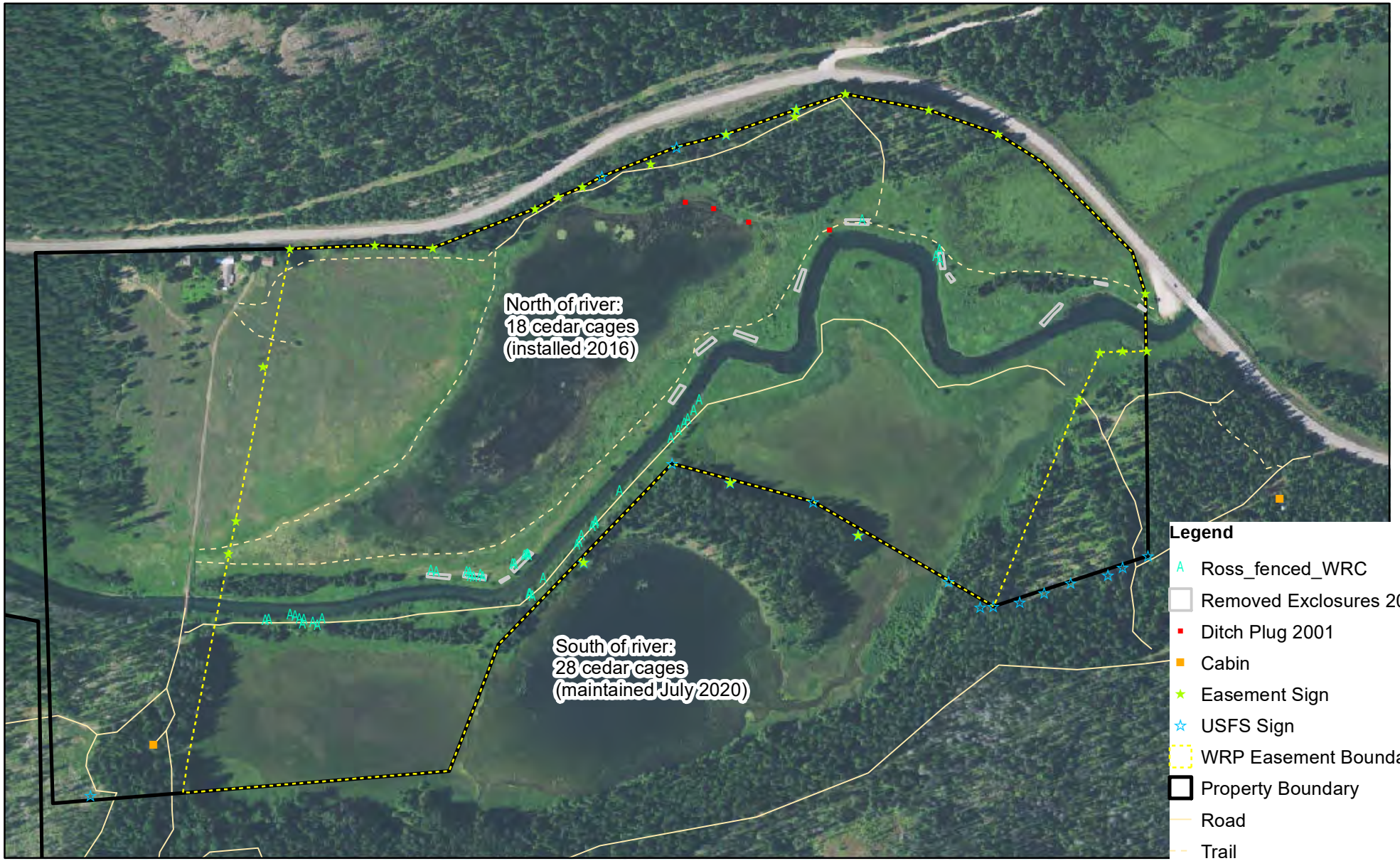
N

# Bull River Riparian Function Restoration

Customer(s): MALCOLM JAMIE ROSS
District: Green Mountain Conservation District
Approximate Acres: 115 ac. in NRCS easement
78 + 146 = 224 ac owned
Legal Description: Section 11 T27N R33W

## Inventory Map
## 2019 Aerial Photo

Date: 9/9/2021
Field Office: Plains
Agency: USDA - NRCS
Assisted By: Troy Hidy
State and County: MT, Sanders




**Legend**

- Ross_fenced_WRC
- Removed Exclosures 2016
- Ditch Plug 2001
- Cabin
- Easement Sign
- USFS Sign
- WRP Easement Boundary
- Property Boundary
- Road
- Trail

USDA

370 0 370 740 1,110 1,480 Feet

1:5,940
495 Feet/Inch

N

# Bull River Riparian Function Restoration

Customer(s): Robert Stein
District: Green Mountain Conservation District
Approximate Acres: 162 + 105 = 267
Legal Description: Parts of: Sec. 5-8 T27N R32W
Sec. 12 T27N R33W

2019 Photo

Date: 2/25/2022
Field Office: PLAINS FIELD OFFICE
Agency: USDA, NRCS
Assisted By: Troy Hidy
State and County: MT, SANDERS


1:3,000 250 Feet/Inch

180 0 180 360 540 720
Feet

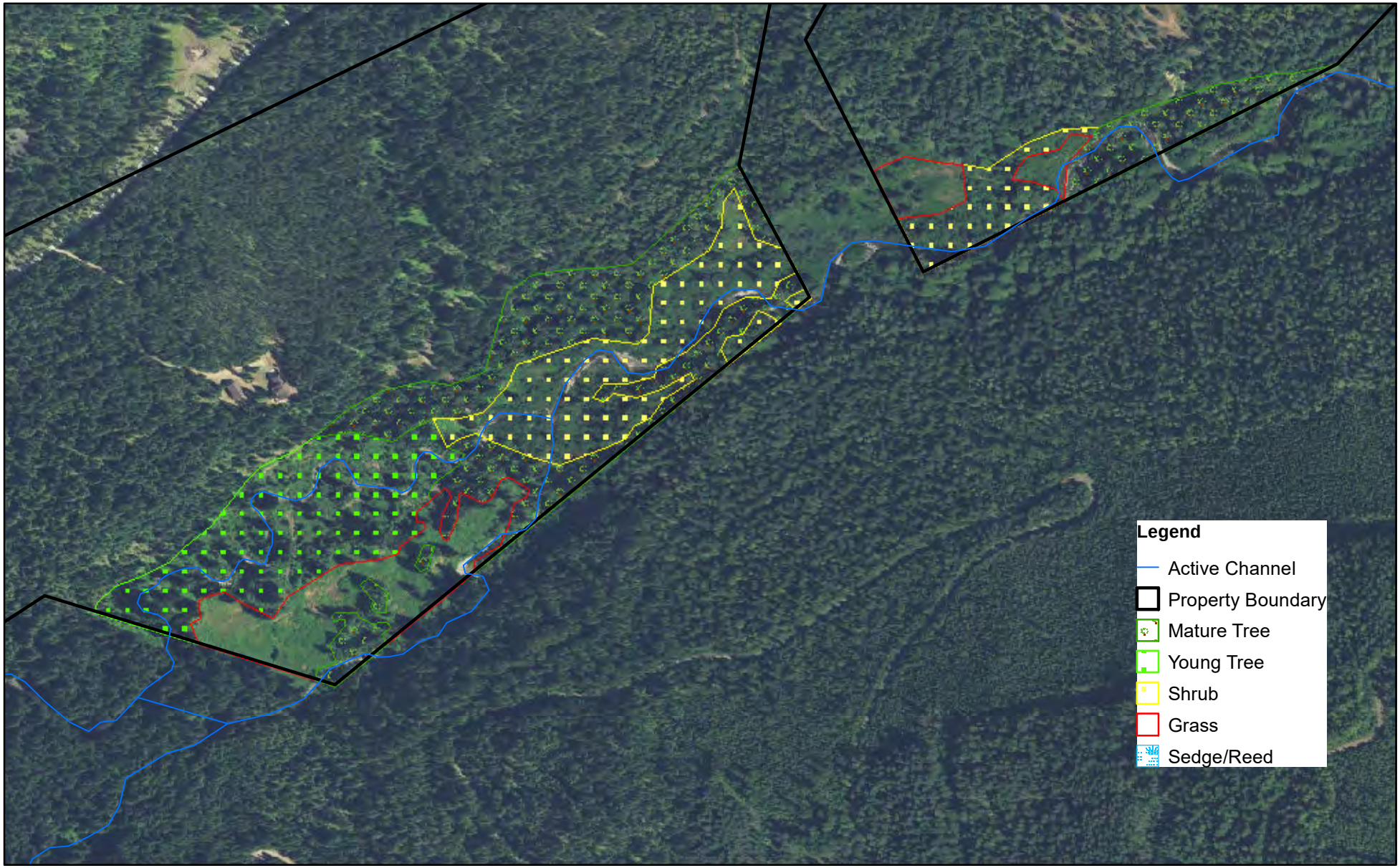
N

# Bull River Riparian Function Restoration

Customer(s): Robert Stein
District: Green Mountain Conservation District
Approximate Acres: 162 + 105 = 267
Legal Description: Parts of: Sec. 5-8 T27N R32W
Sec. 12 T27N R33W

Riparian Stands
2019 Photo

Date: 3/3/2022
Field Office: PLAINS FIELD OFFICE
Agency: USDA, NRCS
Assisted By: Troy Hidy
State and County: MT, SANDERS




1:5,280 440 Feet/Inch

320 0 320 640 960 1,280
Feet

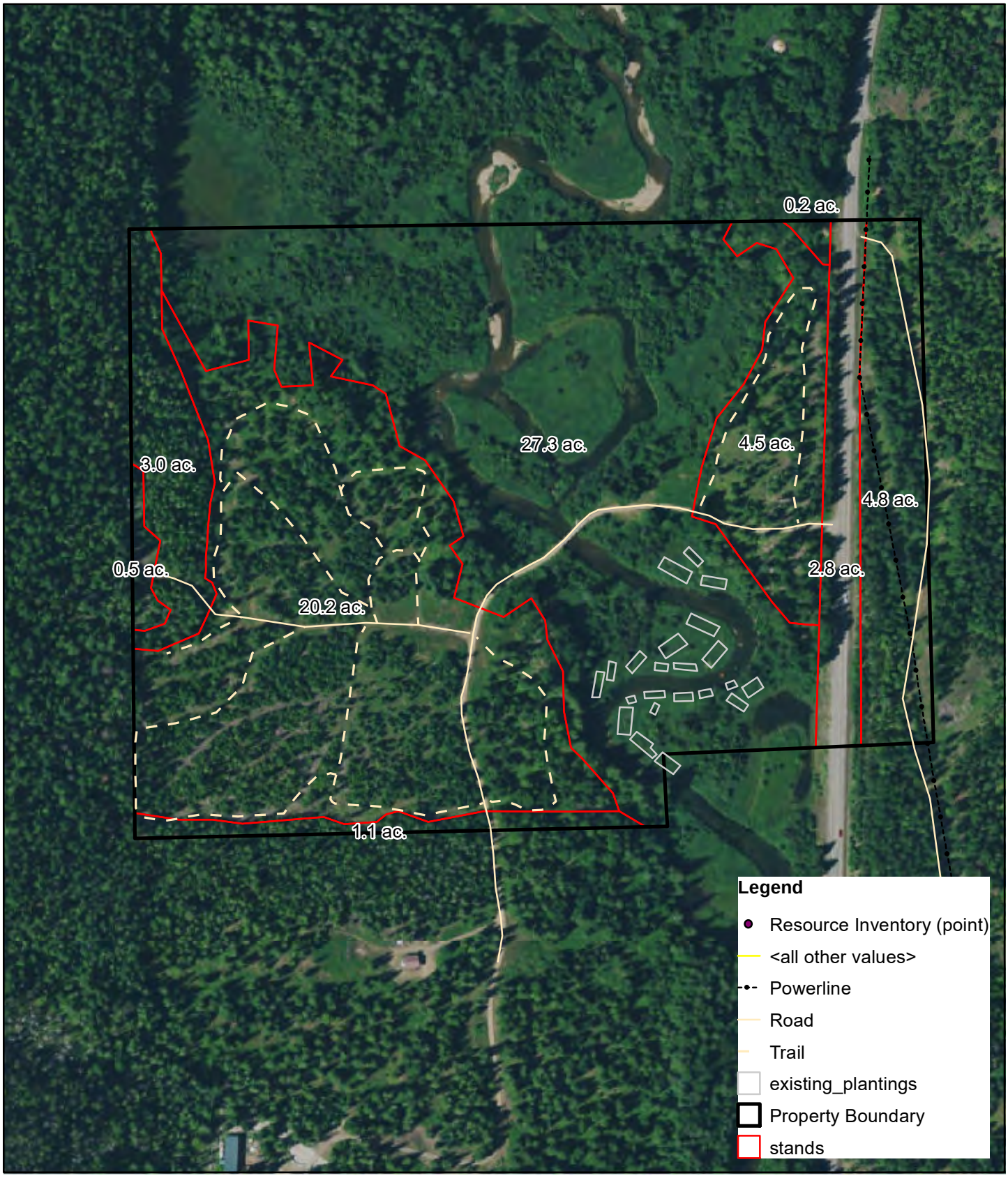
N

# Bull River Riparian Function Restoration

Customer(s): Warrington Living Trust
District: Green Mountain CD
Approximate Acres: 65
Legal Description: Sec.32 & 33, T28N R33W

## 2019 Aerial Photo

Date: 2/25/2022
Field Office: Plains Field Office
Agency: USDA - NRCS
Assisted By: TROY HIDY




USDA

1:3,960
330 Feet/Inch

190 0 190 380 570 760
Feet

N

# Bull River Riparian Function Restoration

| Ownership | Waterbody | Conservation Easement | Summary of past efforts | Maintenance needs | Further Revegetation Potential | Revegetation Plan / Landowner Agreement Status |
|---|---|---|---|---|---|---|
| 1 (See Map)<br>Stein | East Fork Bull River | Yes | Planting along a channel restoration project occurred in 2001 and 21 additional exclosures were installed in 2002. Bob has planted additional trees in the floodplain over the last two decades. Approx. 100 trees were planted in 2021, and another 57 trees were planted in 2022. | Maintenance has occurred intermittently over the last two decades. A portion of large exclosures were removed approx. 1 decade after installation. In 2021 and 2022, the LCFWG worked with Montana Conservation Corps for three weeks to remove remaining fencing exclosures. Hundreds of individual cages remain and will be checked annually for maintenance needs. | NRCS estimates approximately 4 acres of open areas to plant could support at least 500 additional trees in the floodplain area. Bob Stein has an NRCS EQIP contract to support 300 plantings by FY2026. | East Fork Bull River Revegetation Plan (2022-2025), completed in 2022; landowner agreement for revegetation efforts from 2022-2025 is finalized for approx. 100 trees annually for four years. |
| Stein | Bull River | Yes | 3 exclosures were installed in 2015 and planted in 2017. | Fencing is nearing the end of its life and will be removed by 2025. Any conifer or tree species remaining will be fenced individually. | Gaps between exclosures or surrounding exclosures could support perhaps a dozen more plantings to promote further shading of reed canarygrass, but area between river and streamside wetland is relatively narrow. | Landowner agreement finalized in 2015; Bull River Revegetation Plan (2023-2026) is under development, expected December 2022; updated landowner agreement, expected March 2023. |
| 2 (See Map)<br>Edwards/Nye | East Fork Bull River and Bull River | Yes | 16 exclosures were installed in 2015 and planted in 2017. Approx. 125 additional trees were planted in 2021, and another approx. 112 were planted in 2022. | Fencing on exclosures is nearing the end of its life and will be removed by 2025. Any conifer or tree species remaining will be fenced individually. Individually caged trees will be checked at least annually, if not more frequently by landowners who frequently clear grass around plantings. | Approximately 8 acres of property is mixed shrub/reed canary grass riparian area. Past plantings are located within this same area, but in order to fill in floodplain and shade out reed canarygrass throughout this area, there is opportunity for at least 200-300 more plantings. | Ownership of property changed in summer of 2022; East Fork Bull River Revegetation Plan (2022-2025), completed in 2022, and Bull River Revegetation Plan (2023-2026), expected December 2022, apply to the property; past landowner agreement expired with change of ownership so new landowner agreement will be developed, expected March 2023 or sooner. |
| 3 (See Map)<br>Warrington family | Bull River | Yes | 22 exclosures were installed in 2015 and planted in 2017. 154 additional trees were planted in 2022. | Fencing on exclosures is nearing the end of its life and will be removed by 2025. Any conifer or tree species remaining will be fenced individually. Individually caged trees will be checked at least annually. | Approximately 27 acres of the property is riparian and floodplain area. Some well established trees exist throughout, but an area at least triple of what has been planted to-date is dominated by reed canarygrass which would be easily 500 plantings. Warrington family has an NRCS EQIP contract to support 300 plantings by FY2026. | Bull River Revegetation Plan (2023-2026), expected December 2022; landowner agreement expected March 2023 or sooner |
| 4 (See Map)<br>Ross | Bull River | Yes | 11 exclosures were installed in 2005 and planted in 2006; 100-200 additional plantings were also completed at this time in smaller cages. | In 2016, the LCFWG worked with MCC crews for five days removed the fencing around the 11 exclosures. 43 Western Red Cedars were caged. Since, the LCFWG and NRCS staff have conducted a few days of maintenance enlarging and removing individual cages. LCFWG and Project ASCENT interns worked with NRCS to cut weed matting around the base of trees planted on both sides of the river. Over a decade of sediment deposition has made these mats extremely difficult to remove, so partners are at minimum cutting large holes so that planted trees are not eventually girdled. | To further facilite natural regeneration, it will require additional trees to shade and compete with the reed canarygrass. While a good start has been made on this property, additional planting would help promote a resilient riparian forest. Landowner would like to start with area directly upstream of the highway bridge, where LCFWG estimates there is room for 50-100 trees. | Bull River Revegetation Plan (2023-2026), expected December 2022; landowner agreement expected March 2023 or sooner for additional work |
| Avista - Wood Duck Block Management Area | Bull River | Yes | 13 exclosures were installed in 2010 and planted in 2012. 200 individually caged trees were planted in 2017. | Significant maintenance (over two weeks of MCC crew time) was completed on the Wood Duck property to remove failed exclosures and address significant beaver browse. Over 650 supplemental plantings were completed. By 2021, exclosures had largely regrown / recovered and large exclosure fencing was removed. Tree species were individually caged where established. Weed matting is still present around approximately 1/3 of exclosures and will need to be removed. | Large patches of reed canarygrass and other grass species persist adjacent to previous planting area. Avista is supporting LCFWG in 2022/2023 to evaluate potential value and benefit of further plantings in this area to accelerate the recovery of a riparian forest. There is opportunity for 100-200 more trees depending on planting densities. | Landowner agreement completed in 2017; Bull River Revegetation Plan (2023-2026), expected December 2022; updated landowner agreement expected March 2023 or sooner for additional work |

# Bull River Riparian Function Restoration

| Ownership | Waterbody | Conservation Easement | Summary of past efforts | Maintenance needs | Further Revegetation Potential | Revegetation Plan / Landowner Agreement Status |
|---|---|---|---|---|---|---|
| Zigan | Bull River | | 1 exclosure was installed in 2015 and planted in 2017. | Fencing on exclosures is nearing the end of its life and will be removed by 2025. | Pending landowner interest, there is potential for a few more trees and shrubs (<10). | Landowner agreement completed in 2015; Bull River Revegetation Plan (2023-2026), expected December 2022; updated landowner agreement will be developed for any additional work |
| Rowe | Bull River | | 26 exclosures were installed in 2015 and planted in 2017. | Fencing on exclosures is nearing the end of its life and will be removed by 2025. LCFWG has already begun working to removed fence and cage individual trees, but it will likely take at least one more week of MCC crew time to complete that effort. | There is opportunity surrounding existing exclosures to fill in floodplain vegetation and expand to areas along the bank not included in previous project. LCFWG will be drafting updated site specific revegetation plan with proposed maintenance schedules and potential planting opportunities. Pending landowner review, site could benefit from additional plantings. | Landowner agreement completed in 2015; Bull River Revegetation Plan (2023-2026), expected December 2022; updated landowner agreement will be developed for any additional work |
| Jura | Bull River | | 18 exclosures were installed in 2015 and planted in 2017. | Fencing on exclosures is nearing the end of its life and will be removed by 2025. Relative to many other properties, fencing is is good condition and will likely be one of last removed of sites fenced in 2015. | Coupled with preexisting vegetation, there is limited opportunity for further riparian plantings and site is fairly well saturated. | Landowner agreement completed in 2015; Bull River Revegetation Plan (2023-2026), expected December 2022 |
| Carabin | Bull River | | 3 exclosures were installed in 2015 and planted in 2017. An additional 12 trees were planted in 2017. | Fencing on exclosures is nearing the end of its life and will be removed by 2025. Relative to many other properties, fencing is is good condition and will likely be one of last removed of sites fenced in 2015, in part due to landowner presence. | There is opportunity surrounding existing exclosures to fill in floodplain vegetation. LCFWG will be drafting updated site specific plans with proposed maintenance schedules and potential planting opportunities. Pending landowner review, site could benefit from additional plantings. | Landowner agreement completed in 2015; Bull River Revegetation Plan (2023-2026), expected December 2022; updated landowner agreement will be developed for any additional work |
| Sommer | Bull River | | 70 individually caged trees were planted in 2017. | A few mortality replacement plantings have been completed, but largely the landowner has monitored and mowed around plantings to reduce reed canarygrass competition. | Landowner has expressed interested in additional plantings. A site-specific revegetation plan will be developed in winter of 2022, and pending landowner approval pursued in 2022-2025. | Landowner agreement completed in 2017; Bull River Revegetation Plan (2023-2026), expected December 2022; updated landowner agreement will be developed for any additional work |
| Kootenai National Forest - Cabinet Ranger District | Bull River | N/A | 59 exclosures were installed in 2016 and planted in 2018. Another 23 exclosures were installed in 2018 and planted in 2020. | The Kootenai National Forest has conducted monitoring and maintenance since installation, with occasional help from LCFWG and MCC crews when available. Currently, the forest is working to transition exclosures to individual cages. | There is potential value in further planting throughout the floodplains surrounding this vegetation; however, this may require additional consultation. In the short term, it will be best to support the forest in maintaining existing revegetation effort. | Bull River Revegetation Plan (2023-2026), expected December 2022; Participating agreement was finalized in 2016 for the LCFWG and Green Mountain Conservation District to support this effort. |
| Crull | Bull River | | Following an initial failure of plastic fencing installed as a part of a demonstration project, LCFWG used salvaged fencing from other projects to cage 118 trees surviving in addition to 4 trees that were caged individually in the original project. | Project needs to be monitored for plant survival and maintenance needs. | There is signficant opportunity to expand revegetation efforts on this property, pending landowner interest. However, landowners have had this property up for sale off and on over the last five years, so no effort is being made at this time. | Bull River Revegetation Plan (2023-2026), expected December 2022 |
| Kootenai National Forest - Cabinet Ranger District | East Fork Bull River and Bull River | N/A | | | A Decision Memo was signed by the Cabinet District Ranger authorizing up to 200 tree and shrub plantings along the East Fork Bull River. | East Fork Bull River Revegetation Plan (2022-2025); Participating agreement for the LCFWG to complete this work is anticipated in fall of 2022. |

# Bull River Riparian Function Restoration

| Ownership | Waterbody | Conservation Easement | Summary of past efforts | Maintenance needs | Further Revegetation Potential | Revegetation Plan / Landowner Agreement Status |
|---|---|---|---|---|---|---|
| Cross | Bull River | Yes | | | Property is protected by NRCS conservation easement which controls vegetation management; plan to meet with landowner and NRCS in fall of 2022 or spring of 2023 to discuss planting opportunities. | Bull River Revegetation Plan (2023-2026), expected December 2022; landowner agreement would be developed for any proposed work |
| Kettle | Bull River | Yes | | | Met landowner as a result of 2020-2022 outreach efforts and proximity to Warrington property; interested in a site visit and discussing opportunities/recommendations for planting trees along the river. | Bull River Revegetation Plan (2023-2026), expected December 2022; landowner agreement would be developed for any proposed work pending site visit and any site specific plan that is developed |
| Walrath | Bull River | | | | Met landowner onsite as a result of 2020-2022 outreach efforts in the Bull River and past community presentations; landowner expressed interest in planting efforts and LCFWG anticipates drafting a site specific revegetation plan in winter of 2022/2023. | Bull River Revegetation Plan (2023-2026), expected December 2022; landowner agreement expected by March 2023 |
| Homik/Dameron | Bull River | | | | Landowner interested as a result of 2020-2022 outreach efforts; need to schedule site visit | Bull River Revegetation Plan (2023-2026), expected December 2022; landowner agreement would be developed for any proposed work pending site visit and any site specific plan that is developed |
| Potts | Bull River | | | | Landowner has expressed some interest, pending site visit and scope of work | Bull River Revegetation Plan (2023-2026), expected December 2022; landowner agreement would be developed for any proposed work pending site visit and any site specific plan that is developed |
| Scott | Bull River | | | | Landowner has expressed repeated interest; need to schedule site visit | Bull River Revegetation Plan (2023-2026), expected December 2022; landowner agreement would be developed for any proposed work pending site visit and any site specific plan that is developed |
| Abrahamson | Bull River | | | | Met landowner onsite as a result of 2020-2021 outreach efforts in the Bull River; drafted landowner agreement for review and landowner approval is pending. | Bull River Revegetation Plan (2023-2026), expected December 2022; landowner agreement expected pending landowner review and approval of site specific plan |

Green Mountain
CONSERVATION DISTRICT
PO Box 1329 · Trout Creek, MT 59874 · (406) 827-4833
greenmountaincd.org

September 30, 2022

Brita Olson, Coordinator
Lower Clark Fork Watershed Group
P.O. Box 1329
Trout Creek, MT 59874

Dear Ms. Olson,

Please accept this letter as an expression of support from the Green Mountain Conservation District (GMCD) and our ongoing willingness to assist in the Lower Clark Fork Watershed Group's (LCFWG) riparian revegetation project in the Bull River watershed.

The GMCD has been a member of the LCFWG, as well as a fiscal sponsor and project partner, since the organization was formed in 2004. Prior to that, we helped form and serve as the fiscal sponsor for landowner watershed councils in multiple tributaries to the Lower Clark Fork River. The GMCD and LCFWG have worked together to plan, fund, administer, coordinate and implement many restoration projects over the years – including in the Bull River Watershed.

We are currently working to secure funding for staff capacity, including a Big Sky Watershed Corps member, that would allow GMCD staff and the additional member to contribute directly to planting efforts, landowner and community outreach and project maintenance in 2023. We aim to continue building and sustaining capacity at the district to support these efforts through the scope of your current proposed projects and into the future.

Due to our long history and involvement with the LCFWG and work in the Bull River, it is without hesitation that we support your efforts to secure funding for future phases of the ongoing riparian revegetation efforts in this very important tributary of the Lower Clark Fork River. We have full confidence in LCFWG's ability to carry out this work, and know it complements the GMCD's mission to protect and enhance the natural resources of Western Sanders County.

Sincerely,

William D Naegel

Green Mountain Conservation District

KANIKSU
LAND TRUST

October 5, 2022

Brita Olson
Lower Clark Fork Watershed Group
P.O. Box 1329
Trout Creek, MT 59874

Dear Ms. Olson,

This letter is to express the full support of Kaniksu Land Trust for the Lower Clark Fork Watershed Group's continued work to restore native riparian vegetation along the banks of the Bull River and East Bull River.

Kaniksu Land Trust is an accredited land trust whose mission is to care for the lands and people of the Kaniksu Region, today, tomorrow and forever. To that end we have completed more than 30 land conservation projects throughout this region – which includes Sanders County, Montana and Bonner and Boundary Counties in Idaho - since forming in 2002. Our land trust holds 7 conservation easements in the Bull River Valley and maintains and monitors an 8th, nearly all of which are on properties where your organization has planted much-needed native trees and shrubs. We are impressed with the results thus far of this restoration initiative and are excited to see natural regeneration now occurring from initial planting efforts years ago.

The Bull River is a high priority for our conservation work because of the importance of this river for threatened Bull Trout and other native fish species. Because of our commitment to steward the lands under our management, and the benefits of restoring native vegetation to this river system, consider us a full partner in your efforts to restore the health of this river.

Sincerely,

Regan

Regan Plumb
Conservation Director
Kaniksu Land Trust

MONTANA CONSERVATION CORPS

301 N. Willson Ave, Bozeman, MT 59715 * PH: 406-587-4475 * www.mtcorps.org

September 14, 2022

Brita Olson, Coordinator
Lower Clark Fork Watershed Group
P.O. Box 1329
Trout Creek, MT 59874

Dear Ms. Olson,

On behalf of Montana Conservation Corps (MCC), let me express our satisfaction in being included as a partner in your riparian revegetation projects in the Bull River watershed. This letter is in support of your efforts to secure funding to support the next three years of partnership in pursuit of further restoration work.

The mission of the MCC is to inspire young people through hands-on conservation service to be leaders, stewards of the land and engaged citizens who improve their communities. We have had multiple opportunities to live this mission through our more than six years of working with the Lower Clark Fork Watershed Group, partnering to support ongoing planting efforts in the Bull River drainage. We have deployed multiple MCC Crews to assist with the planting of native trees and shrubs, and in the maintenance of previous plantings.

It is so gratifying to see the success of this work over the years, while working with the professionals at the LCFWG. This project has given many MCC members exposure to quality restoration work, an opportunity to work with positive mentors, a glimpse into the power of partnerships for land stewardship, and exposure to a potential career pathway.

We look forward to partnering with the Lower Clark Fork Watershed Group on future phases of this long-term restoration project.

Please don't hesitate to contact me with questions regarding the contents of this letter.

Sincerely,

Clifford Kipp
Regional Director
MCC – Northern Rockies
clifford@mtcorps.org

FWP.MT.GOV

THE **OUTSIDE** IS IN US ALL.

September 30, 2022

Brita Olson, Coordinator
Lower Clark Fork Watershed Group
P.O. Box 1329
Trout Creek, MT 59874

Dear Ms. Olsen,

Please accept this letter of support for Lower Clark Fork Watershed Group's (LCFWG) proposed work on the Bull River.

The mainstem Bull River and East Fork Bull River are important migratory and spawning (respectively) tributaries for Bull Trout, a threatened species. They also support Westslope Cutthroat Trout, Mountain Whitefish, and a popular sport fishery. Because of the long-term benefits to fish habitat, we have been involved and supportive of the LCFWG efforts to restore this river through a multi-decade riparian revegetation effort. This work is time-consuming and requires patience, but we have seen results as the monoculture of reed canarygrass is gradually replaced by native shrubs and trees. Over time this project will improve the function of the Bull River and surrounding floodplain areas necessary for the long-term resilience of the system and the fish habitat it provides.

This work requires collaboration with landowners, including small private property owners as well as the U.S. Forest Service. All projects include multiple stakeholders with diverse objectives, and the LCFWG is essential for coordination during this process. The LCFWG assists in many aspects of restoration throughout the drainage including pre-project planning (such as stakeholder collaboration, obtaining funds, permitting, and contractor selection and oversight), as well as on-the-ground work (such as planting, maintenance and monitoring). We value the group's ongoing commitment to champion this project over the long-term.

We support the LCFWG's proposed work on the Bull River over the next three years and believe it to be in line with the goals and objectives of our agency, in particular the Future Fisheries Improvement Program. We further expect to continue supporting the LCFWG's efforts in the Bull River by supporting funding through the Avista's Clark Fork Settlement Agreement for ongoing maintenance of past projects.

Sincerely,

Travis Rehm

Travis Rehm
Fisheries Biologist
Montana Fish, Wildlife & Parks, Region 1
5427 Hwy. 200
Thompson Falls, MT 59873
(406) 382-3032

October 4, 2022

Brita Olson
Lower Clark Fork Watershed Group
P.O. Box 1329
Trout Creek, MT 59874

Dear Ms. Olson,

As landowners in the Bull River Valley, We are happy to offer our support of your efforts to fund continued revegetation efforts on our property and other properties in the area.

We have lived in the Bull River for over two decades, and feel fortunate to be stewarding a parcel at the confluence of the East Fork Bull River and mainstem Bull River. The Bull River is near and dear to our hearts, and a big part of our lives. We value its scenic beauty – and also recognize the importance of protecting and conserving the river for the many fish and wildlife species we share the valley with.

We have been caretaking this piece of land for years, supporting the previous owners Don and Helen Edwards in their vision of managing the land surrounding their home for the benefit of nature. Don donated a conservation easement for the property to the Kaniksu Land Trust in 2020, and we are privileged to continue the Edwards legacy of stewardship on the property.

For the last few years, we have been working to implement recommendations made by the Natural Resources Conservation Service who completed a resource assessment on the property. This work has included pruning Western White Pine, forest health thinning, and supporting the Lower Clark Fork Watershed Group's planting efforts on the mainstem and East Fork Bull River and surrounding floodplains. In addition to supporting additional planting efforts, we help maintain the plantings every summer and mow around the planting cages to reduce competition and support the young trees as they are getting established. We are committed to continuing this work in partnership with you and the Lower Clark Fork Watershed Group for the next 3 years and into the future for as long as this property is ours to steward.

It's gratifying to see the conservation progress year after year, and to know that we are contributing to making this river system healthier, and giving fish and wildlife in this valley a better opportunity to thrive. We only wish we could live to see these trees in 100 years!

We wish you success in recruiting more landowners to participate in this program and in efforts to securing funding to expand the work. Please feel free to use this letter of support toward that aim.

Sincerely,

David R. Nye
Karen Nye

Dave and Karen Nye

Project ASCENT

September 30, 2022

Brita Olson
Lower Clark Fork Watershed Group
P.O. Box 1329
Trout Creek, MT 59874

Dear Ms. Olson,

I am writing on behalf of the entire Project ASCENT Board of Directors to express Project ASCENT's support and enthusiasm for your efforts to restore a healthy ecosystem in the Bull River watershed through continued revegetation work along the mainstem Bull River and the East Fork Bull River. Let this letter signal our full support for your efforts to secure funding for this important work.

Project ASCENT is a Sanders County non-profit organization dedicated to getting kids outdoors and connected to nature. Our primary purpose is to offer recreational opportunities and outdoor education primarily to underprivileged youth in our area and the surrounding areas.

We are particularly excited about the opportunity to place older youth in internships with the Lower Clark Fork Watershed Group so they can learn about the value of native vegetation and healthy rivers, while contributing to ongoing conservation projects. Just as important, these internships will give youth a chance to experience teamwork with people from different walks of life and build self-confidence. This will give them a meaningful summer job and perhaps inspire them to appreciate conservation work and perhaps consider it as a future career option.

We are hopeful that adequate funding can be secured to continue this critical restoration work along our treasured waterways and provide a transformative growth experience for youth from our community.

Sincerely,

Rob Christensen, CEO
Project ASCENT
P.O. Box 1954
Thompson Falls, MT 59873

October 5, 2022

Brita Olson
Lower Clark Fork Watershed Group
P.O. Box 1329
Trout Creek, MT 59874

Dear Ms. Olson,

As a landowner in the Bull River Valley, I am happy to offer my support of your efforts to fund continued revegetation efforts on my property and other properties in the area.

This land is my favorite place on earth, and the only true home I've ever known. In fact, this fall marks the 50th anniversary of my family moving to our property, and I remember sitting around the dining room table with Mr. Berray who homesteaded the place with his father, Casper Berray, in the early 1900s. I heard of all of the years of labor that the first homesteaders in the Bull River valley put into clearing the fields, diverting the river, and turning this land into one of the most productive farms in the Bull River valley. When I was in school, we harvested 2,000-3,000 bales of hay out of our fields.

While in many ways it is difficult to balance this rich legacy that I inherited with a return to nature, it's been nearly 30 years since our family has hayed or kept animals. The homestead has been placed in multiple conservation easements. Drainage ditches from our fields have been plugged and wetlands on the property now support many species of migratory waterfowl, beaver, muskrat and other wildlife. I am deeply passionate about protecting this land from subdivision and stewarding it as a place where nature can thrive.

Every tree along the river currently has grown in since the late 1990s, some naturally and some through past planting efforts. I fully support the Lower Clark Fork Watershed Group's continued efforts to establish trees along the river and floodplain, which will eventually provide quality habitat, shade the river, and contribute to the long term resilience of the habitat on our land. The Lower Clark Fork Watershed Group has worked with the Natural Resources Conservation Service for years to maintain past plantings and support these efforts on our property. My wife and I are enthusiastic for additional western white pine, Engelmann spruce and western red cedar to be established along the river, further shade out reed canarygrass and continue this long-term project.

I wish you success in recruiting more landowners to participate in this program and in efforts to secure funding to expand the work.

Sincerely,

Jamie Ross

October 5, 2022

Brita Olson
Lower Clark Fork Watershed Group
P.O. Box 1329
Trout Creek, MT 59874

Dear Ms. Olson,

As a landowner on the East Fork Bull River, I am happy to offer my support of your efforts to fund continued revegetation efforts on my property and other properties in the area.

My property includes a portion of the East Fork of the Bull River, a spawning and rearing stream for Bull Trout, which is listed as a threatened species under the ESA, and for native Westslope cutthroat trout, a Montana species of special concern. Historically the riparian area of the property was an old growth western red cedar forest, but the forest was heavily logged by the previous landowner. This led to the establishment of extensive areas of reed canary grass, which has thick root mats that preclude shrub and tree seedling generation. My long term vision and objective for the riparian area of the property is to reestablish western red cedar forest, which will provide shade for cooler water temperatures for more favorable trout habitat and deep roots for streambank stability.

Prior revegetation work has been done in the riparian area to establish riparian shrubs and western red cedar trees with good success. You can feel the temperature difference provided by the shade of the canopy cover on a hot day which is the result of over 20 years of revegetation efforts on my property. I am encouraged by natural generation in these previously planted areas that we are now observing – a sign that our relatively short-term planting efforts will be resilient over the long term. Despite these successes, there are still significant areas along the stream and in nearby floodplain covered in reed canarygrass and with limited tree cover. I am enthusiastic about the continued efforts proposed by the Lower Clark Fork Watershed Group and fully support the proposed work to expand revegetation efforts on my property and others in the drainage.

I value and appreciate the natural surroundings in which I live, and am pleased to have the opportunity to be a good steward of this land, leaving it healthier than when I arrived. I have placed my property in conservation easements, and hence the land and restoration investments will be protected in perpetuity. I wish you success in recruiting more landowners to participate in this program and in efforts to secure funding to expand the work.

Sincerely,

Robert A. Stein

United States Department of Agriculture
Forest Service
Kootenai National Forest
Cabinet Ranger Station
2693 MT Highway 200
Trout Creek, MT 59874-9503
406-827-3533

**File Code:** 2700
**Date:** September 28, 2022

Brita Olsen - Director
Lower Clark Fork Watershed Group
P.O. Box 1329
Trout Creek, MT 59874

Dear Ms. Olson,

As the primary land manager in the Bull River Watershed, the Kootenai National Forest recognizes the importance of the work being conducted by the Lower Clark Fork Watershed Group (LCFWG) and its partners to restore native riparian vegetation in the Bull River and East Bull River. Of the 142 square miles in the watershed, the vast majority (93 percent) are on USFS managed lands. The Bull River drainage is an important tributary for native fish, and we share your commitment to restoring these rivers to a more resilient and high-quality condition.

Because of our responsibility to steward the lands under our management, and the benefits of restoring native vegetation to this river system, we are working to facilitate the expansion of the riparian revegetation work onto U.S. Forest Service lands along the East Bull River. In 2021 and 2022, the Kootenai National Forest issued Categorical Excluded Decision Memos to authorize riparian plantings along the East Bull River. We also have facilitated funding of riparian revegetation work in the East Bull River through the Secure Rural Schools and Community Self-Determination Act to support efforts on public lands in 2022 and 2023. We look forward to future opportunities to assist with this important restoration work on lands that we manage.

Sincerely,

MICHAEL D. FEIGER
District Ranger

September 27, 2022

Brita Olson
Lower Clark Fork Watershed Group
P.O. Box 1329
Trout Creek, MT 59874

Dear Ms. Olson,

As a landowner in the Bull River Valley, I am happy to offer my support of your efforts to fund continued revegetation efforts on my property and other properties in the area.

We have owned our property on the mainstem Bull River for decades and have protected it with a conservation easement from the Kaniksu Land Trust. We've been happy to support planting efforts on our property since 2015 and the continued efforts of the Lower Clark Fork Watershed Group in the Bull River. Past plantings are performing well and we enthusiastically supported another 150 trees planted on our property this past year. All previous planting efforts have taken place downstream of our bridge, and while these areas will continue to be maintained and saturated with plantings, there are large areas upstream of the bridge on our property that are dominated by reed canarygrass. We fully support the Lower Clark Fork Watershed Group's efforts to expand plantings efforts throughout the floodplain on our property and elsewhere in the Bull River valley.

It's gratifying to see the progress year after year, and to know that we are contributing to making this river system healthier, and giving fish and wildlife in this valley a better opportunity to thrive. In addition, we have been working with the Natural Resources Conservation Service to implement recommendations and forest health improvements throughout our property. Last year, this included upland thinning, pruning and hundreds of blister rust resistant western white pine plantings. Through multiple partnerships, we are moving toward whole property management for the health of the forest, Bull River, and the many species that utilize and compose the habitat on our property.

We are pleased to have the opportunity to be a good steward of this land, leaving it healthier than when we first saw it. I wish you success in recruiting more landowners to participate in this program and in efforts to securing funding to expand the work on our property and beyond.

Sincerely,

Brad Warrington

Bull River Riparian Function Restoration

USDA United States Department of Agriculture
Farm Production and Conservation
Natural Resources Conservation Service
NRCS – Montana
Plains Field Office
7487 MT HWY 200
Plains, MT 59859

10/07/2022

Brita Olson
Lower Clark Fork Watershed Group
P.O. Box 1329
Trout Creek, MT 59874

Dear Ms. Olson,

The NRCS has a long history of working with the LCFWG in collaboration with other conservation partners, such as Green Mountain Conservation District, US Forest Service, Avista Utilities, and Montana Fish, Wildlife, and Parks within the watershed to restore the native vegetation on a landscape-scale within the Bull River Watershed.

NRCS prioritizes our workload through our Local Working Group process. One of the priorities identified by the Local Working Group in Sanders County has been the restoration and revegetation of the Bull River watershed. NRCS has worked with multiple partners, including LCFWG, to develop and implement projects that address these identified priorities. As a result of this collaboration, a Targeted Implementation Plan (TIP) was developed to address revegetation in the Bull River Watershed.

As such, we look forward to continuing to work closely with the LCFWG in the coming years to continue our long history of coordination and collaboration.

Sincerely,

Dillon Martini
District Conservationist
(406) 826-3701
Dillon.Martini@usda.gov

# Roots for Rivers Targeted Implementation Plan (TIP)

## Riparian Restoration of Woody Vegetation

## Natural Resources Conservation Service

## Sanders County, Montana

**Examples of reed canary grass, and other introduced grasses along the Bull River, and subsequent bank sloughing in riparian area cleared for hay ground.**

**Desired riparian condition includes robust stands of woody shrubs (such as Douglas spirea and willow) and trees (such as hawthorn and cottonwood).**

**Trees planted approximately 15 years ago on this NRCS wetland easement along the Bull River are now well established.**

**New plantings, such as these installed in fall of 2018, require browse protection and weed matting for at least 5-10 years until they are established enough to compete with surrounding vegetation and/or browse pressure. In some areas that are suitable, such as the opposite bank pictured in the photo on the left (planted in 2012), large enclosures can be installed to protect larger areas of vegetation.**

## *Overview and Background Information*

Riparian areas are critically important landscape features. Over the past 120 years human development has caused significant degradation to the riparian areas within the Bull River drainage. As was common in most areas of the west, early settlement, homesteading, and logging was concentrated in the riparian areas within the Bull River drainage. These riparian areas were highly sought after due to their productive soils, proximity to water, and their relatively flat terrain in an otherwise mountainous area. Riparian forests were cleared of timber first, followed by large-scale logging on the adjacent areas. Roads were constructed throughout the landscape to assist with these logging operations. Most of the larger riparian areas are private while the adjacent areas are mostly Forest Service lands. Large areas of the larger riparian areas were planted to reed canarygrass, which has since taken over these riparian areas creating a monoculture. This monoculture of reed canarygrass fails to provide stream and flood plain stability. One unique feature of the Bull River drainage is that grazing is relatively uncommon.

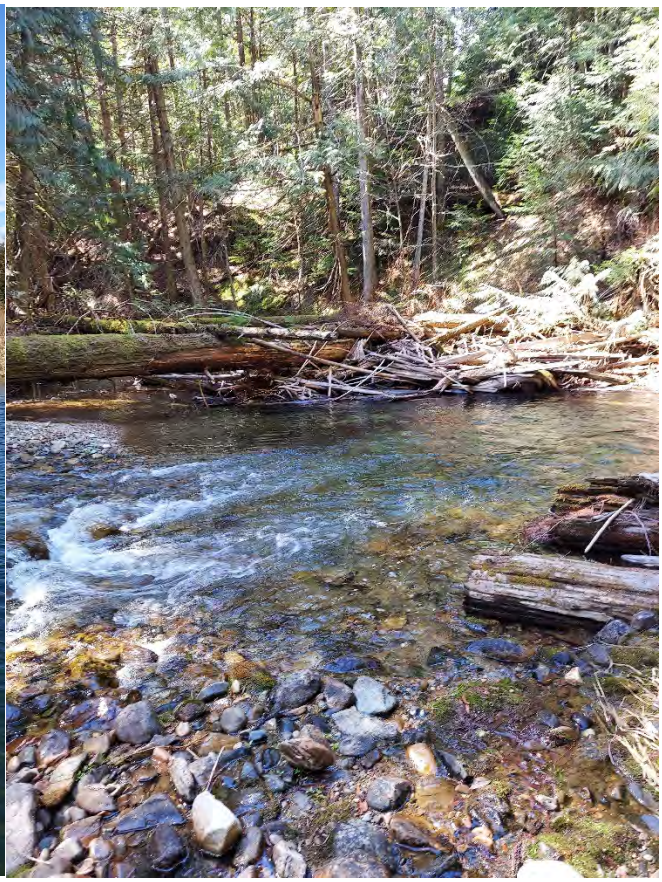
The Lower Clark Fork Watershed Group (LCFWG) in conjunction with Green Mountain Conservation District (GMCD) has been actively working to restore native riparian vegetation along the Bull River since 2002. The Natural Resource Conservation Service (NRCS) has complemented this work by restoring woody vegetation on wetland easements within the Bull River and has provided technical assistance to LCFWG and GMCD on other properties in the Bull River watershed throughout the years. Working cooperatively, NRCS, GMCD, and LCFWG have had success in establishing species such as western red cedar, western white pine, spruce, and cottonwood trees which help to provide stability to the banks, shade for the river, and large down woody debris to the stream.

This TIP will utilize the lessons learned over the past two decades to restore riparian areas within the Bull River drainage. The TIP will be completed in cooperation with the LCFWG and GMCD. The US Forest Service (USFS) has also implemented similar projects on federal property which are often adjacent to private properties that will be restored through this TIP. This TIP will work to expand the cumulative benefits that multiple partners can provide.

## *Problem Statement*

Due to the lack of large rock and bedrock in most area streams, large diameter wood and tree roots are a key component to stream and flood plain stability. Historically, this created high quality fishery habitat for native fish species by maintaining complex stream structures with deep, cool temperature pools. These areas also provided quality habitat for terrestrial wildlife species (Sanders County Long Range Plan, page 23).

**Current conditions on the Bull River consist of mostly reed canarygrass, as documented in the picture on the left. You can see some of the existing plantings that have been installed by Lower Clark Fork Watershed Group. On the right, you can see a properly functioning riparian area that currently exists on the East Fork of Bull River. Coarse woody debris has resulted in a diverse stream with riffles, pools, and structure that provides great aquatic habitat. Coarse woody debris coupled with diverse vegetation and structure also help prevent sedimentation and bank erosion issues.**



This project will improve fish and wildlife habitat as well as water quality in the Bull River Watershed. Riparian corridors in this area have the potential for high biodiversity and habitat value. Not only are healthy riparian areas vital to the long-term survival of native fish, they also provide important habitat for numerous birds, ungulates such as moose, elk and deer, beaver and other furbearers, and, when composed of diverse flowering plant species, native pollinator species. Bull trout, a species listed as threatened under the Endangered Species Act, are present in the drainage but declining - maintaining and improving high quality habitat is a component of multi-part conservation efforts for the species. The project area includes bull trout critical habitat. The Sanders County Long Range Plan explicitly discusses the desire to improve wildlife habitat for both bull trout and cutthroat trout (pages 13, 14, and 24 of the Sanders County Long Range Plan).

The Bull River is listed by the Montana Department of Environmental Quality (DEQ) as impaired by sediment as well as 'physical substrate habitat alterations', affecting aquatic life and the cold-water fishery. The priority recommendation for addressing stream impairments in the Bull River drainage, identified in the Lower Clark Fork Tributary Watershed Restoration Plan, is to continue streamside revegetation efforts. The Sanders County Long Range Plan discusses the DEQ listing of the Bull River and discusses addressing these problems as well as improving riparian forest health on pages 7, 13, 14, 23, 24, and 25.

Many riparian habitat conditions suffer from the loss of native riparian vegetation due to historic uses such as logging, wildfire and land conversion to agriculture. Following human disturbances, invasive reed canarygrass has replaced native vegetation in many areas. The aggressive nature of reed canarygrass inhibits the natural regeneration of woody shrubs and trees, as well as native grasses, forbs, and reeds. Meanwhile, the invasive grass lacks the deep root structures needed to prevent excessive erosion of the river's banks which are highly susceptible to erosion during seasonal high-water events. Reed canarygrass' tendency to prevent the natural regeneration of native vegetation further degrades in-stream and riparian habitat for fish and wildlife. Reed canarygrass typically outcompetes all other vegetation creating a monoculture that is extremely difficult to control. In addition, reed canarygrass does not provide the amount of shade trees and shrubs are able to provide to the stream resulting in increased water temperatures.

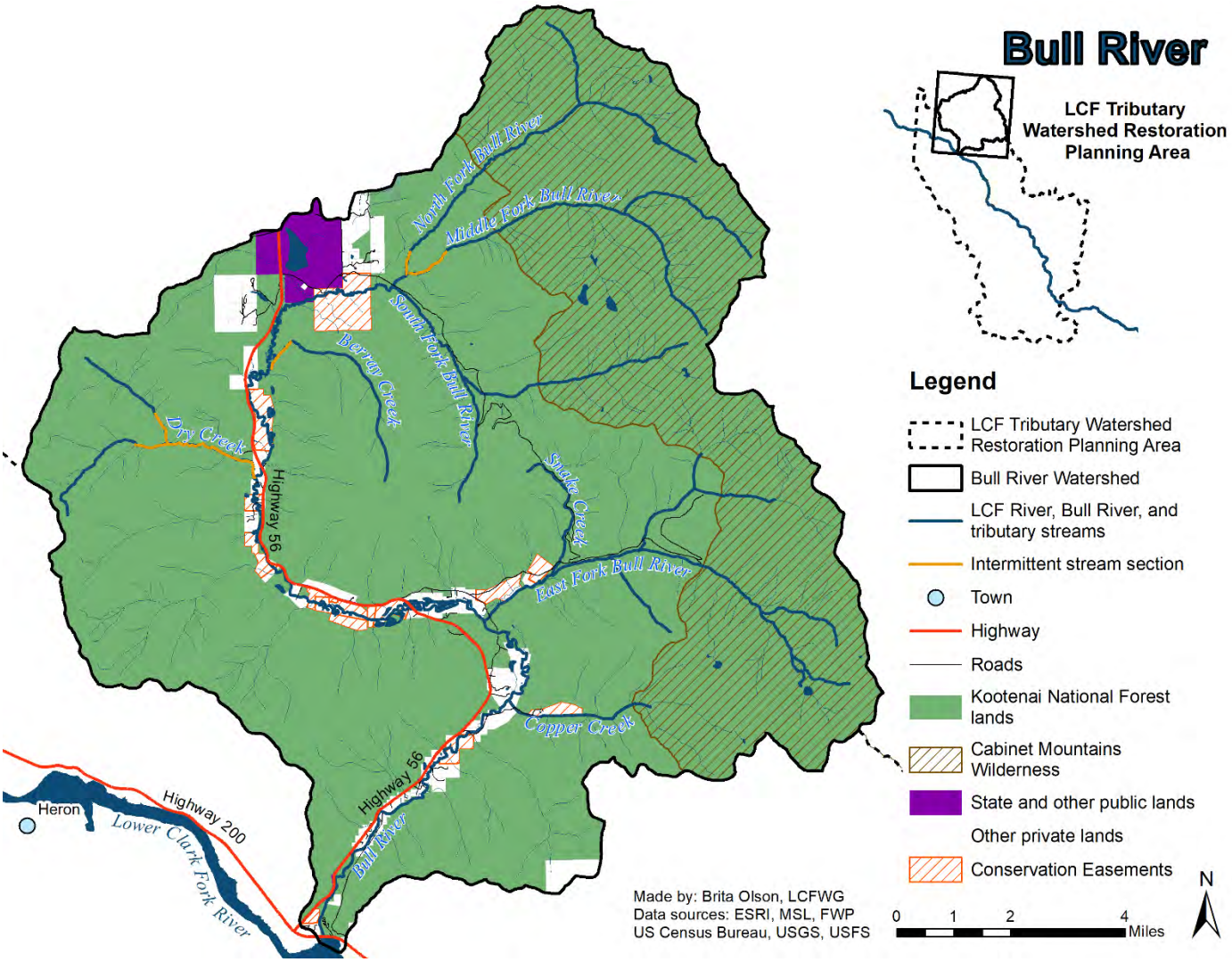



*Figure 1: The Bull River drainage, located in Sanders County, MT. The boundary of this TIP is the Bull River Watershed, and the TIP applies to private property that has riparian areas within the drainage.*

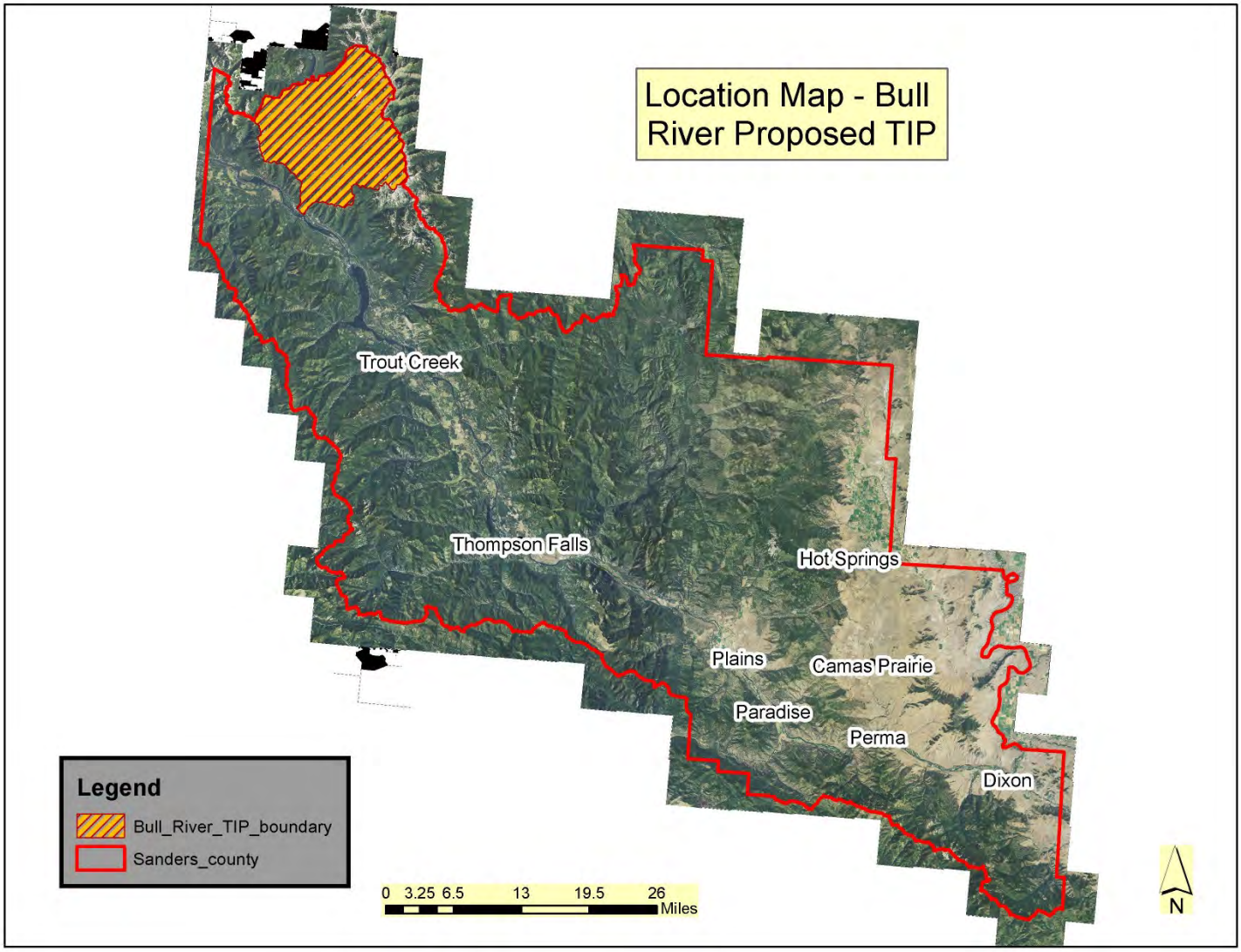



*Figure 2: The Bull River drainage as located in Sanders County.*

## *Goals and Objectives*

The goals and objectives of this project will be completed jointly via the NRCS, GMCD and LCFWG. This project will be highlighted as part of a concerted outreach effort to engage the community and other landowners in the GMCD service area in supporting and getting involved in efforts to improve ecological integrity and resilience of riparian areas. The LCFWG and the GMCD are collaborating on an extensive outreach effort to educate and engage more landowners through direct mailings, improved online resources for landowners and the general public, and articles in the local media. The project will provide a positive example of the kind of work landowners can do with the help of the LCFWG, GMCD and the NRCS, and will help generate future projects with new partners.

This project will restore woody vegetation to streamside areas where it historically existed but often is currently dominated by reed canarygrass and/or other invasive species (such as spotted knapweed). We will work closely with landowners to develop the revegetation plan, purchase container plants - primarily conifers and black cottonwood. The restoration methods will involve plantings of small groups of individual trees. Plantings will be protected from browsing

beaver, deer and other wildlife with fencing and competition from reed canarygrass and other weeds reduced by mechanical removal (with hand tools) and placement of weed matting as needed. The LCFWG has established many plantings throughout the Bull River Valley in the last two decades and maintains revegetation sites to ensure the new plants are protected until they are mature enough to withstand browse and encroaching reed canarygrass without protection. Shading is a successful technique in reducing the competitiveness of reed canarygrass and has been shown to result in significant decreases in both above-ground and below-ground biomass of reed canarygrass. This technique has been successful in restoring native riparian vegetation along the Bull River over the years and is making incremental improvements to the overall health of this important ecosystem. Establishing deeply rooted native vegetation will reduce erosion, increase shade, and improve habitat for both aquatic and terrestrial species.

Treatments will include a variety of practices to establish or promote woody vegetation in the riparian area. The primary practice will be Riparian Forest Buffer (391) to establish appropriate woody vegetation in areas where it has been reduced or eliminated. Fence (382) will be used to protect woody vegetation from damage due to deer, elk, moose, and beaver. Tree Pruning (660) will be used only on western white pine in or adjacent to riparian areas to improve resilience to blister rust. Forest Stand Improvement (666) and Woody Residue Treatment (384) will be used to improve existing stands of woody vegetation within or adjacent to riparian areas. Herbaceous Weed Treatment (315) will be used to treat weed infestations. Plantings will typically consist of physically removing reed canarygrass with handtools, planting a tree (container or bare root stock), laying down 5 feet by 5 feet landscape fabric, and using t-posts and woven wire to exclude ungulates and beavers.

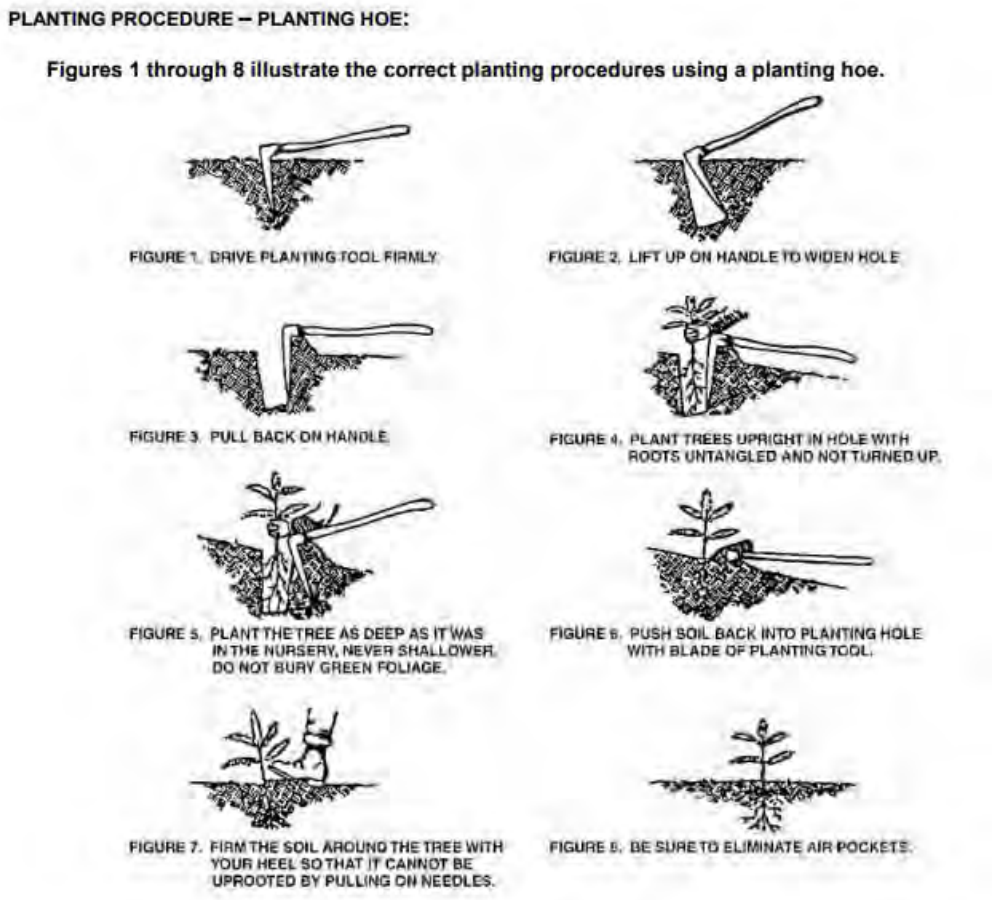



*Figure 3: Typical procedure for planting trees.*

**In the following picture, you can see the individually planted trees as an example of work this TIP will accomplish. In the picture, these trees were planted and are being maintained by Lower Clark Fork Watershed Group.**

Rough, preliminary, aerial estimates of river that potentially has reed canarygrass shows 10-15 miles of river that could be treated. This project aims to treat up to 7.5 miles of river which is the maximum that partner groups believe they can maintain at the current time. Various sources estimate the total river length at 25 miles. Therefore, roughly 40-60% of the river has the potential to have treatments, and we hope to treat 50-75% of the problem areas. This would result in the potential for 70-90% of the Bull River to meet NRCS planning criteria for identified resource concerns.

This TIP will address the following resource concerns:

- Plant:  Structure and Composition – Primary Resource Concern
- Plant: Pest Pressure – Supporting Resource Concern
- Soil:  Bank erosion, streams – Supporting Resource Concern
- Animal:  Aquatic habitat for fish & aquatic organisms – Supporting Resource Concern

All of these resource concerns tie directly to the Sanders County Long Range Plan. Page 7 of the long range plan discusses water quality and the sedimentation problem in the Bull River. Pages 13, 14, 24, and 25 all discuss improving wildlife habitat, particularly for endangered and threatened species, such as bull trout and cutthroat trout. In addition, page 23 discusses the decline of healthy riparian forests.

As a direct result of the Roots for Rivers TIP, the Bull River Watershed will experience a decrease in the abundance of invasive reed canarygrass, an increase in the quality of riparian habitat for both aquatic and terrestrial wildlife, an

increase in carbon sequestration, and a decrease in sedimentation within the Bull River Watershed. In the long-term, the money utilized in this TIP will most likely result in an increase in bull trout and cutthroat trout thanks to the benefits of creating a healthy riparian forest instead of leaving the area as a monoculture of reed canarygrass. The project will also beneficially impact bird species, big-game, and other terrestrial wildlife. The changes this TIP has the potential to bring to the landscape will benefit recreational users and travelers in the Bull River watershed, providing a special place for future generations to experience.

## Proposed Alternatives and Actions

1. Alternative 1: No action will occur. NRCS will not provide financial or technical assistance to restore woody vegetation to riparian areas in the Bull River drainage.

2. Alternative 2: The preferred alternative. Under this alternative NRCS will utilize the following practices to provide both technical and financial resources to restore woody vegetation in riparian areas: Riparian Forest Buffer (391), Fence (382), Tree Pruning (660), Forest Stand Improvement (666), Woody Residue Treatment (384), and Herbaceous Weed Treatment (315). This alternative will provide the greatest opportunity to improve the condition of riparian areas within the Bull River Drainage.

3. Alternative 3: Under this alternative, NRCS would utilize the following practices to provide both technical and financial resources to decrease the abundance of reed canarygrass and establish woody vegetation in riparian areas: Herbaceous Weed Treatment (315) combined with Prescribed Burning (338) and followed with Tree/Shrub Establishment (612). This alternative would require intensive management and would likely result in an increase in stream sedimentation. In addition, it would be very costly.

Alternatives will be analyzed in compliance with the National Environmental Policy Act (NEPA). All practices chosen for implementation will meet NEPA requirements. Special consideration will be given for practices affecting T/E species, such as Canada Lynx and Bull Trout, to meet all federal regulations and NRCS policy requirements. Any cultural resources present will be identified and avoided during the planning and implementation of practices involving any federal action.

## *Partnerships*

This project is an outgrowth of ongoing collaborative efforts to restore woody vegetation along the Bull River, led by the LCFWG and the NRCS. This effort has the potential to be expanded through additional TIPs to include other riparian areas in the Green Mountain Conservation District, with support from many partners including Green Mountain Conservation District, Kootenai National Forest, Montana Fish, Wildlife & Parks, Avista Utilities, volunteers, and landowners. This work continues to be a priority for stakeholders throughout the watershed who recognize the long-term, multi-species and watershed level benefits of this effort.

The mission of the LCFWG is to facilitate collaboration among watershed stakeholders and to coordinate efforts to maintain, enhance and restore the ecological integrity of tributaries to the lower Clark Fork River. A key focus of the organization's work has and continues to be working with landowners to revegetate the Bull River with woody trees and shrubs. Likewise, GMCD's mission is to protect and enhance the natural resources of the district and to educate the public about natural resource concerns. This TIP is well-aligned with these partners' missions and will be well supported through this partnership.

The following partners will provide both direct and indirect assistance:

- Natural Resources Conservation Service – Plains Field Office
- Lower Clark Fork Watershed Group
- Green Mountain Conservation District

The Plains Field Office, Lower Clark Fork Watershed Group, and Green Mountain Conservation District have a long history of partnership coordinating on conservation efforts. LCFWG has served as a liaison between NRCS, Forest Service, MT Fish, Wildlife & Parks, MT DEQ, Avista Utilities, and Kaniksu Land Trust. GMCD would like to increase conservation technical assistance to community members by working with the LCFWG, which this NRCS TIP will help facilitate.

This partnership will provide 'boots-on-the-ground' assistance towards implementation of the TIP. NRCS personnel with appropriate Job Approval Authority will oversee these plans to ensure that they meet NRCS Standards and Specifications. NRCS job sheets will be completed for each practice.

GMCD will help with administrative services, grant administration, and storage. LCFWG will provide on-the-ground work, through employees and volunteers, in both the installation and maintenance of the practices. They will also help find and educate landowners on this TIP and how it can help conservation on their land.

| | |
|---|---|
| **Primary Resource Concern** | Plant - Structure and composition |
| **Additional RCs treated by the TIP** | Soil - Bank erosion, streams |
| | Animal - Aquatic habitat for fish and aquatic organisms |
| | Plant – Pest Pressure |
| **TOTAL Acres in the TIP Area (All Land Uses and Ownership)** | 90,942 ac |
| **Total Acres Private Lands** | 5,807 ac |

## *Implementation and Outreach Efforts*

| TIP Treatment Acres by Land Use | Units | FY22 | FY23 | FY24 | FY25 | FY26 | Total |
|---|---|---|---|---|---|---|---|
| **Acres of Forest Planned** | Acres | 50 | 50 | 50 | 50 | 50 | 250 |

## TIP OUTCOMES

| Describe TIP Outcome(s) | Units | FY22 | FY23 | FY24 | FY25 | FY26 | Total Treated |
|---|---|---|---|---|---|---|---|
| Restore woody vegetation component of riparian forest | Number of plantings | 250 | 250 | 250 | 250 | 250 | 1,250 |
| Increase roots in the riverbanks thus decreasing sedimentation | Miles of eroding banks treated | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 7.5 |

## PARTNERSHIPS

| Partners | Services, assets or assistance provided |
|---|---|
| Green Mountain Conservation District | Outreach to landowners and oversight of Lower Clarkfork Watershed Group's partnership. |
| Lower Clarkfork Watershed Group | Outreach to landowners. Management of restoration activities including planting, maintenance and landowner communications. |

| Estimated Partnership Leverage | FY22 | FY23 | FY24 | FY25 | FY26 | |
|---|---|---|---|---|---|---|
| Green Mountain Conservation District TA | $1,800 | $1,800 | $1,800 | $1,800 | $1,800 | $ |
| Lower Clarkfork Watershed Group TA | $30,480 | $30,480 | $30,480 | $30,480 | $30,480 | $ |
| | | | | | | |
| | | | | | | |

## BUDGET INFORMATION

| Conservation Program(s) | EQIP |
|---|---|

| NRCS | FY22 | FY23 | FY24 | FY25 | FY26 | |
|---|---|---|---|---|---|---|
| Estimated FA | $25,000 | $25,000 | $25,000 | $25,000 | $25,000 | |
| Estimated Number of Contracts | 10 | 10 | 10 | 10 | 10 | |

It is estimated that implementation of this TIP will require $125,000 in total from NRCS over the course of five years. Total financial obligations will be dependent upon the practices contracted and the extent of the contract practices; the chosen suite of practices will be dictated on a site-specific basis. Some contracts will require only riparian forest buffer

and fence practices while other may need forest stand improvement, woody residue treatment, and tree pruning practices to fully treat riparian woody vegetation for maximum benefit. It is expected that different riparian areas will require unique combinations of conservation practices in order to accomplish restoration objectives.

## *Screening and Ranking*

Screening tools and ranking questions will be used to prioritize areas within the work unit based upon interest levels of potential applicants as well as the priorities of our partners.

**Potential Ranking Questions:**

1. Is the riparian area lacking woody vegetation and/or dominated by nonnative species, such as reed canarygrass, other pasture grasses, or noxious weeds?
2. Is the adjacent stream TMDL listed?
3. Is the adjacent stream perennial?

**Screening:**

- Reference Montana NRCS Bulletin MT300-21-08, attached to this document

## *Progress Evaluation and Monitoring*

Evaluation and monitoring will take place on an annual basis. NRCS and LCFWG will analyze interest levels, implementation rates, and staff availability to plan and direct workloads. Each contracted practice will be overseen by field office staff with certifications being made upon completion, contingent on practices meeting NRCS standards and specifications. Progress will be recorded in Conservation Desktop or other appropriate databases.

After practices have been implemented and contracts complete, LCFWG and landowners will monitor and maintain plantings. LCFWG and GMCD have the capacity to seek funding through the Avista settlement agreement and state agencies, and NGOs for project monitoring and maintenance.

Progress towards achieving this goal will be measured by calculating the total linear feet of treatment. Each enrolled property will be monitored for success using photo-points with photos taken before planting and subsequent monitoring 1 year after planting, 3-years after planting and 5-years after planting.

## *References:*

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RDG. 2013. Bull River Watershed Restoration Prioritization Plan Update, Lower Clark Fork River near Noxon, Montana. Report to Avista Corporation, Noxon, Montana. River Design Group, Whitefish, Montana.

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# Bull River Revegetation Plan (2022): Planting in Reed Canarygrass (*Phalaris arundinacea*)

Prepared by Brita Olson, Coordinator, Lower Clark Fork Watershed Group (LCFWG)

Special thanks to Sarah Busmire (LCFWG), Troy Hidy (Natural Resource Conservation Service), Regan Plumb (Kaniksu Land Trust), Susan Drumheller (Clark Fork Grant Writer), and Rebecca Johnson (LCFWG Volunteer) for technical assistance and edits. This plan was developed with support from the Montana Watershed Coordination Council Watershed Fund.

*See Attachment A – Planting in Reed Canarygrass: Two decades of progress in the Bull River for accompanying photos, referred to as Slide 1, 2, 3, etc.*

## Summary

Planting efforts in Reed Canarygrass (*Phalaris arundinacea)* have been ongoing in the Bull River drainage for two decades. This revegetation plan represents a synthesis of both research and on-the-ground experience of Lower Clark Fork Watershed Group staff and partners, aimed at guiding the next decade of planting efforts in the Bull River drainage. This document contains a description of the project area and site potential, brief history of past efforts, comparison of preferred techniques, and a planting guide. It is aimed at providing guidance for current and future planting practitioners in the Bull River drainage as well as elsewhere in the state of Montana and beyond where Reed Canarygrass presents a conservation challenge in the restoration of streamside and floodplain areas.

## Project Area

Elevation: 2300-2400'
Aspect: Flat (riparian and floodplain areas along the mainstem)
Soil: mostly fine, alluvial deposits with pockets of more coarse deposits (gravel and cobble); rocks not typically encountered on planting sites.

Current Conditions: The riparian (streamside) and floodplain areas along the Bull River, through a combination of past land use and the spread of invasive Reed Canarygrass/*Phalaris arundinacea*, are in many areas grass-dominated and ecologically limited. The Bull River drainage was first homesteaded in the late 19$^{th}$ and early 20$^{th}$ century (Jamie Ross, personal communication, October 12, 2022; Vanek 1986). In order to secure ownership of a section, homesteaders were required to live for at least five consecutive years on the land and to make improvements; they capitalized on natural clearings (meadow wetlands), constructed drainage ditches, and developed hayfields (Vanek 1986; Vanek 1991; Slides 8-9). Some stretches of the

Bull River were dredged and straightened (Jamie Ross, person communication, October 12, 2022; Slide 11). Timber was harvested and decked on the river's edge over the winter, to be floated down to mills along the Clark Fork during the spring through a series of splash dams (Vanek 1986; Slide 10). The "slough grass" or "swamp grass" (Sedge or *Carex spp.*) that grew in natural clearings was poor fodder for cattle: "Our cows lost weight eating it." (Jamie Ross, personal communication, October 12, 2022). In the mid-20th Century, many ranchers planted Reed Canarygrass to improve hay yields on sodden ground previously dominated by sedge (Mona Vanek, personal communication, October 24, 2016; Slide 6). In some areas, Reed Canarygrass is still considered a valuable agricultural crop but, while better forage than sedge species, it is still perceived as poor fodder by many ranchers and there is growing awareness of its negative environmental impacts to wetlands and waterways (Isleib 2022). As late as 1995, some ranchers were still haying the Bull River; in other areas, landowners have no memory of disturbance or land management in as much as 50 years (Jamie Ross, personal communication, March 4, 2022; Don Edwards, personal communication, February 28, 2021). Particularly along the lower 8 miles of the river, ranches and former homesteads have been subdivided into smaller sections and river fronting properties are largely enjoyed for their scenic value. Many large parcels have been protected from subdivision by conservation easements and are primarily managed for their long-term conservation value and the fish and wildlife habitat they provide (Slide 12). Despite removal of disturbance over two decades or more and additional conservation protections (plugging of drainage ditches, cessation of haying activities in streamside areas, limits on riparian logging due to the Streamside Management Zone law of 1991), in many areas Reed Canarygrass continues to dominate streamside and wetland areas and limits the natural regeneration of native species, including trees, shrubs and forbs, that would otherwise compose a native riparian community, provide habitat for fish and wildlife, and promote natural river and floodplain function (Slides 13-15; Slides 3-5).

Reed Canarygrass is typical of many invasive species in that it features a high allocation of resources to reproduction, clonal growth, long growth period, rapid growth, high productivity, and a wide tolerance to environmental variability (Maurer et al. 2003; Slide 7). This grass is widespread and considered native to North America, Europe, and Asia (NRCS 2002); however, aggressive varieties are understood to be non-native European cultivars or hybrids that have become increasingly invasive (Lavergne and Molofsky 2004; Maurer et al. 2003; Townsend and Hebda 2013). Paleo-ecological sampling and carbon dating of pollen and seed in another Pacific Northwest wetland (located in British Columbia) demonstrated that Reed Canarygrass came to dominance following agricultural disturbance and had no pre-European equivalent; previously wetlands were more diverse (Townsend and Hebda 2013). Similarly, it is likely that Reed Canarygrass also came to dominance in the Bull River following disturbance (described above) as a result of direct planting or spread from other naturalized areas. Reed Canarygrass is known to reduce plant diversity, particularly in native species richness and abundance, and is considered a strong invader (Schooler et al 2006; NRCS 2009). Regardless of "native" status, Reed Canarygrass in the Bull River functions as a non-native, invasive species that limits the

establishment of native woody vegetation (NRCS 2009). The grass can spread prolifically once established; it reproduces from seed, stem fragments, and rhizomes (Annen 2017; NRCS 2009). Rhizomes demonstrate both phalanx (i.e., rhizomatous mats spreads with a uniform front) and guerilla (i.e., individual rhizomes extend multiple feet beyond edge of established stand) growth (Annen 2017). The grass is one of the first plants to emerge in the spring and continues growing well into the cooler months of fall; this allows the grass to quickly shade out other species (NRCS 2009). The grass can grow to be 6-7' tall which not only contributes significant shade but also reclines after maturity and under rain and snow to form a dense thatch and choke out competing species (Annen 2017; NRCS 2009). Subsequent years of Reed Canarygrass growth are then able to feed off the nutrients stored and composted in this thatch. The iterative process of vigorous growth, thatch formation, suppression of other species, and nutrient recycling is referred to as the Reed Canarygrass-litter feedback loop (Annen 2017). Furthermore, the species has a high degree of genetic variability and adaptability, which allows the grass to thrive across a range of soils and hydrologic conditions (NRCS 2009; Weston et al 2021). Both seeds and fragments disperse readily in streams and waterways. Therefore, management efforts particularly in streamside and connected wetland and floodplain areas must consider eradication of Reed Canarygrass unrealistic (NRCS 2009; Annen 2017). Even if conservation practitioners manage to eradicate Reed Canarygrass from one area, subsequent reinvasion is highly likely due to the grass's widespread distribution upstream and throughout the watershed.

Need for Action: Despite its widespread dominance in the Bull River valley, there remains an ecological impetus to replace or enhance Reed Canarygrass stands with native species. The mainstem Bull River is listed as impaired by sediment and for physical substrate habitat alterations affecting aquatic life (Bond and Staten 2010). The primary source of sedimentation in the Bull River that needs to be addressed is from unstable banks due to the loss of native, woody riparian vegetation and the introduction and spread of Reed Canarygrass. While better than bare soil, Reed Canarygrass provides little bank stability. Its roots only extend 12-18 inches into the soil and because the species often forms a monoculture, there are not often other species present to provide a diverse root system, bank stability, and quality fish habitat. When approaching Reed Canarygrass management, practitioners should view the community in terms of the alternative states model (Annen 2017). Degradation can occur gradually (death by a thousand paper cuts, or in this case, blades of grass) until a degradation threshold is met (e.g., Reed Canarygrass monoculture with limited or nonexistent regeneration of native woody species). A degraded state will continue, despite even decades of restoration activities, until a recovery threshold is met. In the Bull River valley, the recovery threshold is a resilient riparian community dominated by native vegetation, including a diversity of root structure, canopy height, and plant diameters, that provide habitat for a broad range of native insect, fish and wildlife communities. Moreover, large diameter/tall trees provide habitat for animals that use tree cavities, shading/cover to the stream, in-stream habitat when embedded in the streambank and/or extending into the water, and non-mobile large woody debris in the floodplain important as nurse logs, water storage in organic matter, and refuge for small

terrestrial animals (Troy Hidy, personal communication). For restoration practitioners, this presents a significant challenge. Funding contracts and commitments rarely extend past 3-4 years, and results are preferred within political cycles of 2-4 years. Most academic studies to inform approaches only last approximately 1-2 years. Reversing Reed Canarygrass requires a minimum of 5-7 years (Annen 2017). In the Bull River, revegetation efforts in Reed Canarygrass have been initiated on a dozen private ownerships and public land parcels (Kootenai National Forest). Only on one site, the oldest project which was initiated 20 years ago in the early 2000s, have natural regeneration of conifers and other shrub species been observed. This is an indication that the recovery threshold on this site and elsewhere in the Bull River is attainable but may take decades to reach (Slide 19).

Opportunity in a Conservation Landscape: While a minimum of 5-7 years of effort and a payoff date of perhaps 20 years in the future may be intimidating, the Bull River is a place where investing this level of effort is feasible and worthwhile. The Bull River drainage is dominated by public land managed by the Kootenai National Forest; the headwaters on the East side of the valley lie in the Cabinet Mountain Wilderness and the headwaters on the West side of the valley lie in a roadless area managed as wilderness. Private land is concentrated on the bottomlands of the valley along the river, which provides important habitat connectivity for migratory Bull Trout/*Salvelinus confluentus*, Westslope Cutthroat Trout/*Oncorhynchus clarkii lewisi,* Grizzly Bears/*Ursus arctos horribilis*, and numerous other iconic fish and wildlife species. All landowners partnering with the Lower Clark Fork Watershed Group (and/or the Green Mountain Conservation District) to establish riparian vegetation are required to sign 20-year landowner agreements to protect investments. Beyond that, numerous large parcels, including the majority of the acreage on which ongoing revegetation efforts are occurring, are held either by the Kootenai National Forest or protected by perpetual conservation easements held by the Natural Resource Conservation Service, Kaniksu Land Trust and other entities. These protections limit further subdivision and development, outline conservation goals, and will provide lasting protection for large chunks of the Bull River valley, including nearly all of the East Fork Bull River drainage.

Site potential: The climax condition of bottomlands of both the mainstem and East Fork Bull River is dominated by large Western Red Cedar (*Thuja plicata*) with diverse understory herbaceous species where light availability permits. Some areas, such as adjacent upland areas where elevation and moisture regime permits, may be codominant with Western Hemlock (*Tsuga heterophylla*). Natural succession (e.g. following a fire) in these habitat types is characterized by diverse species composition and habitats. Important successional tree species include conifers such as Western White Pine/*Pinus monticola*, Western Larch/*Larix occidentalis*, Douglas Fir/*Pseudotsuga menziesii*, Grand Fir/*Abies grandis*, and Englemann Spruce/*Picea engelmannii* as well as deciduous trees including Black Cottonwood/*Populus balsamifera ssp. Trichocarpa*, and occasionally Quaking Aspen/*Populus tremuloides* and River Birch/*Betula nigra*. Important shrub species include Sitka Alder/*Alnus Sinuata* or Thin-leaf Alder/*Alnus incana*, Black

Hawthorn/*Crataegus douglasii*, Rocky Mountain Maple/*Acer glabrum*, Willow/*Salix spp.*, Elderberry/*Sambucus cerulea*, Red Osier Dogwood/*Cornus sericea*, Western Yew/*Taxus brevifolia*, Woods Rose/*Rosa gymnocarpa*, Thimbleberry/*Rubus parviflorus*, Snowberry/*Symphoricarpus albus*, and Devil's Club/*Oplopana horridum* (Smith and Fischer 1997). Numerous herbaceous and fern species are also present.

When disturbance creates openings in the canopy, shade intolerant species such as Black Cottonwood, Western White Pine, Western Larch, and Douglas Fir can take hold if moisture conditions are suitable (well-drained sites). Especially cold and frosty conditions may favor Engelmann Spruce. Moist and seasonally inundated sites will favor small diameter tree and shrub species such as alder, dogwood, and willow. Cover from a maturing forest will eventually moderate moisture and temperature, promoting the cedar and hemlock climax regime. Areas where beaver are present will favor an open canopy, shrub species, and inundated wetland conditions. This may potentially delay forest succession for decades if not entirely. Where acceptable to landowners and natural resource managers, beaver activity in a watershed can create a complex mosaic of stream and habitat on the landscape (Pollock et al 2018). Beaver activity generally improves conditions for willow, cottonwood, dogwood, and other sprouting riparian species. However, beaver can also limit species diversity in the areas immediately surrounding their activities due to concentrated foraging activities (particularly coupled with browse from ungulates or livestock), tendency to over-harvest, and altered forest succession (Baker and Hill 2003). In key areas of the Bull River that are important for migratory Bull Trout/*Salvelinus confluentus*, fisheries managers have opted to manage beaver populations in favor of meeting native salmonid conservation goals. This may also create an opportunity for aggressive riparian revegetation efforts (Oldenburg 2022).

In some areas, a climax condition may be the desirable trajectory for revegetation sites. However, in other areas, open, sedge-dominated wetland habitats provide the greatest ecological benefit. Managing Reed Canarygrass in these habitats requires a different approach. While many approaches to controlling Reed Canarygrass in wetlands have proven ineffective over the long-term (Healy 2010), depending on site-specific conditions, management goals, and opportunity, a combination of techniques such as haying and herbicide application may be considered to lessen Reed Canarygrass dominance, particularly where existing native species are already present (Clark and Thomsen 2020; NRCS 2009). Most wetland restoration gains in the Bull River have been made through alterations in the hydrologic regime by plugging drainage ditches (Troy Hidy, NRCS, personal communication).

The greatest potential to reach a recovery threshold through restoration efforts and grow a naturally regenerating native community in the Reed Canarygrass dominated stream and floodplain areas of the Bull River occurs when landowners and managers are open to a vegetative change (NRCS 2009; Troy Hidy, NRCS, personal communication). Once established, a native plant community with a mature overstory can shade Reed Canarygrass and effectively compete for light and nutrients. Therefore, planting efforts aimed at long-term vegetative

change along a stream and across a floodplain can be a long-term, resilient Reed Canarygrass management approach (NRCS 2009).

## Considerations for planting in and managing Reed Canarygrass

Understanding Reed Canarygrass physiology and behavior on the landscape as described above is the first step toward designing an effective management and planting effort that disrupts the feedback loops that support Reed Canarygrass's continued dominance on the landscape and that can pay off over the long-term (Healy 2010). While Reed Canarygrass is a strong competitor and presents a significant challenge, as described above, light availability limits both Reed Canarygrass seed and rhizome fragment germination, so generally speaking, closed canopies are less susceptible to invasion or recolonization (Maurer et al 2003). However, tillers attached to unshaded parent clones are not limited by even heavy shade (Maurer et al 2003). Success of planting efforts depends on prepping a suitable planting site, suppressing Reed Canarygrass long-enough for trees to outgrow and compete for light. Planting projects must form dense canopy over large enough areas to shade out the grass and provide a sustainable solution over the long-term (Annen 2017; Maurer et al 2003; NRCS 2009).

*Haying, burning, and herbicide:* Vegetation management through haying, burning, and herbicide use are common suggestions and tested technique for managing Reed Canarygrass, but the application of these techniques for revegetation goals on the Bull River are limited. Reducing agricultural inputs, nutrient mining (removing organic matter through activities such as haying or burning where applicable/feasible to disrupt the Reed Canarygrass-litter feedback loop), or treating with herbicide can reduce the competitiveness of Reed Canarygrass. However, without continued management, Reed Canarygrass will likely continue to persist if a vegetative change is not made (Annen 2017; Healy 2010; NRCS 2009). Relative to native species, Reed Canarygrass is considered a weak competitor for nutrients, but can be extremely responsive to nutrient additions and virulent when resources are plentiful, growing and spreading even more aggressively (Annen 2017; Green and Galatowitsch 2002; Maurer et al 2003). Both burning and herbicide treatment have been found to only provide short-term effects, even if significant reduction is made in Reed Canarygrass biomass, Reed Canarygrass can quickly recolonize in as little as two years (Adams and Galatowitsch 2006; Foster and Wetzel 2005; Healy 2010). Burning alone may more likely have a stimulating effect on Reed Canarygrass, which has been shown to recover quickly and show no difference in biomass measured in burned and unburned plots just 12 weeks after burning (Hovick et al 2007; Adams and Galatowitsch 2006). Burning is likely best considered for site preparation and as a compliment to other treatments; however, while burning may improve site accessibility and ease of herbicide application, it does not necessarily increase the efficacy of other treatment (Adams and Galatowitsch 2006). Herbicide can effectively suppress Reed Canarygrass, but herbicide treatment alone or in combination with burning over multiple years is not sufficient to allow native community to dominate (Adams and Galatowitsch 2006; Healy 2010). Typically, grass specific herbicides stunt but don't

kill Reed Canarygrass (Healy 2010). Broad-spectrum herbicides (such as Monsanto's Round-Up Ultra) have been shown to reduce Reed Canarygrass biomass as much as 90% relative to control, when treated in August or September (twice as effective as spring treatments), but this would kill all vegetation including desired natives on the site (Adams and Galatowitsch 2006; Healy 2010). Particularly in areas that will receive Reed Canarygrass or other weed inputs like the Bull River, treatments that reduce or kill Reed Canarygrass may simply create a germination site for Reed Canarygrass or an opening for another undesirable noxious weed such as Common Tansy/*Tanacetum vulgare*, Canada Thistle/*Cirseum arvense*, Spotted Knapweed/*Centaurea stoebe*, and others (Schooler et al 2006). If employed, haying, burning, and herbicide should be considered more as a technique for site preparation or maintenance than as a solution on their own; proactive revegetation with native species is necessary for long-term Reed Canarygrass management (NRCS 2009). In addition to the above, limitations of site access, liability, potential negative externalities of herbicide use (most effective formulations on Reed Canarygrass are not recommended for use near water bodies), and labor availability all further limit the desirability of these approaches, particularly for small, nongovernmental organizations implementing projects in the Bull River, such as the Lower Clark Fork Watershed Group. Where revegetation projects are aimed at establishing woody vegetation, practitioners have found it more productive to focus less on eliminating Reed Canarygrass, and instead on how to effectively grow trees that can compete for light and be resilient over the long-term.

*Site preparation, weed suppression, browse protection:* A small tree or shrub seedling planted in the middle of a monoculture of Reed Canarygrass will require that additional care be taken in prepping site for planting, suppressing surrounding grass and weeds, and protecting from browse. The LCFWG has successfully utilized two techniques in the Bull River, which are described below. The preferred technique, individually caged plantings, is described at length below in the "Planting Guide" as a resource for future practitioners in the Bull River and other drainages across Montana and other environments where Reed Canarygrass inhibits natural succession.

## History of efforts and comparison of preferred techniques

Over the last two decades, the LCFWG, Green Mountain Conservation District (GMCD), Natural Resources Conservation Service (NRCS), Kootenai National Forest (KNF), Montana Fish, Wildlife & Parks, and numerous funders, contractors and landowners have partnered on over a dozen sites in the Bull River drainage to establish native vegetation in Reed Canarygrass (Slide 12). Especially in the early days, a number of experimental techniques were employed, two of which showed significant promise and were implemented widely. Initially, exclosure plantings were preferred. This technique utilized a heavy, nonwoven roadbed geotextile fabric to smother 15' swaths of Reed Canarygrass over a period of two years (Slides 23, 25, 26, and 30). These areas were typically 15' x 30', but sometime much larger, and were fenced as a large exclosure to

exclude Reed Canarygrass and wildlife browsing. Initial efforts utilized this technique in the early 2000s spread along the East Fork Bull River and interspersed with individual plantings in near stream areas, with an individual weed mat and welded wire cage (Slide 19). Exclosures were typically stocked with a tree and shrub species mix utilizing 1 yard spacing or greater. Observing initial successes on the East Fork Bull River, another project was initiated in 2006 (Slides 29-31), and then on another property in 2010 (Slide 2, 25, 26). Though the first few projects utilized individually caged plantings, likely due to contractor preference and perceived efficiency, emphasis was placed on large exclosures only in the third project, and then in a large expansion of this effort in 2015 on private land (Slide 23) and in 2016 on KNF lands (Slide 32). Starting in 2016, as a number of maintenance issues were recognized and addressed on projects of different ages, the LCFWG revisited individual plantings as a potentially more sustainable long-term solution. Since 2017, over 900 individual plantings have been implemented on numerous properties in the Bull River (Slides 21-22, 24, 27-28) and the LCFWG continues to support the maintenance of plantings completed in 216 exclosures since 2002.

There are a number of dimensions in which to evaluate these two techniques and determine where further investments should continue to be made and in which site-specific context. First is the long-term outcome and impact to riparian and floodplain areas. The primary goal is to establish a resilient riparian forest that can eventually, even if after 20 years or more, regenerate naturally, thus addressing current identified stream impairments in the Bull River and meeting the needs of native species for generations to come. Secondly, project implementers and funders must evaluate cost-effectiveness and feasibility. To suppress Reed Canarygrass and allow for natural regeneration over the long-term, practitioners must establish enough vegetation to compete effectively with Reed Canarygrass, close the canopy, and shade the grass enough that succession can occur. Riparian plantings on a smaller scale can still be valuable but are less resilient over the long-term (plantings may live to maturity but succession may not occur).

*Total area of long-term impact:* In terms of area of impact, assuming a planted conifer tree lives to maturity, it could provide up to 16 ft diameter / approximately 200 sq. ft. of canopy cover or a more modest 10-12 ft diameter / 80-120 sq. ft. of canopy cover. One exclosure (15’ x 30’) can realistically grow 4-5 conifers to maturity. Trees and shrubs were typically planted at maximum 1 yard spacing or greater, equating to perhaps 15-50 plants per exclosure. This dense spacing may be suitable for shrub species but would produce stunted tree growth. A 450 sq. ft. exclosure could realistically result in 4-6 mature trees over the long term, as trees were rarely planted at more than 10-12 foot spacing given setbacks from the exclosure edge. Therefore, an average size exclosure is roughly equivalent in area of impact to 5 individual plantings over the long-term. This is supported by observations of exclosures 5+ years after planting that either have only 4-6 surviving tree species, or a few more that have denser spacing but with less vigorous growth. Comparing 216 exclosures to 900 trees completed to-date, assuming 80-200 sq. ft. canopy cover per individually caged tree and 400-500 sq. ft. of canopy cover per

exclosure over the long-term, exclosure plantings completed to-date have created 1.98-2.48 acres of riparian forest and individual plantings have created 1.65-4.13 acres of riparian forest (Slide 39). Furthermore, individual plantings can be spread more effectively across floodplains and adjusted to microtopography and are more effective at preventing browsing by beaver and ungulates.

*Materials cost:* Exclosures have a perceived efficiency. However, when you compare the costs based on an expected outcome versus a per tree planted basis, individual plantings are less expensive in terms of materials. This calculation assumes a more expensive and larger nursery stock is used in individual plantings and assumes only 15 plants are planted per exclosure (instead of the up to 50 plants that has been planted by contractors in the past) (Slide 38).

## Individual Plantings x 5 = $218.30

| | | | | | |
|---|---|---|---|---|---|
| Weed Matting: 4x4 ft mat, precut with slit | $ 2.55 | 1 | mat | 1 | $ 2.55 |
| 6.5' T-posts: 1 per tree (clips included) | $ 6.29 | 1 | post | 1 | $ 6.29 |
| Fencing: 14 gauge welded wire fencing | $1.97 | 1 | foot | 10 | $ 19.70 |
| Staples | $ 0.16 | 1 | staple | 7 | $ 1.12 |
| Plant | $14.00 | 1 | plant | 1 | $ 14.00 |
| | | | | Subtotal per site | $ 43.66 |
| | | | | Total for five sites | $ 218.30 |

## 15x30 Exclosure: 4-6 tree outcome = $315.83

| Product Description | Unit Cost | Unit | Measurement | Requirement | Subtotal |
|---|---|---|---|---|---|
| Fabric: $572.09 / 300 ft roll, adjusting $460/roll in 2015 costs to 2022 prices | $ 572.09 | 1 | roll | 0.1 | $ 57.21 |
| 6.5' T-posts: 7-8 ft spacing (clips included) | $ 6.29 | 1 | post | 6 | $ 37.74 |
| Fencing: 14 gauge welded wire fencing | $1.97 | 1 | foot | 90 | $177.30 |
| Staples | $ 0.16 | 1 | staple | 38 | $6.08 |
| Plants | $2.50 | 1 | plant | 15 | $37.50 |
| | | | | Total per exclosure | $ 315.83 |

*Labor cost:* Depending on the labor resources available to an organization, implementation costs for both revegetation can be widely variable. The LCFWG utilizes a mixture of staff, contract (Montana Conservation Corps), and volunteer labor to implement Bull River revegetation projects. There are different costs associated with all of these sources and trade-offs of efficiencies, liability, ease of logistics/availability, and hourly costs that may be

prioritized differently depending on the specific planting site and organizational capacity. Generally, exclosures favor upfront implementation efficiencies and present a long-term maintenance burden, while individual plantings can seem to be a tremendous effort per tree during implementation (1-1.5 hours per tree, depending on ease of site access) and are easier to maintain (and more effective browse protection) over the long-term. For example, one 15 x 30 foot exclosure cost the LCFWG $750 to remove in 2022, not accounting for material disposal costs. Funders may prioritize the apparent efficiency in upfront costs, but when considering total cost of implementation over the long-term, there are extremely limited resources available for long-term project maintenance (Slide 39).

*Timeline for implementation:* Exclosures require a minimum of 3 years to implement, as planting occurs typically 2 years after fabric deployment. Individual plantings, on the other hand, can be implemented in a very short period in the spring or fall. There are limited sources of funding that provide funding contracts that last for 3-5 years (Slide 39), so a phased implementation of individual plantings is more approachable and easier to implement at different scales depending on funding availability from year to year (Slide 39).

*Overall effectiveness:* Large exclosures have proven to be wrought with maintenance issues, including:

- beaver browse that favors the persistence of only willow, dogwood, cottonwood and other sprouting species (Slide 31 and 33);
- exacerbated erosion when positioned too close to the river (Slide 32);
- girdled trees when mat is left in place too long and is difficult to remove (Slide 34);
- materials embedded by Reed Canarygrass or silt deposition (Slide 35);
- large amounts of materials utilized per tree that is difficult to install and eventually remove (Slide 36);
- large swaths of fabric can prohibit vegetative reproduction of woody species that are desired if not removed (Vander Meer et al. 2009);
- greater impact on ungulate and wildlife movement than individually caged plantings; and
- trusting all eggs (trees) in one basket (welded wire fencing) if exclosure is targeted by beaver (Slide 29). Beaver can dig under or pull through fencing, regardless of fencing gauge (12.5 or 14) (Slide 33).

Comparing direct experiences over the last 20 years, individual plantings appear to be the best investment to meet the goal of growing a resilient riparian forest. Adoption rates and landowner enthusiasm also appears to be much greater. Large exclosures can be very effective in establishing willow bars but when browse protection is removed and ungulates can browse willow bars following beaver browse, these sprouting species may decline in dominance. A planting guide for individual plantings is shared below.

## Planting Guide

*Seed/plant sources for Montana native species:*
DNRC Montana Conservation Seedling Nursery (http://dnrc.mt.gov/divisions/forestry/forestry-assistance/conservation-seedling-nursery)
University of Idaho Pitkin Forest Nursery (https://www.uidaho.edu/cnr/center-for-forest-nursery-and-seedling-research/pitkin)
Clifty View Nursery (https://www.cliftyview.com/)
USDA Forest Service (https://www.fs.usda.gov/detail/ipnf/about-forest/districts/?cid=stelprdb5085769) – must order in advance through a USFS agreement or receive in-kind from local district for planting on public lands

*Site selection, site preparation, and planting:* Prior to planting, sites will be identified / selected by LCFWG, NRCS and/or experienced restoration practitioners with planting experience and marked with flagging and/or a t-post (which will eventually be used for browse protection). When working with volunteers or temporary crews, planting success is greatly improved when site selection is completed by experienced practitioners, as soil type, existing vegetation, spacing requirements of planted vegetation when mature (8-16' diameter), light requirements of seedlings, proximity to water bodies, microtopography (relatively flat so that fencing can be installed flush with the ground), elevation (likely to support tree and shrub species, not sedge or herbaceous community), access and landowner approval must all be considered. Riparian stands and priority planting areas should be mapped (typically in partnership with the NRCS through resource planning activities conducted with each landowner) for long-term record keeping and follow-up. Sites within the riparian area and floodplain that are protected from extended inundation by floodwaters, dispersed 8-16 ft apart (to allow for proper distribution of tree and shrub species), and currently dominated by non-natives species will be priorities for planting across revegetation sites. A 3-5' diameter area can first be cleared with a weedwhacker equipped with a grass blade (optional), then cleared with a pick mattock or other hand tool of preference to remove Reed Canarygrass rhizomatous mat and reduce competition from grass encroachment and/or other weeds. There is typically 2-6 inches of thatch on top of the soil with 4-6 inches of rhizomatous mat below to soil surface that has to be dug out so that trees can be planted in mineral soil. Seedlings will be planted according to nursery directions in April/May or October/November.

*Weed mat: A* 4' x 4' piece of weed matting is secured around the planting with 8" landscape staples to reduce pressure from weeds. The LCFWG prefers weed mats that have a slit from the center all the way to the edge of the mat. An additional cross can be made to provide more growing room for the tree (approximately 4-6 in. diameter), but implementers should be mindful that the mat will be more effective if flush with the ground and with limited cuts. A single slit all the way to the edge should prevent the mat from ever fully girdling the tree (Slide 40). The slit can be oriented around the t-post, leaving 4-6 inches on either side of the tree or with the tree centered in the cross of the mat. Five staples should be used to secure mat

around the tree, one in each corner and one between the t-post and the tree (but closer to the t-post).

*Fencing:* 1-2 t-posts and approximately 10 feet of wire fencing (welded 2”x4”, minimum 14-gauge, 6 ft tall) is used to protect each planting from beaver and ungulate browse. Typically one post is sufficient, especially when paired with landscape staples on the opposite side to secure the bottom of the fence’s position and contact with the ground. Fencing should be positioned so that the planted tree is approximate 12-18 inches from the t-post. If the t-post is installed first, then the plant should be positioned 12-18 inches off the t-post. The knobs of the t-posts should face outward to ease installation of fencing. In some areas an additional post may be used if the ground is uneven enough that a post is required to secure fencing in contact with the ground and prevent a large gap that a beaver could utilize. However, it is rare that more than one t-post is needed. Two staples can be used to secure the fencing to the ground (at “10 and 2”, if the t-post is at “6”). It may be tempting to build a smaller diameter cage than the 3 ft diameter that requires approximately 10 feet of fencing however, a 3 ft diameter allows greater longevity as the cage can be expanded around a growing tree (Slide 40).

*Irrigation:* No irrigation is necessary as the water table is high along the Bull River and soil sediments are fine enough to allow for capillary action. Planting efforts are also timed early enough in April/May to benefit from spring rains or in October (when dormant) to benefit from fall rains. If drier sites are planted, such as a perched alluvial deposits (which are present on some properties), arrangements may be made to irrigate if practitioners determine it to be necessary for 2-3 years as plantings are established.

*Variations:* Methods may vary depending on the site, as follows:
(1) Additional plantings located on cobble bars and areas not dominated by Reed Canarygrass will not require scalping, though hand-pulling of Spotted Knapweed may be necessary. Noxious weeds will be bagged and removed from site or disposed of on-site as directed by the landowner.
(2) Some plantings of beaver and browse-resilient trees and shrubs (Engelmann spruce, wood’s rose, etc.) can be completed directly along the mainstem or East Fork Bull River without browse protection (which in close proximity to the river may be undermined by erosion, runoff, or channel migration) or in floodplain areas not immediately adjacent to the river or without signs of beaver activity (lower elevation areas, channels, etc.). Expecting higher mortality, plantings without browse protection will be completed at higher densities.

## Maintenance and monitoring

Annual maintenance is expected however, past experience working in the Bull River has shown that individual plantings (versus large exclosures) require very little maintenance. Most issues arise from the death of, or limb drops from, surrounding vegetation (such as hawthorn or alder); encroaching Reed Canarygrass and weeds (can be reduced by mowing or weed whacking surrounding area, although this has not been tested systematically, but when implemented does appear to improve survival rates if labor is available); and plant mortality (if fenced and

free from other browse) from vole damage, disease or moisture stress (such as too dry in a cobble patch or too wet from prolonged inundation from floodwaters, making this an important consideration in site selection). All revegetation sites will be visited at least annually, ideally biannually in both the spring and fall, to assess maintenance needs, if any. Minor maintenance can be completed immediately, while a larger effort or mortality replacement plantings are planned as resources (staff capacity, volunteers, materials/supplies, funding) are available. The LCFWG, as resources allow, typically commits to maintain plantings and revegetation efforts for a minimum of 10 years.

The LCFWG's typical monitoring efforts for this project are informal and are meant to assess maintenance needs. Mortality rates are recorded for plants with browse protection, in anticipation of mortality replacement plantings (or removal of materials, depending on what cause of mortality is determined to be). Prior to or at the initiation of planting efforts (after sites are flagged/marked for planting), photo points are established. Post-implementation photo points are taken after planting is complete and repeated at 2, 5, and 10 years post-project to record vegetation growth and assess project outcomes.

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