

DRAFT Environmental Assessment

North Burnt Fork Creek Culvert Removal and Restoration

Lee Metcalf National Wildlife Refuge, Montana



Prepared by Lee Metcalf National Wildlife Refuge, 2022

Page intentionally left blank

Table of Contents

1	Executive Summary	6
2	Purpose and Need for Action	7
2.1	Refuge Background	7
2.2	Purpose and Need for Taking Action	8
2.3	Decision to be Made by the Responsible Official	10
2.4	Public Review	10
3	Alternatives	10
3.1	Alternative A (No Action)	10
3.2	Alternative B (Proposed Action)	10
3.3	Alternatives Considered but Dismissed From Further Consideration	14
4	Affected Environment and Environmental Consequences.....	15
4.1	Air Quality.....	15
4.1.1	Existing Conditions.....	15
4.1.2	Effects of Alternative A (No Action) on Air Quality	15
4.1.3	Effects of Alternative B (Proposed Action) on Air Quality	16
4.2	Wetlands	16
4.2.1	Existing Conditions.....	16
4.2.2	Effects of Alternative A (No Action) on Wetlands	17
4.2.3	Effects of Alternative B (Proposed Action) on Wetlands	17
4.3	Stream Channels and Fisheries.....	17
4.3.1	Existing Conditions.....	17
4.3.2	Effects of Alternative A (No Action) on Stream Channels and Fisheries	19
4.3.3	Effects of Alternative B (Proposed Action) on Stream Channels and Fisheries	19
4.4	Waterfowl.....	20
4.4.1	Existing Conditions.....	20
4.4.2	Effects of Alternative A (No Action) on Waterfowl	20
4.4.3	Effects of Alternative B (Proposed Action) on Waterfowl	20
4.5	Species of Concern, Threatened and Endangered Species and Critical Habitat	21
4.5.1	Existing Conditions.....	21
4.5.2	Effects of Alternative A (No Action) on TES and Critical Habitat.....	22
4.5.3	Effects of Alternative B (Proposed Action) on TES and Critical Habitat	22

4.6	Cultural and Historic Resources	22
4.6.1	Existing Conditions.....	22
4.6.2	Effects of Alternative A on Cultural and Historic Resources	23
4.6.3	Effects of Alternative B (Proposed Action) on Cultural and Historic Resources	23
4.7	Wildlife – Dependent Recreation	23
4.7.1	Existing Conditions.....	23
4.7.2	Effects of Alternative A (No Action) on Recreation	24
4.7.3	Effects of Alternative B (Proposed Action) on Recreation	24
4.8	Invasive and Nonnative Plants and Animals.....	24
4.8.1	Existing Conditions.....	24
4.8.2	Effects of Alternative A (No Action) on Invasive and Nonnative Plants and Animals	25
4.8.3	Effects of Alternative B (Proposed Action) on Invasive and Nonnative Plants and Animals	25
4.9	Summary of Analysis	25
4.9.1	Alternative A: No Action.....	25
4.9.2	Alternative B: Proposed Action	25
5	Consultation and Coordination	27
5.1	List of Preparers*	27
5.2	Pertinent Laws, Executive Orders, and Regulations	27
6	References	28

1 Executive Summary

This draft Environmental Assessment presents a proposal to improve fish passage and riparian habitat on North Burnt Fork Creek as it passes through Lee Metcalf National Wildlife Refuge (Refuge). The Refuge is managed by U.S. Fish and Wildlife Service (USFWS) and is located in the Bitterroot valley near Stevensville, Montana. The proposed action was described and reviewed as part of the 2012, Refuge Comprehensive Conservation Plan Goals for the Bitterroot River Floodplain and North Burnt Fork Creek (USFWS, 2012, pgs 78-82).

The Refuge is primarily managed for waterfowl habitat and has constructed a series of impoundments to create shallow wetlands. One such impoundment was built on North Burnt Fork Creek, 0.2 miles from its confluence with the Bitterroot River. The structure, a set of two vertical pipes leading into two culverts, effectively impounds water but also created a full passage barrier to fish migrating between the Bitterroot River and North Burnt Fork Creek. Many fish species in the Bitterroot, including Federally threatened bull trout and Montana Species of Special Concern, Westslope Cutthroat trout, migrate into tributaries like North Burnt Fork Creek to spawn. The structure has also encouraged sediment to precipitate out which, over time, has made this area less beneficial for waterfowl. Additionally, reed canarygrass, a highly aggressive non-native grass, has established throughout the riparian area, outcompeting the native riparian tree and shrub community, and simplifying habitat for migratory songbirds and other riparian-dependent species.

The Refuge, in partnership with Trout Unlimited and Montana Fish, Wildlife and Parks, is proposing a project to eliminate the fish passage barrier which would open up approximately 2.5 miles of stream habitat and improve ½ mile of riparian habitat through plantings. Importantly, the project area, located within the Wildlife Viewing Area (WVA) of the Refuge, is highly visited by the public who use its American with Disabilities Act of 1990 (ADA)-accessible trail system for walking, wildlife viewing and environmental education and interpretation. This project would ensure that access to the WVA trail system is maintained and improved, though access may be limited during construction.

This draft Environmental Assessment presents two alternatives for this project, along with an assessment of impacts to natural and recreational resources. Alternatives include:

1. Alternative A: No Action
2. Alternative B: Proposed Action, including removal of the water control structure, construction of a pedestrian bridge, revegetation and natural evacuation of impounded sediment.

Details on each alternative and its impacts can be found in this report. Impacts are also summarized in **Table 4-2**.

2 Purpose and Need for Action

2.1 Refuge Background

Lee Metcalf National Wildlife Refuge was established on February 4, 1964, for the protection of migratory bird species. It is a 2,800-acre Refuge managed by the U.S. Fish and Wildlife Service, located in the Bitterroot River Valley of southwest Montana (**Figure 2-1**). The Refuge encompasses a portion of the Bitterroot River and North Burnt Fork Creek and is located between the scenic Bitterroot and Sapphire Mountains. The Refuge provides a diverse mosaic of western mountain valley habitats including gallery and riverfront forest, wet meadow, wetlands, and grassland benches.

The Refuge also provides opportunities for the public to enjoy compatible wildlife-dependent recreation, including hunting, fishing, wildlife observation, photography, environmental education, and interpretation. It is a very popular community and tourist destination with more than 143,000 visitors annually (USFWS, 2012).



Figure 2-1. Project vicinity map showing the Bitterroot valley and the project area, just north of Stevensville on Lee Metcalf National Wildlife Refuge, along North Burnt Fork Creek. Map by River Design Group

2.2 Purpose and Need for Taking Action

The primary purpose of this project is to restore aquatic organism passage between North Burnt Fork Creek and the Bitterroot River as well as the natural topography and water flow patterns of the floodplain as described in the 2012, Refuge Comprehensive Conservation Plan Goals for the Bitterroot River Floodplain and North Burnt Fork Creek (USFWS, 2012, pgs 78-82).. This project would restore aquatic passage from the Bitterroot River to approximately 2.5 miles of North Burnt Fork Creek. It would also remove or reduce levees in two places within the Bitterroot floodplain on the Refuge.

Many fish species in the Bitterroot rely on access to tributaries like North Burnt Fork Creek to spawn and rear their young, yet man-made structures such as undersized culverts and irrigation diversions often prevent fish from accessing large tracts of suitable habitat. On the Refuge, a pair of 48" culverts and stoplog risers near the mouth of North Burnt Fork Creek have limited fish passage for over 50 years. The structures were placed by the Refuge to impound the area and create additional waterfowl habitat. However, due to sedimentation precipitating out, the quality of the waterfowl habitat has declined over the years. The culverts entrap whole trees, logs and debris, often requiring the Refuge staff to clean them with the use of a chain saw and at times, a backhoe.

A secondary goal of this project is to improve riparian habitat along North Burnt Fork Creek. This area was historically dominated by cottonwood (*Populus tricocarpa*), with a mixed shrub understory, providing excellent, varied habitat for migratory songbirds, fish, furbearers, and the many other species that inhabit the Bitterroot floodplain ecosystem. Within the project area, native trees and shrubs have been suppressed by the highly aggressive, non-native reed canarygrass (*Phalaris arundinacea*) which prevents germination and new growth of natives. It also reduces floodplain and instream habitat quality, providing simplified structure, cover and bank stability. The proposed project would remove portions of the reed canary sod and replace this monoculture with areas planted with native shrubs and riparian tree species.

Importantly, the project area, located within the WVA, is highly visited by the public who use its ADA-accessible trail system for walking, wildlife viewing and education. This project would ensure that access to the WVA trail system is maintained by replacing the paved path over the culverts with a bridge, though access may be limited during construction.

Partners in this project, including the Refuge, Trout Unlimited, Montana Fish Wildlife & Parks and US Fish and Wildlife Service (USFWS) Division of Ecological Services, have developed an alternative to meet these project goals, with the engineering support of River Design Group. This Environmental Assessment (EA) presents a proposed action which fully restores connectivity for all aquatic organisms between the Bitterroot River and North Burnt Fork Creek, improves riparian habitat, and maintains ADA-accessible visitor access to the WVA trail system. It also presents

other alternative components that are being considered and summarizes why they are not the preferred action.

The proposed action presented in this EA includes the removal of a water control structure consisting of two culverts and stoplog risers in North Burnt Fork Creek; associated streambank restoration; construction of a pedestrian bridge to maintain visitor access; construction of a low water crossing to maintain Refuge maintenance access; removal of fill from an abandoned roadbed; and riparian revegetation. These proposed actions are intended to improve habitat connectivity throughout North Burnt Fork Creek while improving the overall ecological integrity of natural systems within the project area. A map of the Analysis Area can be found in Appendix A: Figure 2-2

2.3 Decision to be Made by the Responsible Official

The decision to be made by the responsible official will be to authorize the restoration and improvements in the WVA as proposed, vary the design to meet the purpose and need, or to defer any action at this time. Authorization of this project would include that designs meet all USFWS standards and applicable laws, and that necessary permits and approvals are obtained from the U.S. Army Corps of Engineers, Montana Department of Environmental Quality, and Montana Department of Fish, Wildlife and Parks.

2.4 Public Review

In order to solicit comment on the proposed action and range of alternatives, an open house will be hosted by the Refuge and TU to present the plan and solicit public comment. Interested parties would be able to submit comment for 30 days. Public input will be considered before plans are finalized.

3 Alternatives

This section provides a description of the alternatives.

3.1 Alternative A (No Action)

Under the No Action Alternative, no floodplain, stream channel, or riparian restoration activities would occur, existing water control structures would remain in place, hindering passage for aquatic organisms in North Burnt Fork Creek. No revegetation would occur as a result of this project and reed canarygrass would continue to dominate North Burnt Fork Creek's floodplain on the Refuge. Flows in North Burnt Fork Creek would continue to be bifurcated, with the majority of flow passing through the culvert and stoplog structures. The WVA would remain open for wildlife observation, photography, and education.

3.2 Alternative B (Proposed Action)

Alternative B, the Proposed Action, would restore aquatic organism passage through the Refuge by removing a water control structure consisting of two, 48' culverts with attached 72'' stoplog risers. The adjacent streambank and floodplain would be restored to native riparian species, and an ADA-accessible pedestrian bridge would be installed to maintain visitor access on existing WVA trails. The viewing structure that currently sits adjacent to the culverts would be relocated near the bridge of North Burnt Fork Creek. This action would reconnect 2.5 miles of stream habitat to the Bitterroot River for the first time in 50+ years. While visitor access may be limited short-term during construction, the Refuge would open trails as soon as it is safe to do so.

Details on each action and efforts to mitigate disturbance are presented below:

1. Barrier Removal & Channel Restoration

Removal of the water control structure is the primary objective of this proposal. A heavy equipment operator would be contracted to remove the existing structure, reconstruct the adjacent banks and floodplain and prepare the site for pedestrian bridge installation.

During construction, several measures would be in place to ensure that in-stream impacts from construction are minimal and temporary. In-stream work would only occur from July 15-September 1, a window of time that bull trout and other salmonids are least sensitive to in-stream disturbance. Additionally, temporary cofferdams would be constructed at the culvert/stoplog location to provide localized dewatering during removal and bridge construction. Stormwater and erosion control structures (e.g. silt fence and silt curtain) would also be in place to limit sediment impacts to the immediate construction area.

The water control structure has trapped sediment upstream for years and this has often been exacerbated by erosion upstream and sediment and debris from The Supply Ditch that is purged into North Burnt Fork Creek. Removal of the structure would result in an estimated 720 yards of sediment passively evacuating from the North Burnt Fork channel during subsequent, natural high flow events. If a gravel bar downstream of the culverts mobilizes, an additional 520 cubic yards of sediment could also evacuate over time, with a total maximum volume 1240 cubic yards evacuated. Passive evacuation of sediment is preferable to mechanical removal because it allows work to occur without complete channel dewatering and does not require equipment to enter the creek, reducing disturbance. The volume of sediment estimated to enter the Bitterroot River from this project is minimal in the context of the natural sediment flux in the Bitterroot River each spring. For context, the 1,500-foot Bitterroot River bank eroding within the WVA was estimated to contribute 6,000 cubic yards of sediment *each year* between 2014 and 2017. Under this alternative, sediment evacuation would also occur naturally in spring when aquatic organisms are adapted to large sediment inputs.

Where North Burnt Fork Creek meets the water control structure, a smaller, ditched channel diverts a portion of water northwards. The channel is dry each summer. Under this alternative, this northward channel would be maintained for high flow events, but recontoured from its current, linear ditch form into a series of wetland swales. A map of the draft plan overview, including locations of the barrier removal and revegetation, can be found in Appendix A: Figure 3-1.

2. Bridge construction

An ADA-accessible pedestrian bridge would be installed at the site of the current water control structure to maintain visitor access to the south end of the WVA. The bridge would be 80-feet in length, with a minimum 96" inside rail-to-rail width, 90 pounds per square foot loading weight and 42" rails. It would function primarily as a pedestrian bridge but could accommodate a small truck (H-5) for emergencies or maintenance. The bridge and trail improvements would be ADA-compliant. The bridge abutment and superstructure

would be designed with the assumption that the Bitterroot River may eventually threaten this infrastructure. As such, the abutments will use minimal concrete relying instead on helical anchors and native material. Appendix A: Figure 3-2 presents the Preliminary bridge design.

3. Streambank Treatments

Stream bank restoration would be necessary along 400-linear feet in the area impacted by the water control structure removal. Banks would be rebuilt in their natural alignment using a vegetated wood matrix consisting of small-diameter wood, brush, willow cuttings and native backfill. This approach would not only provide stability for new banks but would also add instream complexity and overhead cover for aquatic and riparian-dependent organisms. A illustration of the proposed streambank treatment can be found in Appendix A: Figure 3-3. The proposed stream cross-section detail at the bridge site, after restoration, can be found in Appendix A: Figure 3-4.

4. Low-Water Stream Crossing Construction & Partial Levee Removal

Under Alternative B, a low water stream crossing would be constructed approximately 2,300 feet upstream of the water control structure, providing access for heavy equipment to enter the WVA for maintenance (e.g. trail improvement, education structure maintenance). The crossing would be sited along an existing levee which at one time supported a bridge across North Burnt Fork Creek, and currently restricts overbank flow of Burnt Fork Creek and the Bitterroot River. To establish the appropriate slopes for the crossing, 813 cubic yards of levee material would be removed and hauled off-site. The remaining material would be gradually sloped and a hardened crossing installed, as presented in Appendix A: Figure 3-5.

5. Revegetation

To increase native cover and reduce reed canarygrass, a combination of reed canarygrass sod removal, solarization, planting, fencing and willow trenches would be used. In total, this effort would plant, fence and weed mat 300+ trees and shrubs and plant 3,000+ willow cuttings along the banks and floodplain of ½ mile North Burnt Fork Creek. Appendix A: Figure 3-6 presents a map detailing the proposed revegetation treatments.

The 3-acre area directly adjacent to the water control structure removal is referred to as the “intensive planting areas” where reed canarygrass sod would be removed mechanically. This would both reduce the root mass and ability of reed canarygrass to resprout but would also serve as a way to lower the floodplain elevation when the streambed elevation would have dropped 1-2 feet from sediment evacuation. Following sod removal, 1) native trees and shrubs would be planted 2) weed fabric around individual plants would be installed and secured and 3) fencing would be placed around planting areas to prevent browse from ungulates and beaver.

Throughout the entire ½ mile (7.5 acre) project area, including the “dispersed planting area,” willow cuttings would be planted in pre-dug trenches and trees planted where site conditions allow.

Reed canarygrass is a highly aggressive grass, pervasive in Montana. While less intensive approaches are sometimes used to combat it, they rarely are successful long-term. The proposed approach is not intended to fully eradicate reed canarygrass from the property; Given its aggressive root system and ability to recolonize, this is not a reasonable expectation. Instead, it would establish a native tree and shrub component alongside reed canarygrass, providing shade, bank stability and cover. Over time, mature cottonwoods are known to shade out reed canarygrass, further limiting its impact on habitat.

6. Viewing structure relocation

The viewing structure that currently sits along the walking trail and just above the water control structure is proposed for removal and reconstruction. The option of leaving the viewing structure in place was assessed, yet it was not feasible with the construction of the new bridge. Instead, under Alternative B this structure would be relocated, north of its current location, maintaining a shaded sitting area for visitors along the trail. The approximate new location of the structure is shown in Appendix A: Figure 3-1.



Figure 3-6. The water control structure (foreground) and Viewing structure (background) along the paved trail in the Refuge WVA.

3.3 Alternatives Considered but Dismissed From Further Consideration

During the development of this project, partners considered a wide range of alternatives beyond the two presented in this draft EA. Below is a brief summary of several alternatives evaluated, but not pursued, and justification for their removal from consideration.

- **North Channel as Main Burnt Fork Creek Channel:** This alternative would have removed the passage barrier and directed North Burnt Fork Creek northward, through the existing seasonal channel, instead of westward. The benefit of this alternative is that it would add several miles of habitat to North Burnt Fork Creek in a reach that is gaining ground water, beneficial for aquatic species. However, this alternative would require major channel construction to increase channel capacity. It would also cause a substantial increase in the amount of water headed towards Whitetail Golf Course in the spring, where annual flooding is already a problem. Finally, this alternative would also require substantial bank hardening to maintain this channel, which would naturally erode towards the alignment proposed in Alternative B.
- **Mechanical Removal of Sediment:** This alternative is identical to the proposed action with the key exception that during the barrier removal activity, sediment that has accumulated upstream of the standpipe structure would be removed mechanically (with an excavator) rather than naturally evacuated during Spring floods. This alternative was not selected as the proposed alternative for several reasons. First, the volume of sediment in question is quite small relative to the natural annual flux of sediment in the Bitterroot River, so the natural evacuation of sediment proposed in Alternative B is not expected to have a notable impact on the Bitterroot River or the organisms therein. Mechanical removal of sediment above the water control structure would require equipment to work in the stream across a large area (800 linear feet), which would require temporarily dewatering of a section of the stream or excessive turbidity during a time that aquatic species are not accustomed to high sediment loads. Additionally, the cost and logistics of hauling material off-site is substantial.
- **No bridge:** The Bitterroot River is actively eroding into the WVA and towards the project area. A channel migration study estimates that the River will overtake the project area in 12-45 years. Given this risk, partners considered removing the water control structure but not installing a pedestrian bridge, given the high investment in at-risk infrastructure. All recreation structures would instead be relocated and a new trail area improved to provide ADA-accessible visitor access. This proposal was removed from consideration given the high visitor use and the wide range of channel migration projection timelines. As erosion occurs, the Refuge will assess the need for alternative trail access and infrastructure removal. The bridge and abutment infrastructure were designed with these risks in mind, allowing for deconstruction and relocation.
- **Vehicular bridge:** While the WVA is primarily a pedestrian trail, it is occasionally used by vehicles or heavy equipment for trail or structure maintenance, or for access in the event of an emergency. For this reason, a vehicular bridge rated to carry heavy equipment was considered. This alternative was removed due to the high cost of this bridge. Instead, under the proposed alternative, a low water crossing would be available

for heavy equipment access, and the pedestrian bridge rated to allow a small emergency vehicle (ambulance).

4 Affected Environment and Environmental Consequences

This section describes the area in which the proposed project would occur and focuses on those resources and the associated environmental consequences that would be anticipated through implementation of the no action and action alternatives. This section does not provide a detailed description of the environment at large but supplies the needed information for the reader to understand the discussion in this section pertaining to the anticipated changes in the affected environment resulting from implementation of the Proposed Action.

4.1 Air Quality

4.1.1 Existing Conditions

Air quality problems in Montana are usually related to urban areas and narrow mountain river valleys that are prone to temperature inversions. These temperature inversions cause chemical and particulate matter to become trapped in the air. (Particulate matter is tiny liquid or solid particles in the air that can be breathed in through the lungs, with the smaller particulates being more detrimental than larger particles.) These air pollutants have the greatest adverse effect on Montana's air quality.

Air quality in the Bitterroot Valley and Ravalli County is classified as either "attainment" or "unclassifiable-expected attainment" with respect to the National and Montana Ambient Air Quality Standards for all regulated air pollutants. The primary pollutant of concern in the Bitterroot Valley is particulate matter less than 2.5 microns in size (PM_{2.5}). Ambient PM_{2.5} levels have been measured at several locations in the Bitterroot Valley over the past several years and continue to be measured in the community of Hamilton, approximately 20 miles south of the refuge. Smoke from wood burning appliances (primarily residential heaters and woodstoves), forestry and agricultural prescribed burning practices, and forest fires occasionally result in elevated PM_{2.5} levels in the Bitterroot Valley. The Montana Department of Environmental Quality conducts an open burning smoke management program to mitigate impacts from forestry and agricultural burning. Nevertheless, Missoula experienced 16 days of Stage I Air Alerts in 2003. The Montana Department of Environmental Quality evaluates monitored concentrations of PM_{2.5} during the winter months to address elevated PM_{2.5} levels primarily resulting from wood burning appliance emissions during periods of poor atmospheric dispersion (Hoby Rash, Monitoring Section Supervisor, Ambient Air Monitoring, Montana Department of Environmental Quality; email; September 27, 2010).

4.1.2 Effects of Alternative A (No Action) on Air Quality

No effect. Under the No Action alternative, existing air quality would remain unchanged, and no effects would result in the project area or Airshed.

4.1.3 Effects of Alternative B (Proposed Action) on Air Quality

No significant impact. Under Alternative B, construction activities may increase airborne dust, but levels are not anticipated to exceed air quality standards. An increase in pollutant emissions is expected as a result of heavy equipment activity. The construction-related emissions would be temporary and localized with levels not anticipated to exceed air quality standards. Work would be performed during established work hours so as to minimize any direct and indirect effects on neighboring properties. In addition, appropriate Best Management Practices (BMPs) would be applied to mitigate any potential impacts to air quality. Available technologies, including the use of watering, mulching, and/or applying surfactants to existing native/gravel roads may be used where appropriate to minimize dust emissions. In general, these impacts would be localized and temporary.

4.2 Wetlands

4.2.1 Existing Conditions

Indicators of wetland hydrology, soils and vegetation were recorded as part of investigating site conditions to support restoration design and permitting. Existing wetlands at the Refuge include both emergent and scrub-shrub wetland classifications. Wetlands occur on the floodplain of North Burnt Fork Creek and are bounded by a hillslope to the east which leads to uplands and the main parking area at the Refuge, and a slight terrace to the west which is occupied by a black cottonwood (*Populus trichocarpa*) gallery. A narrow emergent wetland also brackets a ditched side channel at the north of the project area.

Emergent wetlands on the floodplain of North Burnt Fork Creek are dominated by reed canarygrass, an aggressive non-native, as well as broadleaf cattail (*Typha latifolia*) and common beaked sedge (*Carex utriculata*). Where the groundwater table is at or within a few inches of the soil surface during a majority of the growing season, broadleaf cattail and common beaked sedge are present in higher percent cover than reed canarygrass, and this condition exists in a patchy distribution throughout the project area floodplain of North Burnt Fork Creek. Non-dominant components of emergent wetland communities include water smartweed (*Polygonum amphibium*) and yellow flag iris (*Iris pseudacorus*); Stinging nettle (*Urtica dioica*) and Canada thistle (*Cirsium arvense*) are also present in few locations especially at the upstream portion of the project area. The wetland on the floodplain of the ditched side channel to the north consists almost exclusively of reed canarygrass, although few small pockets of broadleaf cattail are also present in this location.

Scrub-shrub wetlands at the Refuge restoration project area include a dominant cover of sandbar willow (*Salix exigua*) with similar understory composition as emergent wetlands. Scrub-shrub wetlands occur in a few main patches throughout the floodplain of North Burnt Fork Creek and are more abundant at the south of the project area.

4.2.2 Effects of Alternative A (No Action) on Wetlands

No effect. Under the No Action alternative, wetland hydrology would not be restored and existing vegetation communities would continue to occur as mapped in 2022. Reed canary grass would continue to suppress germination and establishment of native trees and shrubs.

4.2.3 Effects of Alternative B (Proposed Action) on Wetlands

No significant impact. Under Alternative B (Proposed Alternative), the project area would see a net increase in wetland area of 0.08 acres. Grading and excavation activities would result in 0.78 acres of temporary wetland impacts, including excavation of levee features and reed canarygrass sod mat to prepare for revegetation with native trees, shrubs, sedges and rushes. All temporary wetland impact areas would be retained as wetlands following project implementation, and the wetlands would have a greater diversity of native plants which would be maintained by natural spring flood regimes rather than artificial impoundments. Sandbar willow in the scrub-shrub wetland which would be excavated along with the reed canarygrass sod mat would be salvaged to the greatest extent possible and replanted following reed canarygrass removal. Additional plantings of sandbar willow and cottonwood would supplement the shrub salvage and transplant effort, if necessary, to ensure that scrub-shrub wetland area would not decrease as a result of Proposed Alternative implementation. Appendix A: Figure 4-1 presents a map of the wetland impact areas prepared as part of a formal wetland delineation.

4.3 Stream Channels and Fisheries

4.3.1 Existing Conditions

A map and photos of current stream conditions can be found in Appendix A: Figure 4-2. The Refuge is located in the Bitterroot River floodplain, with the Bitterroot River running through or alongside Refuge lands for approximately 5 miles. The river flows south to north and has areas of inherently unstable channel configurations until its confluence with the Clark Fork River near Missoula. The floodplain at the Refuge is characterized by multiple abandoned channels, backwater flooding, and entrances of two tributaries from the east, North Burnt Fork Creek and Three Mile Creek.

The project area is focused on North Burnt Fork Creek, 0.3 miles before its confluence with the Bitterroot River. North Burnt Fork Creek is one of the largest drainages on the Bitterroot's east side, flowing 26+ miles westward out of the Sapphire mountains through Forest Service land, private land and eventually, in its lower 0.8 miles, through the Refuge. The water control structure at river mile 0.3, proposed for removal in Alternatives B was once used to back up water in North Burnt Fork Creek to create waterfowl habitat.

North Burnt Fork Creek within the Refuge is a heavily altered stream. The majority of its path in the Refuge flows through an abandoned Bitterroot River meanderbend, also called Francois Slough. At the water control structure, a secondary, manmade channel, flows northward an additional 1-mile before entering the Bitterroot River. This secondary channel carries North

Burnt Fork water during spring and early summer but goes dry on the Refuge each summer and fall. It is supplemented year-round by substantial groundwater inflows along its path, so despite being dry on the Refuge for a portion of the year, its outflow to the river flows year-round. Additionally, the Bitterroot River is actively migrating in an easterly direction, through the WVA. While this erosion is natural, it is likely accelerated by channel straightening and rip-rap banks upstream which both increase shear stress on Refuge banks downstream. A channel migration analysis prepared by River Design Group calculated a migration rate of 10.5-39.6 feet/year between 2006 and 2017 (River Design Group, 2020). It is expected that the River will eventually erode into its former channel, Francois Slough, which is currently the path of North Burnt Fork Creek and within the proposed project area. Based on previous erosion rates, this is anticipated to occur in 12-45 years.

Native fish species in the Bitterroot and North Burnt Fork Creek near the project site include Westslope Cutthroat trout (*Oncorhynchus clarkii lewisi*), mountain whitefish (*Prosopium williamsoni*), longnose sucker (*Catostomus catostomus*), largescale sucker (*Catostomus macrocheilus*), Columbia slimy sculpin (*Cottus cognatus*), Northern pike minnow (*Ptychocheilus oregonensis*) longnose dace (*Rhinichthys cataractae*) and Redside shiner (*Richardsonius balteatus*). Non-native brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) also inhabit the area and are dominant in comparison to native trout species. Non-native northern pike (*Esox Lucius*) and largemouth bass (*Micropterus salmoides*) also occur in the Bitterroot River in localized habitats suitable for them.

Bull trout (*Salvelinus confluentus*) is federally listed as threatened and historically traveled between the Bitterroot River and North Burnt Fork Creek to spawn in the upper Burnt Fork watershed. Bull trout are rarely found in the vicinity of the project area today and have not been documented on the Refuge, though there is a still a relatively strong population off the Refuge in the upper reaches of North Burnt Fork Creek in the Sapphire Mountains. Reduced flows, increased water temperatures, sedimentation, and barriers like the water control structure on the Refuge all likely contributed to the decline of this species in lower North Burnt Fork Creek and the adjacent reach of the Bitterroot River. On September 30, 2010, the Service designated 18,795 miles of streams and 488,252 acres of lakes and reservoirs in Idaho, Oregon, Washington, Montana, and Nevada as critical habitat for bull trout. The Bitterroot River and North Burnt Fork Creek are both located within this designated area. This designation and the status of the bull trout emphasize the need for coordination with other efforts to restore this critical habitat including special consideration in management of Refuge resources

Connectivity between mainstem rivers and tributaries is critical from a fisheries perspective, and a major focus of agency and conservation non-profit work. While each fish species has specific habitat requirements, unobstructed movement between waterbodies allows fish to seek cold or warm water refugia, food resources, and appropriate spawning habitat. It also allows movement during major flood events or fires. For migratory trout species, this movement is an essential component of their life history, using rivers for migration and overwintering, and tributaries for spawning and rearing.

Fish passage barriers, like the water control structure on the Refuge, undersized culverts or impassible or unscreened irrigation diversions, can substantially limit fishes' access to suitable habitat which in turn limits the population. In the Bitterroot River near Stevensville, MT and near this proposed project, Montana FWP sampling shows a long-term average of 419 trout >7" per mile. This is less than half the population density of a site 40 miles upstream where human impacts are less pronounced (Hannon bridge sampling site: 973 trout/mile). These reduced numbers are linked to many factors, but limited access to spawning and rearing tributary habitat is substantial. In its current state, the water control structure in the WVA is a full passage barrier to fish year-round. The secondary, north channel likely provides passage at moderate flows, but is impassible much of the year due to lack of water in the reach within the WVA.

4.3.2 Effects of Alternative A (No Action) on Stream Channels and Fisheries

No effect. Under the No Action alternative, no active restoration would occur and North Burnt Fork Creek would continue to exist in a degraded state, with a substantial barrier preventing year-round fish passage between the Bitterroot River and North Burnt Fork Creek, as well as simplified aquatic and riparian habitat conditions and floodplain disconnection.

4.3.3 Effects of Alternative B (Proposed Action) on Stream Channels and Fisheries

No significant impact. Under the proposed alternative, the removal of the water control structure would reconnect 2.5 miles of North Burnt Fork Creek to the Bitterroot River for all aquatic life. It would also improve 0.5 miles of riparian and instream habitat by establishing cottonwood and native shrubs that can compete with non-native reed canarygrass.

The west-flowing channel through the current water control structure would remain the primary North Burnt Fork Creek channel. The north-flowing channel would be activated at high-flows as a secondary channel. The North channel currently receives water from North Burnt Fork Creek only at moderate-high flows and is dry in summer and fall. This alternative would likely reduce flows in the Spring flood events and have no impact at low flows.

Construction activities, specifically the removal of the water control structure and stream bank reconstruction, may produce a temporary increase in turbidity and fine sediment. Impacts would be minimized by working at low-flows (July 15-September 1 fish window) and constructing cofferdams at the instream construction location to provide localized dewatering. Stormwater and erosion control structures (e.g. silt fence and silt curtain) would also be in place to limit sediment impacts to the immediate construction area.

Sediment that has accumulated upstream of the water control structure (total maximum volume 1240 cubic yards) would evacuate naturally over time during spring flood events. Passive evacuation of sediment is preferable to mechanical removal because it allows work to occur without complete channel dewatering and does not require equipment to enter the creek, reducing disturbance. The volume of sediment estimated to enter the Bitterroot River

from this project is minimal in the context of the natural sediment flux in the Bitterroot River each spring. For context, the 1,500-foot Bitterroot River bank eroding within the WVA was estimated to contribute 6,000 cubic yards of sediment *each year* between 2014 and 2017. Under this alternative, sediment evacuation would also occur naturally in spring when aquatic organisms are adapted to large sediment inputs.

4.4 Waterfowl

4.4.1 Existing Conditions

The water control structure proposed for removal was previously used to impound water and increase waterfowl habitat. Because of sedimentation, the area impounded by the water control structures has, over time, decreased in value for waterfowl and waterbirds. The sediment has also encouraged emergent vegetation (cattail) to take over much of the open water. The impounded area does provide limited habitat for mallard (*Anas platyrhynchos*), American green-winged teal (*Anas crecca carolinensis*), hooded merganser (*Mergus cucullatus*), wood duck (*Aix sponsa*), and other waterfowl and one to two great blue herons (*Ardea herodias*) are often observed feeding from the elevated sediment accumulation. Marsh wrens (*Cistothorus palustris*), Sora (*Porzana carolina*) and Virginia rails (*Rallus limicola*), and red-winged (*Agelaius phoeniceus*) and yellow-headed blackbirds (*Xanthocephalus xanthocephalus*) use the cattails in the spring.

4.4.2 Effects of Alternative A (No Action) on Waterfowl

No effect. Under Alternative A, no habitat restoration actions would occur, and therefore no effects on waterfowl would result. Habitat for waterfowl would not improve. In a normal precipitation year, approximately 6 acres of open water would be available in the impounded creek wetland.

4.4.3 Effects of Alternative B (Proposed Action) on Waterfowl

No significant impact. Alternative B would remove a water control structure that can be managed to impound water in North Burnt Fork Creek for waterfowl and waterbird habitat. The structure has not managed to full capacity of its impoundment capability for approximately 15 years, managing alternatively to provide flow through North Burnt Fork Creek. Even with managing for less impoundment, the structure still constricts flow, causing a ponding effect at high flows each spring and early summer. The removal of the water-control structures would transition the impounded wetland area to a more active riparian zone with higher consistent velocities and lotic stream-bed structure. This would represent a loss of waterfowl habitat.

Construction will not begin until after July 15th, minimizing impacts to nesting waterfowl using the WVA.

4.5 Species of Concern, Threatened and Endangered Species and Critical Habitat

4.5.1 Existing Conditions

The following is a comprehensive list of federally endangered, threatened, proposed, and candidate species as well as designated or proposed Critical Habitats that occur within the project area. Notably, the project area is within designated Critical Habitat for bull trout, a Threatened species. Selective removal of barriers to bull trout migration, such as the water control structure on North Burnt Fork Creek, is an overarching goal for bull trout recovery (USFWS, 2015 , pg D-44) to help “conserve and enhance Bitterroot River migratory populations” (USFWS, 2015, pg D-126).

<i>Species</i>	<i>Status</i>	<i>Relevance</i>	<i>Critical Habitat</i>
Canada Lynx (<i>Lynx canadensis</i>)	Threatened	No suitable habitat	None designated
Grizzly Bear (<i>Ursus arctos horribilis</i>)	Threatened	Recovery Area	Proposed
Wolverine (<i>Gulo gulo luscus</i>)	Proposed	No suitable habitat	None designated
Bull Trout (<i>Salvelinus confluentus</i>)	Threatened	Historically migrated from Bitterroot River up North Burnt Fork Creek to spawn	North Burnt Fork Creek and the Bitterroot River.
Bull Trout Critical Habitat	Designated	Recovery Area	Burnt Fork Creek and the Bitterroot River
Yellow-billed Cuckoo (<i>Coccyzus americanus</i>)	Threatened	Suitable habitat; spp. never documented	Outside of designated critical habitat
Monarch Butterfly (<i>Danaus plexippus</i>)	Candidate	Found on Refuge no habitat in project area	None designated

Table 4-1. Threatened and Endangered species and critical habitats found within the project area

4.5.2 Effects of Alternative A (No Action) on TES and Critical Habitat

No effect. Under Alternative A, no habitat restoration actions would occur, and therefore no effects on TES or critical habitat would result. Habitat and connectivity for native bull trout and Westslope cutthroat trout would continue to be impaired.

4.5.3 Effects of Alternative B (Proposed Action) on TES and Critical Habitat

No significant impact. An Intra-Service Section-7 Biological Evaluation reviewed impacts to TES and critical habitat, based on the proposed action (**Appendix B**). The project is considered to have No Effect on Canada Lynx, Wolverine and Yellow-billed Cuckoo. The project May Affect but is Not Likely to Adversely Affect Grizzly bear, Bull Trout, Bull Trout Critical Habitat and the Monarch Butterfly. The project would not Adversely Affect or Jeopardize any species

Under Alternative B, approximately 2.5 miles of stream habitat would be reconnected and ½ mile of riparian habitat improved in bull trout critical habitat, providing suitable habitat conditions for all life history stages, and restoring fluvial connectivity between the Bitterroot River and North Burnt Fork Creek. Temporary impacts to water quality (increased turbidity) may occur during construction, but impacts would be minimized by working within the fish window (July 15-September 1), using coffer dams and pumps to keep streamflow away from active construction areas, and silt fences to capture sediment.

4.6 Cultural and Historic Resources

4.6.1 Existing Conditions

An assessment and field survey of cultural and historic resources was completed in September 2022 by a U.S. Fish and Wildlife Service Archeologist meeting the Secretary of Interior Professional Qualification Standards for Archaeology and Historic Preservation (36 CFR 61).

Pursuant to Section 106 of the National Historic Preservation Act (NHPA) (54 USC 300101) and its enacting regulations 36 CFR 800, a federal agency is required to consider the affects its actions have on historic properties. NHPA defines a historic property as any prehistoric or historic district, site, building, structure, or object that is included or eligible to be included in the National Register of Historic Places (National Register). As a federal agency, the USFWS must identify historic properties potentially affected by an undertaking, assess potential impacts to them, and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties. Potential impacts can be direct, indirect, or cumulative. Possible impacts include, but are not limited to, ground disturbances and visual changes.

4.6.2 Effects of Alternative A on Cultural and Historic Resources

No effect

4.6.3 Effects of Alternative B (Proposed Action) on Cultural and Historic Resources

USFWS determined the project’s activities are of the type to have the potential to cause effects to historic properties. However, investigation by USFWS staff, which included intensive field survey, identified no cultural resources that met the criteria for inclusion in the National Register and historic property status.

If previously unidentified cultural resources are discovered during project activities, work in the area will stop until an eligibility determination for the NRHP can be made. If at any time historic properties are identified within the project, adverse effects to them will be avoided, minimized, or mitigated through the Section 106 process within 36 CFR 800 *et seq.*

A final report was incomplete at the time of this EA’s publication. It can be requested by contacted Lee Metcalf National Wildlife Refuge: 406-777-5552 or leemetcalf@fws.gov .

4.7 Wildlife – Dependent Recreation

4.7.1 Existing Conditions

The WVA of the Refuge is open to a number of wildlife-dependent recreational opportunities including fishing, wildlife observation, wildlife photography, environmental education and interpretation. It is popular with the public for walking and hiking. The WVA hosts a paved ADA-accessible loop trail as well as several smaller, unpaved trails. Erosion along the Bitterroot Riverbank in the WVA has washed out a large portion of the Cottonwood trail, which was formerly paved, following the path shown in Figure 4-3. An unpaved social trail has been created by regular foot traffic along the bank, looping back to the Metcalf Trail.



Figure 4-3. Map of and photograph of Wildlife Viewing area trail system, including the viewing structure in photograph’s background.

Visitor facilities include a kiosk with maps, bathrooms, an education shelter, and a viewing structure overlooking North Burnt Fork Creek. The roofed viewing structure is located along the Metcalf Trail, adjacent to the water control structure. This structure is most often used by visitors seeking shade and is sometime used for fishing in North Burnt Fork Creek.

4.7.2 Effects of Alternative A (No Action) on Recreation

No effect. Wildlife-Dependent Recreational opportunities in the WVA would remain as they have in the recent past under the No Action Alternative. There would be no minor or temporary impacts from the no-action alternative to existing wildlife-dependent recreational opportunities. Enhancements would occur as funding opportunities become available without consideration of the proposed action.

4.7.3 Effects of Alternative B (Proposed Action) on Recreation

No significant impact. Restoration activities are expected to benefit habitat for native plants and animals, including passerines, fisheries, and cold-water aquatic organisms within the project area. As a result, access to wildlife-dependent recreational activities associated with native riparian habitat is expected to be enhanced over time. These activities include fishing, wildlife observation, wildlife photography, environmental education, and interpretation.

During construction, access to the trails on the south side of the WVA may be limited while the water control structure is removed, and the bridge is installed. Additional closures for public safety may occur while heavy equipment is operating near trails. The Refuge would post signage alerting the public of closures.

With this alternative, the current viewing structure would be relocated to a new site near the pedestrian bridge. The relocation is necessary because the structure sits adjacent to the water control structure proposed for removal. The relocated structure will retain the recreational value of a shaded sitting area along the trail system with a similar view.

4.8 Invasive and Nonnative Plants and Animals

4.8.1 Existing Conditions

Invasive species documented on the Refuge include:

- Plants: yellowflag iris (*Iris pseudacorus*), Houndstongue (*Cynoglossum officinale*), knapweed (*Acroptilon repens*), hoary alyssum (*Berteroa incana*), St. John's wort (*Hypericum perforatum*)
- Animals: American bullfrog (*Lithobates catesbeianus*)

Many non-native species are present on the Refuge and within the project area. Reed canarygrass is not considered a noxious weed but is known to be an aggressive competitor to native vegetation, especially in riparian areas and is dominant in the riparian area along North Burnt Fork Creek in the project area.

4.8.2 Effects of Alternative A (No Action) on Invasive and Nonnative Plants and Animals

No effect. Invasive and nonnative plants and animals within the project area would remain unaffected by the project under the No Action Alternative. It is anticipated that noxious weeds would continue to be managed by the Refuge and reed canarygrass would continue to proliferate throughout the WVA.

4.8.3 Effects of Alternative B (Proposed Action) on Invasive and Nonnative Plants and Animals

No significant impact. The spread of noxious weeds and reed canarygrass would be controlled during construction to the greatest extent practical. Equipment would be required to be washed and free of weed seeds and propagules and inspected to ensure they are compliant before starting work. Disturbed areas would be seeded with a native grass seed mix, including a fast-germinating sterile grass to provide immediate cover and reduce bare ground.

A primary goal of Alternative B is to establish a tree and shrub community within the North Burnt Fork Creek riparian area, currently dominated by reed canarygrass. This action would not eradicate reed canarygrass but would suppress it within planting areas using sod removal and weed fabric, allowing native tree and shrub containerized plants to establish. Mature trees are known to shade out reed canarygrass, reducing its impact on habitat.

Native and non-native fish species are located above and below the water control structure and both may benefit from its removal and the reconnection of habitat.

4.9 Summary of Analysis

4.9.1 Alternative A: No Action

Under the No Action alternative, the WVA would continue to be managed as it has been in the recent past. Fish passage would not be restored, and riparian habitat would not be improved with this action.

4.9.2 Alternative B: Proposed Action

The proposed action would result in temporary and localized impacts to air quality and fisheries (turbidity from construction). It would fully satisfy the purpose and need for this project, reconnecting 2.5 miles of habitat for aquatic organisms and improving riparian habitat for all riparian-dependent species. Visitor access and recreation opportunities may be limited during

construction, yet would be improved in the long-term through improved habitat and wildlife viewing opportunities, as well as improved interpretive signage.

Resource	Alternative A No Action	Alternative B Proposed Action
Air Quality	No effect on air quality.	Construction activity would result in minor, short term, and localized increases in particulate matter and emissions or dust. Temporary and minor impact with no significant impact.
Wetlands	Continued conversion of riparian habitats to cattail dominated wetlands and then to drier vegetation types characterized by monotypic stands of reed canarygrass.	No significant impact. Restoration of riparian habitat on North Burnt Fork Creek. Transition of sediment impacted wetland to active channel and active riparian zone.
Stream channel and fisheries	Continued habitat degradation and likely increase in non-native fish over time. The existing fish passage barrier would persist and continue to fragment aquatic habitat in the WPA.	Approximately 2.5 miles of North Burnt Fork Creek will be reconnected for aquatic passage. Natural hydrologic processes and sediment regimes will be restored. Turbidity from construction will be minimal and temporary. No significant impact.
Waterfowl	No effect on waterfowl.	Loss of water control structure will reduce available open water at the site. Construction will occur in the summer, limiting impacts to nesting waterfowl.
Species of Concern, Threatened and Endangered Species & Critical Habitat	Continued habitat degradation for T&E species and WCT, a Montana Species of Special Concern.	Approximately 2.5 miles of aquatic habitat will be reconnected in bull trout critical habitat. 0.5 miles of riparian habitat will be improved.
Cultural and Historic Resources	No adverse effect.	No significant impact. Final report awaiting signature.
Wildlife-Dependent Recreation	No effect on wildlife-dependent recreation	Enhancement of riparian associated observation, photography, and interpretive opportunities. Access may be limited temporarily during construction.
Invasive and nonnative plants and animals	Continued invasion and spread of noxious weeds and reed canarygrass over time. Continued management to abate noxious weed species in the WVA.	Approximately 0.5 miles of improved riparian habitat through the establishment of cottonwood and native shrubs. Over time this planting should reduce proliferation of reed canarygrass and noxious weeds. Barrier removal will provide access to spawning habitat for native and non-native fish species alike.

Table 4-2. Summary table of the effects of each alternative on resources.

5 Consultation and Coordination

5.1 List of Preparers*

The following personnel were consulted during the development of this EA:

Christine Brissette	Project Manager, Trout Unlimited (TU)
Tom Reed	Refuge Manager, Lee Metcalf National Wildlife Refuge (USFWS)
Jason Lindstrom	Fisheries Biologist, Montana Fish, Wildlife and Parks (MFWP)
Salvatore Caporale	Archeologist (Cultural & Historic Resources) (USFWS)
Selita Ammont	Restoration Ecologist (Wetland Delineation), River Design Group

* Note, this EA drew heavily from the Lee Metcalf National Wildlife Refuge Comprehensive Conservation Plan (2012) which included extensive consultation and involvement from Agency and community partners.

5.2 Pertinent Laws, Executive Orders, and Regulations

National Environmental Policy Act of 1969, as amended: The National Environmental Policy Act (NEPA) requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions.

Endangered Species Act of 1973: Provides for the conservation of the ecosystem upon which endangered species and threatened species depend and provides a program for the conservation of such endangered species and threatened species.

Fish and Wildlife Act of 1956: Under this act, the Secretary of the Interior is authorized to take such steps required for the development, management, conservation and protection of fish and wildlife resources including but not limited to research, development of existing facilities, and acquisition by purchase or exchange of land and water.

National Wildlife Refuge Administrative Act of 1966: Defines the National Wildlife Refuge System and authorizes the Secretary of the Interior to permit any use of an area provided such use is compatible with the major purpose for which the refuge was established.

National Wildlife Refuge Improvement Act of 1977: Expands on NWRS Administration Act of 1966 by providing organic legislation for the National Wildlife Refuge System, and significant additional guidance on management and public use of the Refuge System.

Archaeological Resource Protection Act of 1970: Protects irreplaceable archaeological resources on Federal lands which are 100 years or older.

National Historic Preservation Act: Authorizes the National Register of Historic Places, establishes the Advisory Council on Historic Preservation, and grants power to the Council to review Federal undertakings that affect historic properties.

Title 50 of the Code of Federal Regulations: Implements numerous laws and executive orders concerning wildlife, including administration of National Wildlife Refuges.

Montana Stream Protection Act (SPA 124 Permit): Any agency or subdivision of federal, state, county, or city government proposing a project that may affect the bed and banks of any stream in Montana. The purpose of the law is to protect and preserve fish and wildlife resources. The law is administered by the Montana Department of Fish, Wildlife and Parks.

Federal Clean Water Act (404 Permit): Any person, agency, or entity, either public or private, proposing a project that will result in the discharge or placement of dredged or fill material into waters of the United States. "Waters of the United States" include lakes, rivers, streams, wetlands, and other aquatic sites. The purpose of the law is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. The U.S. Army Corps of Engineers has regulatory review and enforcement functions under the law.

Short-term Water Quality Standard for Turbidity (318 Authorization): Any person, agency, or entity, both public and private, initiating construction activity that will cause short term or temporary violations of state surface water quality standards for turbidity. The purpose of the law is to provide a short-term water quality turbidity standard for construction activities, to protect water quality, and to minimize sedimentation. The law is administered by the Montana Department of Environmental Quality.

County Floodplain Development Permit: Any development including, but not limited to, placement of fill, roads, bridges, culverts, transmission lines, irrigation facilities, storage of equipment or materials, and excavation; new construction/development, placement, or replacement of manufactured homes; and new construction, additions, or substantial improvements to residential and commercial buildings within a designated Special Flood Hazard Area.

6 References

Montana Field Guide. Montana Natural Heritage Program and Montana Fish, Wildlife and Parks. Retrieved from <https://FieldGuide.mt.gov>

USFWS - U.S. Fish & Wildlife Service (2012) Comprehensive Conservation Plan, Lee Metcalf National Wildlife Refuge, Montana. Lee Metcalf National Wildlife Refuge, USFWS Region 6, Lakewood, CO.

USFWS - U.S. Fish & Wildlife Service (2015) Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout (*Salvelinus confluentus*). Montana Ecological Services Office,

Kalispell Suboffice, Kalispell, Montana. Northern Idaho Field Office and Eastern Washington Field Office, Spokane, Washington.

Appendix A: Maps and Figures



EXISTING CONDITIONS
 NORTH BURNT FORK CREEK
 FISH PASSAGE RESTORATION PROJECT
 NEAR STEVENSVILLE, MT

1 EXISTING CONDITIONS
 CONTOURS = 5'
 1" = 200'

EXISTING CONDITIONS

NORTH BURNT FORK CREEK ORIGINATES IN THE SAPPHIRE MOUNTAINS ON THE EAST SIDE OF THE BITTERROOT VALLEY AND IS A TRIBUTARY TO THE BITTERROOT RIVER. FROM THE CONFLUENCE WITH SOUTH BURNT FORK CREEK TO THE MOUTH OF THE BITTERROOT RIVER, NORTH BURNT FORK CREEK IS LISTED AS IMPAIRED FOR TOTAL NITROGEN, TOTAL PHOSPHORUS, AND SEDIMENT (MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY, 2014). ADDITIONALLY, A SUBSTANTIAL FISH PASSAGE BARRIER EXISTS, IMPEDING FISH PASSAGE BETWEEN THE BITTERROOT RIVER AND NORTH BURNT FORK CREEK. HISTORICALLY A MAJOR SPawning TRIBUTARY IN THE LOWER BITTERROOT RIVER, THE BARRIER IS A RELIC CHECK DAM STRUCTURE THAT BIFURCATES NORTH BURNT FORK CREEK. MOST OF THE STREAMFLOW PASSES OVER THE CHECK DAM STRUCTURE WITH LIMITED SEASONAL FLOWS ALSO DIRECTED NORTHWARD THROUGH A NARROW, INTERMITTENT CHANNEL. THE CHECK DAM STRUCTURE HAS CAUSED UPSTREAM AGGRADATION OF SEDIMENTS, PRIMARILY SAND AND SMALL GRAVEL. SEDIMENT DEPOSITION HAS ALTERED CHANNEL GEOMETRY, IMPAIRED HABITAT CONDITIONS, AND IN PART FACILITATED THE CONVERSION OF HISTORICAL SHRUB AND FORESTED RIPARIAN COMMUNITY TYPES TO GRASS MONOCULTURES THAT OUTCOMPETE NATIVE VEGETATION. BARRIER REMOVAL WILL RE-ESTABLISH FISH PASSAGE AND RESTORE FLUVIAL CONNECTIVITY AND ECOSYSTEM FUNCTIONS TO 3.5 MILES OF STREAM CHANNEL.

AN EXISTING LEVEE SYSTEM EXISTS IN THE PROJECT AREA. THE LEVEE SYSTEM PROVIDES FLOOD PROTECTION FOR THE REFUGE, AND PORTIONS FORM THE BASE OF AN ADA-COMPLIANT WALKING TRAIL. THE LEVEES AND TRAIL SYSTEMS HAVE BEEN COMPROMISED BY ACCELERATED RIVER BED MIGRATION AND EROSION FROM THE BITTERROOT RIVER. REMOVAL OF PORTIONS OF THE LEVEE SYSTEM TO REACTIVATE FORESTED FLOODPLAIN SURFACES AND SIDE CHANNEL HABITATS WAS IDENTIFIED AS A REFUGE GOAL IN THE CCP. LEVEE REMOVAL WILL INCREASE FLOODPLAIN CONNECTIVITY AND RESTORE NATURAL RIVERINE PROCESSES INCLUDING THE TRANSPORT AND DISTRIBUTION OF FLOW, NUTRIENTS, AND SEDIMENTS ACROSS FLOODPLAIN SURFACES AS WELL AS PROMOTE NATURAL REGENERATION OF FLOODPLAIN VEGETATION. THESE BENEFITS WILL BE CONSIDERED AGAINST THE VALUABLE USER ACCESS CURRENTLY PROVIDED BY THE LEVEE SYSTEM.

BURNT FORK CREEK CHARACTERISTICS	
DRAINAGE AREA	91 SQUARE MILES
MEAN ANNUAL PRECIPITATION	30 INCHES
STREAM GRADIENT	0.02%
STREAMBED DSZ	COARSE SAND
STREAM TYPE	CS/BS
25-YEAR DISCHARGE (4% EXCEEDANCE)	1,000 CFS*

*DERIVED FROM USGS WESTERN REGIONAL REGRESSION CURVES.

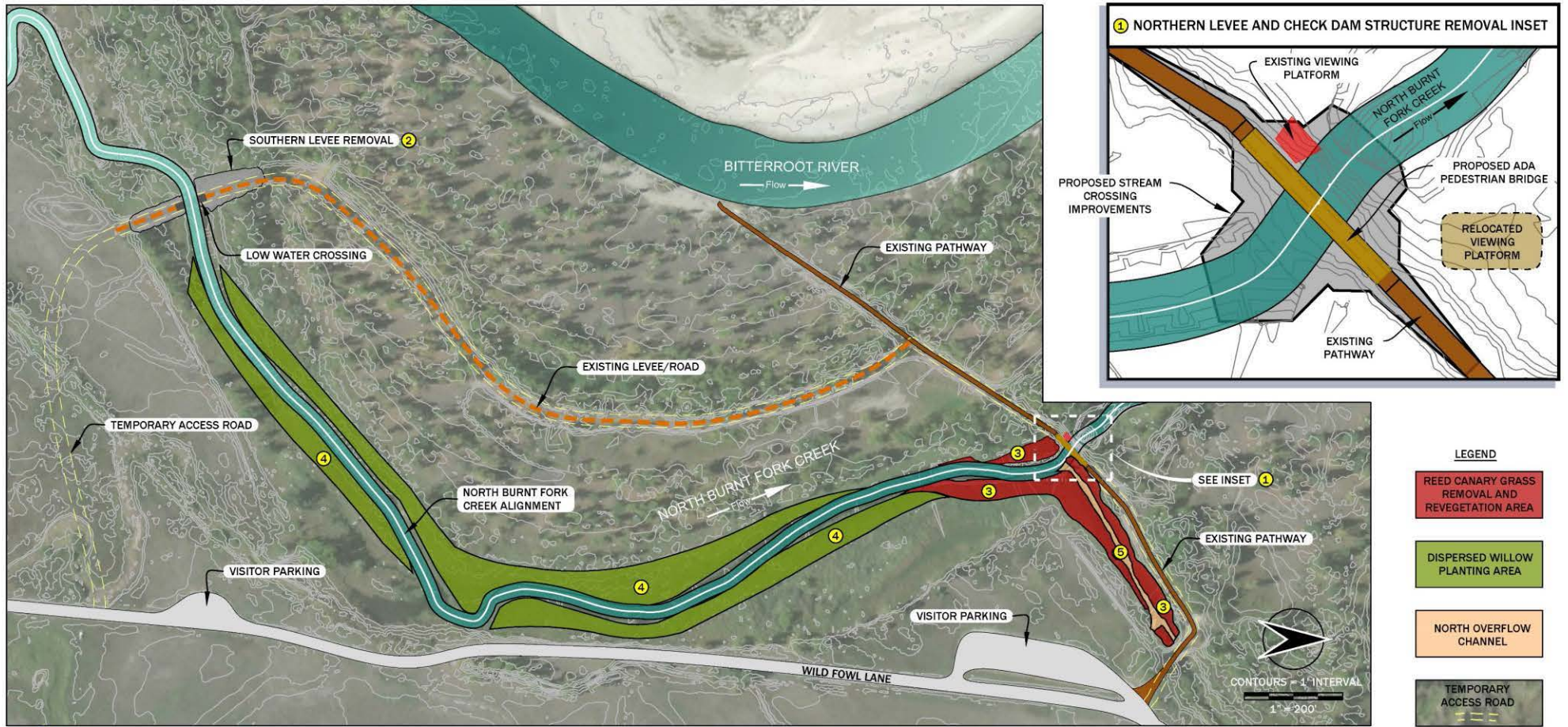
CHK	DESCRIPTION	DATE	BY
J11	50% DESIGN	3/10/22	TH
D	PRELIMINARY NOT FOR CONSTRUCTION		

PROJECT NUMBER: RDG-21-155
 DRAWING NUMBER: 2.0
 Drawing 2 of 16

M:\Projects\2021\RDG-21-155 - Lee Metcalf NWR\GIS\Map\MapInfo\Plans\rdg

Figure 2-2. Map of the Analysis area within Lee Metcalf National Wildlife Refuge. Figure created by River Design Group

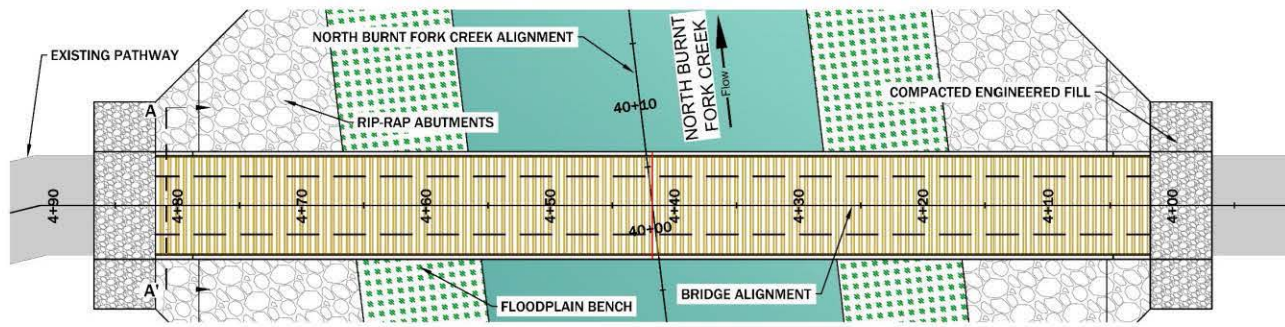
NORTH BURNT FORK CREEK FISH PASSAGE RESTORATION PROJECT LEE METCALF NATIONAL WILDLIFE REFUGE



- PROPOSED ACTIONS**
- | | | |
|--|---|---|
| <p>1 NORTHERN LEVEE AND CHECK DAM STRUCTURE REMOVAL</p> <ul style="list-style-type: none"> • CHECK DAM STRUCTURE DECOMMISSION AND REMOVAL • FLOODPLAIN CONSTRUCTION • BANK STRUCTURE INSTALLATION • MEMORIAL FISHING STRUCTURE RELOCATION • ADA-COMPLIANT PEDESTRIAN BRIDGE CONSTRUCTION | <p>3 REED CANARY GRASS REMOVAL AND REVEGETATION</p> <ul style="list-style-type: none"> • MECHANICALLY REMOVE REED CANARY GRASS ALONG BANKS OF CHANNEL AND WITHIN FLOODPLAIN • TREAT EXPOSED SURFACE WITH FLOODPLAIN ROUGHNESS AND BROADCAST SEED • INSTALL WILLOW CUTTINGS AND BLACK COTTONWOOD CONTAINERIZED PLANTS • INSTALL INDIVIDUAL BROWSE PROTECTORS OR FENCING UNITS AROUND CONTAINERIZED PLANTS | <p>4 DISPERSED WILLOW AND COTTONWOOD PLANTING</p> <ul style="list-style-type: none"> • INSTALL WILLOW CUTTINGS IN DISPERSED LOCATIONS ON THE FLOODPLAIN • UTILIZE NATIVE WILLOW CUTTING STOCK HARVESTED FROM APPROPRIATE LOCATIONS IN THE GREATER PROJECT AREA VICINITY • PLANT BLACK COTTONWOOD TREES IN SUITABLE HABITAT AND INSTALL INDIVIDUAL BROWSE PROTECTORS |
| <p>2 SOUTHERN LEVEE REMOVAL</p> <ul style="list-style-type: none"> • REMOVE REMAINING LEVEE AT EXISTING BREACH LOCATION • CONSTRUCT LOW WATER CROSSING | <p>5 NORTH OVERFLOW CHANNEL</p> <ul style="list-style-type: none"> • CREATE OVERFLOW CHANNEL TO CONVEY NORTH BURNT FORK CREEK HIGH FLOW EVENTS IN PLACE OF EXISTING DITCH. • CONVERT TO EMERGENT WETLAND WITH NATIVE SEDGE AND RUSH PLANT INSTALLATIONS. | |



Figure 3- 1. Alternative B Concept Plansheet. Figure created by River Design Group

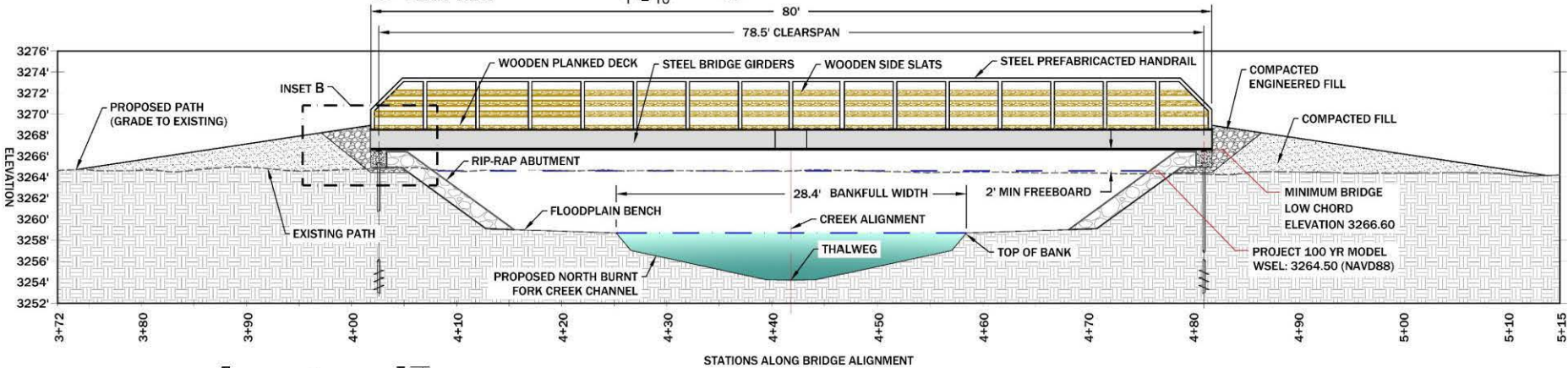


1 NORTH BURNT FORK CREEK BRIDGE
PLAN VIEW
 1" = 10'

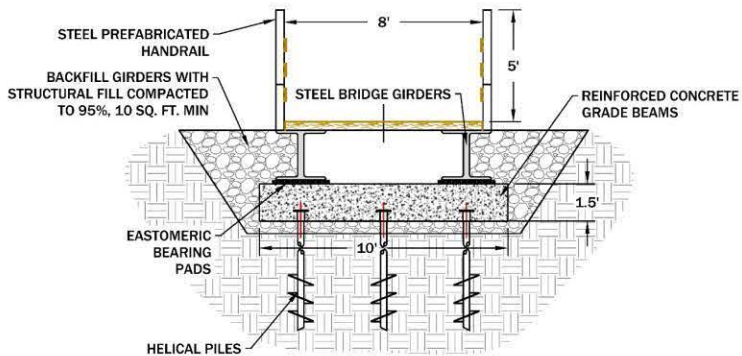
BRIDGE SPECIFICATIONS

BRIDGE ABUTMENTS, BRIDGE DECK, AND ALL CONNECTIONS/FASTENERS SHALL BE PROVIDED BY THE CONTRACTOR AND INSTALLED IN ACCORDANCE WITH THE DESIGN SPECIFICATIONS. DESIGN REPORT AND DRAWINGS SHALL BE PROVIDED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE AND SEALED/SIGNED BY A LICENSED ENGINEER IN THE STATE OF MONTANA. THE FOLLOWING CRITERIA MUST BE INCORPORATED INTO THE DESIGN FOR THE BRIDGE ABUTMENTS, BRIDGE DECK, AND CONNECTIONS/FASTENERS:

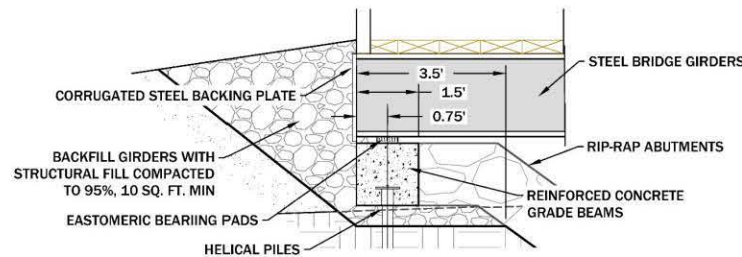
DESIGN LOAD	TBD
MINIMUM CLEAR SPAN OVER STREAM	78.5 FT
MINIMUM CLEAR WIDTH OF BRIDGE DECK W/ HANDRAIL	8 FT
MINIMUM ABUTMENT HEIGHT	13.75 FT
NOMINAL BEARING CAPACITY FOR SOIL	TBD PSF
BRIDGE CARRYING CAPACITY REPORT	TBD



2 NORTH BURNT FORK CREEK BRIDGE
PROFILE VIEW
 1" = 10'



3 NORTH BURNT FORK CREEK BRIDGE
SECTION VIEW A-A'
 1" = 5'



4 GRADE BEAM
INSET VIEW B
 1" = 3'

NOTE:
 PROJECT DATUM (NAVD88)
 THIS LOW CHORD ELEVATION PROVIDES THE TWO FEET OF FREEBOARD REQUIRED BY RAVALLI COUNTY FLOODPLAIN HAZARD MANAGEMENT REGULATIONS (JANUARY 16, 2015, AMENDED OCTOBER 20, 2015), ACCESSED ONLINE:
<https://ravalli.us/DocumentCenter/View/2574/Ravalli-County-Floodplain-Regulations>



BRIDGE DETAILS
 NORTH BURNT FORK CREEK
 FISH PASSAGE RESTORATION PROJECT
 NEAR STEVENSVILLE, MT

NO.	DATE	BY	DESCRIPTION	CHK
0	3/30/22	LS	DRAFT	CN
PRELIMINARY NOT FOR CONSTRUCTION				
PROJECT NUMBER RDG-21-159				
DRAWING NUMBER 8.0				
Drawing of				

Figure 3- 2. Preliminary Bridge Design. Figure created by River Design Group

GENERAL NOTES

1. CONSTRUCTION OF THE VEGETATED WOOD MATRIX WILL OCCUR AFTER THE INFRASTRUCTURE IS REMOVED AND THE DESIGN BANKLINE SUBGRADE ELEVATION IS ESTABLISHED.
2. IF VEGETATED WOOD MATRIX STRUCTURES ARE INSTALLED PRIOR TO OCTOBER 1, LEAVE BACK TRENCH UNFILLED AND COMPLETE STRUCTURE WHEN DORMANT WILLOWS ARE AVAILABLE.
3. IT IS CONTRACTOR'S RESPONSIBILITY TO CUT WOOD INTO APPROPRIATE SIZE LENGTHS TO FIT STRUCTURE DIMENSIONS.
4. ANY CHANGES TO THE CONSTRUCTION SEQUENCE MUST BE APPROVED BY CONSTRUCTION MANAGER.
5. CONTRACTOR SHALL MARK AND CONSTRUCTION ENGINEER SHALL APPROVE THE GENERAL LOCATION FOR EACH VEGETATED WOOD MATRIX STRUCTURE PRIOR TO CONSTRUCTION.

NOTES ON VEGETATED WOOD MATRIX INSTALLATION

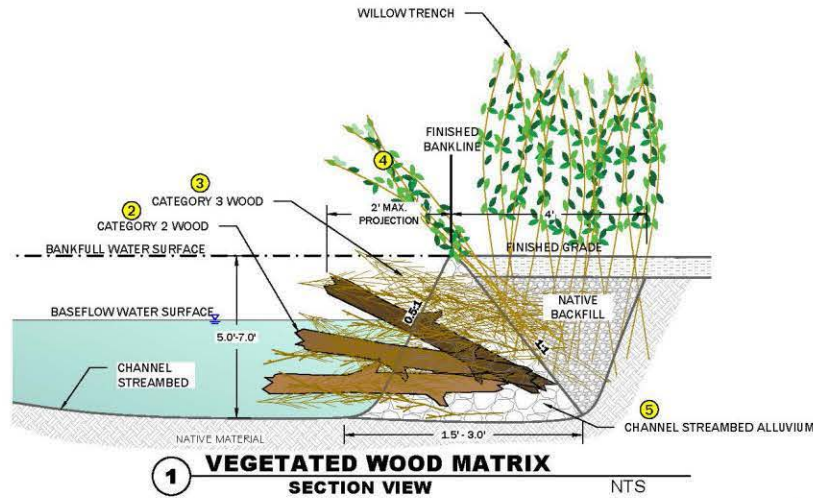
1. EXCAVATE TO THE EXCAVATION LIMITS AS SHOWN. EXCAVATED MATERIAL SHALL BE STOCKPILED ON THE FLOODPLAIN OUTSIDE OF THE IMMEDIATE WORK AREA.
2. PREPARE THE BENCH OF THE STRUCTURE BY PLACING CHANNEL STREAMBED ALLUVIUM FROM THE BASE OF THE EXCAVATION DEPTH, BOTTOM OF EXCAVATION TO WITHIN 1.0 FT. OF FINISHED GRADE.
3. CATEGORY 2 AND CATEGORY 3 WOOD, AND CHANNEL STREAMBED ALLUVIUM SHALL BE PLACED IN ALTERNATING LAYERS AND BUCKET COMPACTED UP TO THE TOP OF BANK ELEVATION AS SHOWN BELOW IN THE INSTALLATION SEQUENCE. PLACE SIX (6) FT TO EIGHT (8) FT. DORMANT WILLOW CUTTINGS AT A DENSITY OF 5 PER LINEAR FT ALONG THE TOP OF BANK LINE ELEVATION. WILLOW CUTTINGS SHALL SLOPE AT AN APPROXIMATE 1:1 SLOPE AS SHOWN IN SECTION VIEW. STEMS MAY OVERLAP. THE CUT ENDS SHALL BE PLACED AT THE BASE OF THE SLOPES WITH THE UN-CUT ENDS EXTENDING BEYOND THE EDGE OF THE TRENCH SO NO GREATER THAN ONE-THIRD OF THE TOTAL CUTTING LENGTH IS EXPOSED BEYOND THE TOP OF BANK EDGE. WILLOW CUTTINGS SHOULD INTERCEPT THE DESIGN TOP OF BANK LINE AS SHOWN IN STEP 5 OF THE INSTALLATION SEQUENCE.
4. THE UPSTREAM AND DOWNSTREAM ENDS OF THE STRUCTURE SHALL TRANSITION SMOOTHLY INTO ADJACENT STREAMBANK STRUCTURES TO MINIMIZE EROSION, FLANKING, AND BANK FAILURE. STRUCTURE ENDS MAY BE STABILIZED WITH ADDITIONAL CATEGORY 1 ROCK AS APPROVED BY ENGINEER.
5. AFTER INSTALLATION OF THE VEGETATED WOOD MATRIX, BACKFILL THE STRUCTURE WITH STOCKPILED MATERIAL TO FINISHED GRADE, AND BUCKET COMPACT. INSTALL WILLOW TRENCHES AT A RATE OF 2 PER LINEAR FOOT (OR 20 PER TRENCH) AS SHOWN. NO AREAS BEHIND THE FINISHED BANKLINE ARE TO BE LEFT BELOW FINISHED GRADE.

STREAMBANK FILL GRADATION

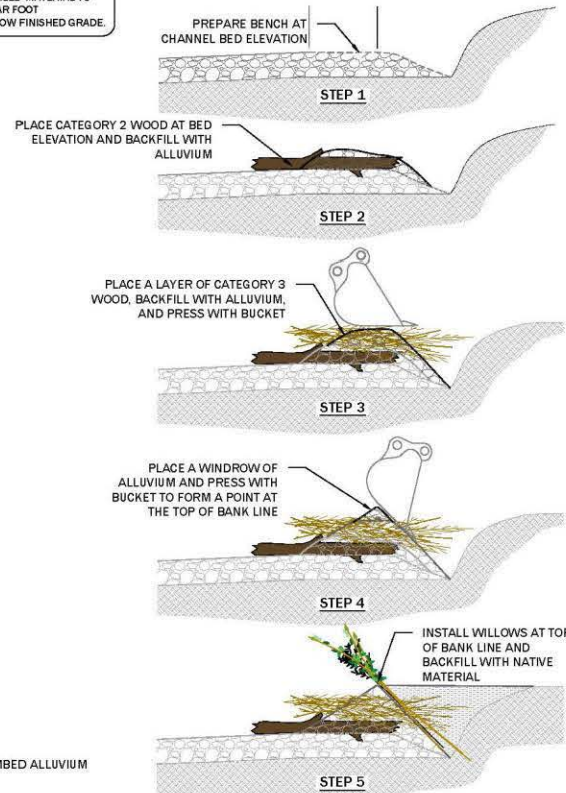
SIZE (INCHES)	PERCENT PASSING	REPRESENTATIVE SIZE CLASS
6	95	D100
5	90-95	D95
4	85-90	D84
3	65 - 85	D65
2	50 - 65	D50
1	30 - 50	D35
0.5	10 - 30	D15
FINES	0-10	

MATERIAL SCHEDULE (PER LINEAR FOOT)

ITEM	DIA.	TYPE 1	QUANTITY	
			TYPE 2	TYPE 3
② CATEGORY 2 WOOD	3" - 6"	0.25	2	-
③ CATEGORY 3 WOOD	< 3"	2	5	0.5
④ WILLOW CUTTINGS	0.25" - 1"	5	5	3
⑤ STREAMBANK ALLUVIUM	6" MINUS	0.2 CY	0.6 CY	-



1 **VEGETATED WOOD MATRIX SECTION VIEW** NTS



2 **RECOMMENDED VEGETATED WOOD MATRIX INSTALLATION SEQUENCE SECTION VIEW** 1" = 5'



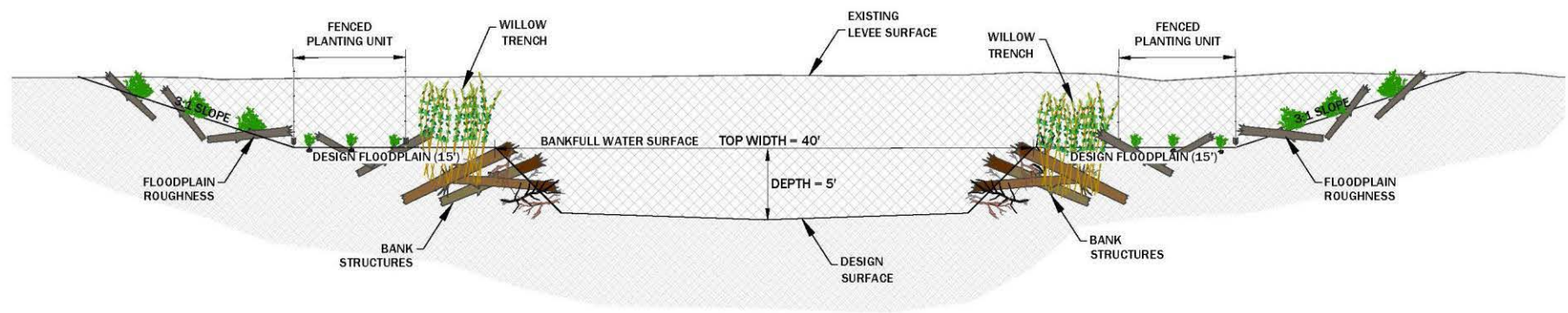
VEGETATED WOOD MATRIX DETAIL
 NORTH BURNT FORK CREEK
 FISH PASSAGE RESTORATION PROJECT
 NEAR STEVENSVILLE, MT

NO.	DATE	BY	DESCRIPTION	CHK
0	3/30/22	TH	50% DESIGN	JMI
			PRELIMINARY	
			NOT FOR CONSTRUCTION	

PROJECT NUMBER
RDG-21-159
 DRAWING NUMBER
7.0
 Drawing 13 of 16

Figure 3-3. Vegetated wood matrix bank treatment. Figure created by River Design Group

CROSS SECTION DETAIL
NORTH BURNT FORK CREEK
FISH PASSAGE RESTORATION PROJECT
NEAR STEVENSVILLE, MT



1 **CROSS SECTION DETAIL AT STA 40+10**
NTS

NO.	DATE	BY	DESCRIPTION	CHK
0	3/30/22	TH	50% DESIGN	JM
PRELIMINARY				
NOT FOR CONSTRUCTION				
PROJECT NUMBER RDG-21-159				
DRAWING NUMBER 6.0				
Drawing 11 of 18				

M:\Projects\2021\RDG-21-159\See Material\WRC\CD\2022-10-20\See Material\Working.dwg

Figure 3-4. Cross section detail at the proposed bridge location (also the site of the water control structure removal,(station 40+10). Figure created by River Design Group

NO.	DATE	BY	DESCRIPTION	CHK
0	3/30/22	TH	50% DESIGN	JM
			PRELIMINARY NOT FOR CONSTRUCTION	

PROJECT NUMBER
RDG-21-159
 DRAWING NUMBER
7.2
 Drawing 15 of 16

CONSTRUCTION NOTES

1. EXCAVATE A 40 FT WIDE BY +\-.1 FT DEEP PRISM INTO THE EXISTING STREAMBED. EXTEND EXCAVATION 10 FT OUT FROM EACH BANKLINE AND TIE INTO EXISTING GROUND.
2. PLACE BOULDER FRAMEWORK FLUSH WITH EXISTING RIFFLE ELEVATIONS 10' APART AS SHOWN.
3. PLACE THE FIRST LIFT OF STREAMBED FILL BETWEEN FRAMEWORK ROCK AND COMPACT USING WEIGHT OF EQUIPMENT.
4. WASH FINES AND WATER FROM ONSITE INTO THE RIVERBED FILL OF THE FIRST LIFT TO SEAL THE VOIDS.
5. PLACE THE SECOND LIFT USING MINIMAL COMPACTION.
6. WASH FINES AND WATER FROM ONSITE INTO THE STREAMBED FILL OF THE FIRST LIFT TO SEAL THE VOIDS.
7. THE ENGINEERED RIFFLE CROSSING SHALL MATCH EXISTING STREAMBED ELEVATIONS ON THE UPSTREAM AND DOWNSTREAM ENDS. THE 10 FT EGRESS FLANKS ON EITHER SIDE OF THE CHANNEL SHALL DAYLIGHT TO EXISTING GROUND FOR SMOOTH TRANSITIONS.

MATERIAL SCHEDULE

ITEM	DIAMETER	QUANTITY
① FRAMEWORK ROCK	12" - 14"	50 EA
② STREAMBED FILL	SEE GRADATION	10 CY

STREAMBED FILL GRADATION

SIZE (INCHES)	PERCENT PASSING
8	100
6	80-90
4	50 - 70
2	20 - 40
1	0 - 10

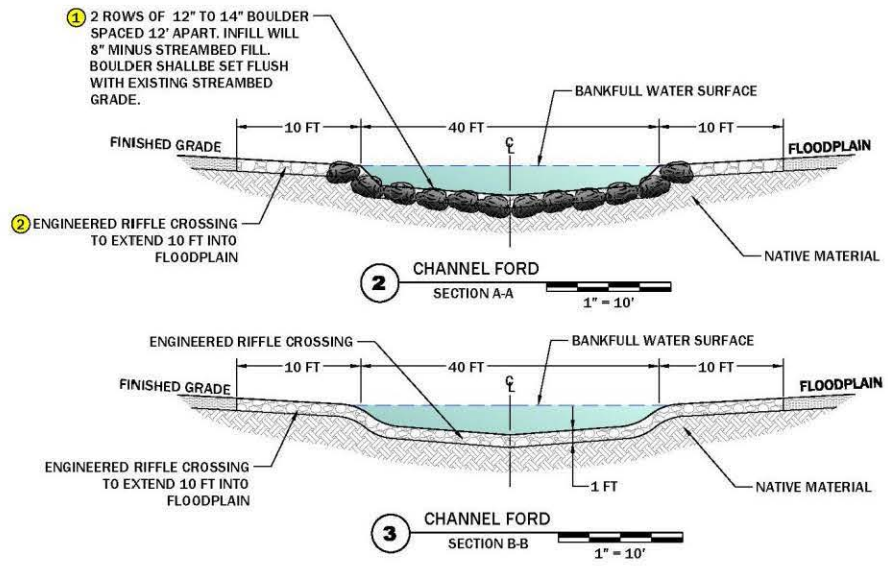
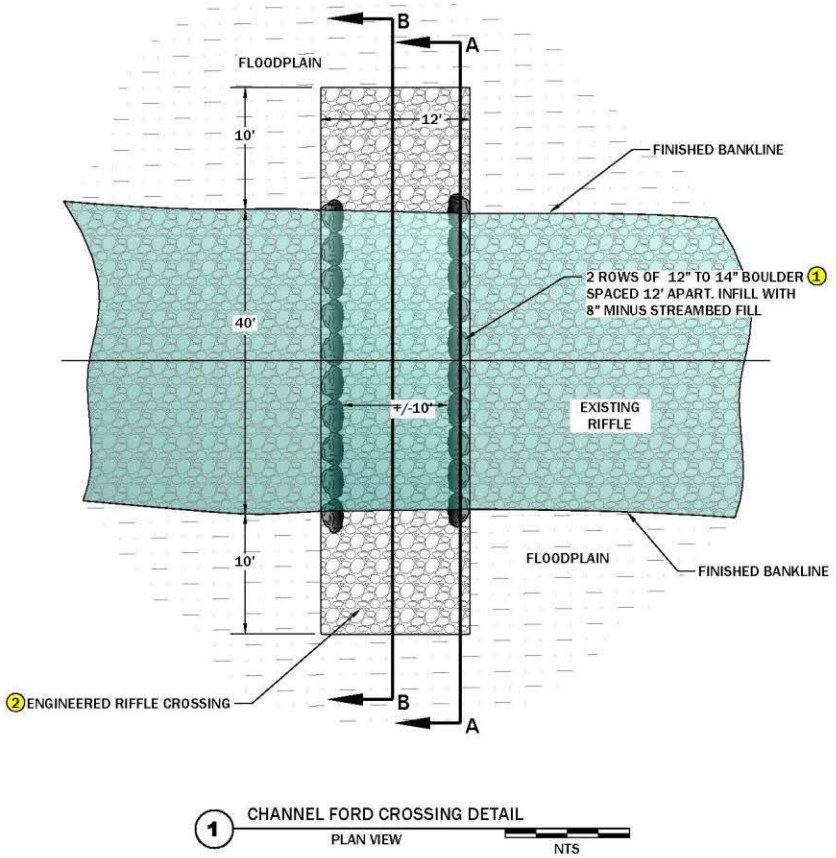
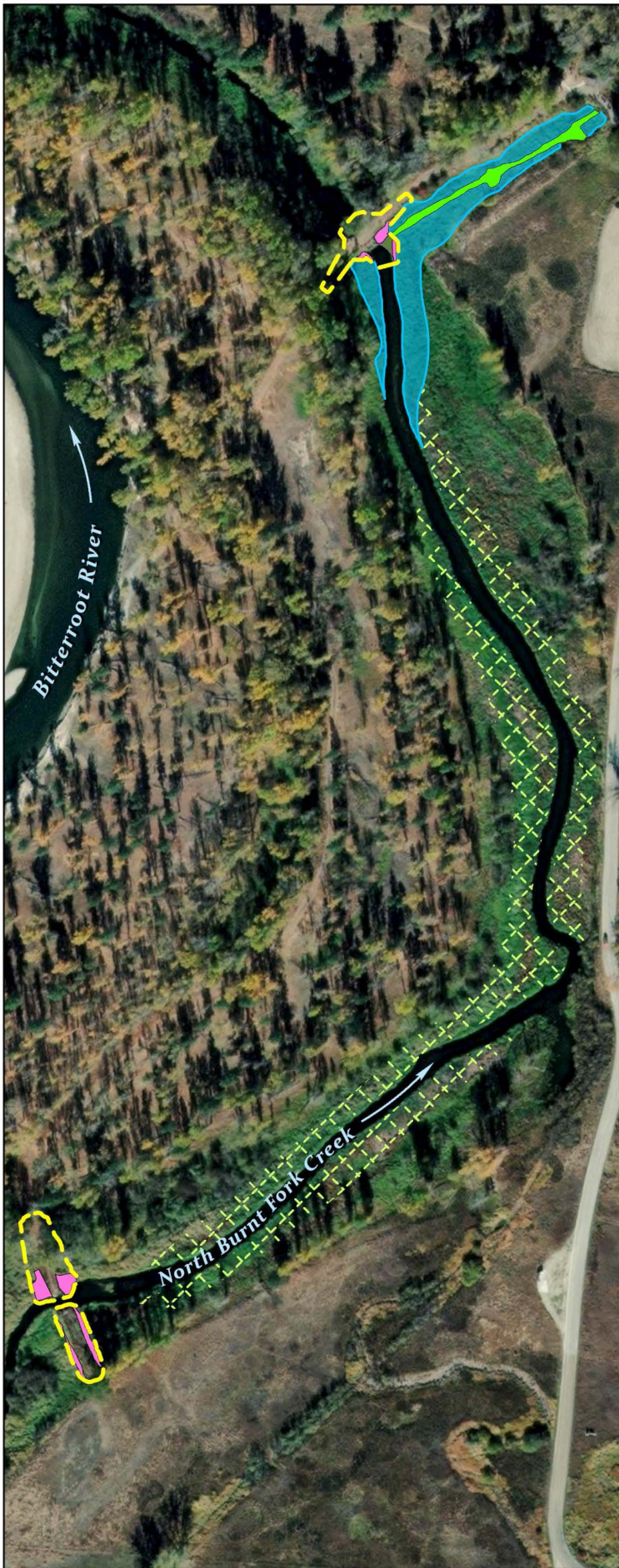


Figure 3-4. Low Water Crossing detail at Station 17+00. Figure created by River Design Group



Figure 3-6. Revegetation Detail. Figure created by Trout Unlimited



Lee Metcalf National Wildlife Refuge

North Burnt Fork Creek
Fish Passage Restoration Project

Wetland Impacts

- Project Grading:**
0.08 acres Temporary Wetland Impact
 Levee and check dam structure removal, retention as emergent wetland

- Reed Canarygrass Removal:**
0.70 acres Temporary Wetland Impact
 Excavation of reed canarygrass sod mat, revegetation with native wetland species including emergent vegetation, willow shrubs, and cottonwood trees

- North Overflow Channel Regrading:**
0.11 acres Permanent Riverine Impact
 Permanent conversion from riverine classification to emergent wetland, revegetation with native sedges and rushes

- Project Grading Extent**

Acres Within Wetland Impact Areas and Project Grading Extents

Classification	Existing Area (Acres)	Proposed Area (Acres)	Change to Area (Acres)
Emergent Wetland	0.78	0.57	-0.21
Scrub-Shrub Wetland	0.00	0.40	+0.40
Riverine Ditch (Waters of the U.S.)	0.11	0.00	-0.11
Total	0.89	0.97	+0.08



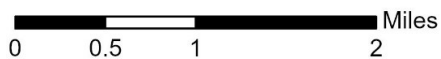
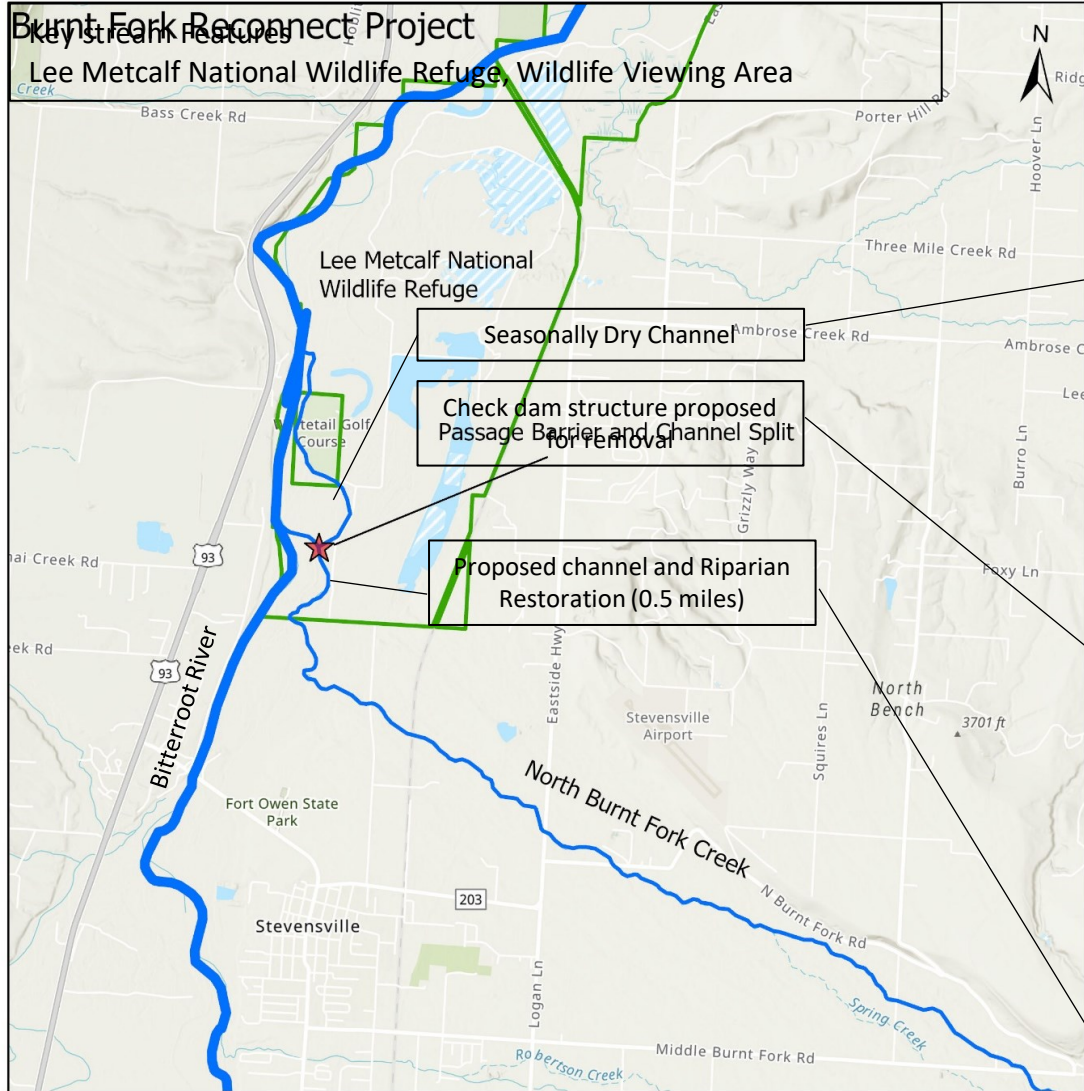
Dispersed Willow and Cottonwood Planting

No excavation or fill activity; willow cuttings and cottonwood trees planted in dispersed pattern throughout floodplain



2022.12.01. River Design Group, Inc.

Figure 4-1. Wetland impacts of the Proposed Action. Figure by River Design Group.



Legend

- North Burnt Fork Creek
- Bitterroot River
- Lee Metcalf National Wildlife Refuge
- Bitterroot Watershed

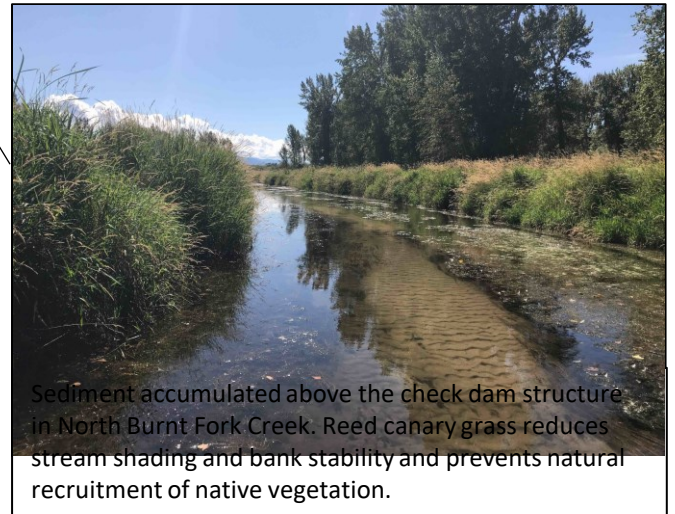
Bitterroot Watershed, MT



The northern channel of North Burnt Fork Creek, downstream of the channel split, which dewateres most summers.



Relic check dam, altering natural flow and sediment regimes and preventing fish migration.



Sediment accumulated above the check dam structure in North Burnt Fork Creek. Reed canary grass reduces stream shading and bank stability and prevents natural recruitment of native vegetation.

Figure 4-2. Map of key stream features including North Burnt Fork Creek and it's split at the water control structure creating a western (primary) and northern (secondary, seasonal) channel.

Appendix B: Intra-Service Section-7 Biological Evaluation -

Intra-Service Section – 7 Biological Evaluation

Originating Person: Tom Reed

Date Submitted: August 17, 2022

Telephone Number: 406 777-5552, 205

I. **Service Program and Geographical Area or Station Name:** Lee Metcalf National Wildlife Refuge (Ravalli County)

II. **Flexible Funding Program (e.g. Joint Venture, etc.) if applicable:** Not applicable

III. **Location:** Ravalli County, MT, T9N, R20W, E1/2 S15.

IV. **Species / Critical Habitat:** List federally endangered, threatened, proposed, and candidate species or designated or proposed critical habitat that may occur within the action area.

<i>Species</i>	<i>Status</i>	<i>Relevance</i>	<i>Critical Habitat</i>
Canada Lynx (<i>Lynx canadensis</i>)	Threatened	no suitable habitat	none designated
Grizzly Bear (<i>Ursus arctos horribilis</i>)	Threatened	Recovery Area	proposed
Wolverine (<i>Gulo gulo luscus</i>)	Proposed	no suitable habitat	none designated
Bull Trout (<i>Salvelinus confluentus</i>)	Threatened	Historically migrated from Bitterroot River up North Burnt Fork Creek to spawn	North Burnt Fork Creek and the Bitterroot River
Bull Trout Critical Habitat	Designated	Recovery Area	Burnt Fork Creek and the Bitterroot River
Yellow-billed Cuckoo (<i>Coccyzus americanus</i>)	Threatened	Suitable habitat; spp. never documented	outside of designated critical habitat
Monarch Butterfly (<i>Danaus plexippus</i>)	Candidate	found on Refuge no habitat in project area	none designated

V. Project Description:

As described in the Comprehensive Conservation Plan (CCP) for the Lee Metcalf National Wildlife Refuge (USFWS 2012) and the Intra-Service Section-7 Biological Evaluation for implementing this CCP (Attachment A), the Refuge's goals include restoring in-stream habitat in North Burnt Fork Creek. This Intra-Service Section-7 Biological Evaluation provides the site-specific information on how this restoration would occur.

The restoration site is near the confluence of North Burnt Fork Creek and the Bitterroot River in the Refuge's Wildlife Viewing Area (T9N, R20W, NW ¼ E ½ S15; map, attachment B). North Burnt Fork Creek has been dammed and diverted in this area of the Refuge for the purpose of creating waterfowl habitat.

This restoration proposal would remove this stop-log culvert dam and restore connectivity of North Burnt Fork Creek with the Bitterroot River. As described in the April 4, 2022, memorandum and 1-D modelling Results from River Design Group (Attachments B and C), this relic dam bifurcates the flow and impedes fish passage between North Burnt Fork Creek and the Bitterroot River. The proposed culvert removal would provide fish passage where it currently does not exist.

The proposed Creek restoration would remove two, 48" culverts with attached 72" stoplog risers and replace them with a pedestrian bridge. The stoplog riser structures have trapped sediment upstream of the culverts for years and this has often been exacerbated by the Supply Ditch annually purging sediment and debris from the Ditch each spring into North Burnt Fork Creek. It is anticipated that removal of the culverts and risers would result in an increase in the velocity of North Burnt Fork Creek for a very short distance at the site of removal and then decrease velocity just downstream of the removal site. Removal of the culverts would result in an estimated 720 yards of sediment passively evacuating from the North Burnt Fork channel during subsequent high flow events. If a gravel bar downstream of the culverts mobilizes, an additional 520 cubic yards of sediment could also evacuate over time. Passive evacuation of sediment is preferable to mechanical removal because it allows work to occur without complete channel dewatering and does not require equipment to enter the creek. The volume of sediment estimated to enter the Bitterroot River (maximum of 1240 cubic yards) is minimal in the context of the natural sediment flux in the Bitterroot River each spring. Several measures are in place to ensure that in-stream impacts from construction are minimal and temporary. In-stream work will only occur during the July 15-September 15 fish window. Additionally, cofferdams will be constructed at the culvert/stoplog location to provide localized dewatering during removal and bridge construction. Stormwater and erosion control structures (e.g. silt fence and silt curtain) will also be in place to limit sediment impacts to the immediate construction area.

The proposal would also remove a portion of a levee approximately 2,300 feet upstream that restricts overbank flow of Burnt Fork Creek and the Bitterroot River. The levee, which at one time supported a bridge across North Burnt Fork Creek, would be gradually sloped in order to create a low-water crossing to facilitate equipment access to this portion of the Refuge when the pedestrian bridge replaces the existing levee over the culverts.

Restoration of the banks of Burnt Fork Creek upstream and downstream of the culvert removal area would include extensive native riparian shrub and tree planting and reed canary grass (*Phalaris arundinacea*) exclusions (Attachment C).

VI. Determination of Effects

(A) Description of Effects. Describe the action(s) that may affect the species and critical habitats listed in item IV. Your rationale for the Section 7 determinations made below (B) should be fully described here.

Canada Lynx

There is no suitable habitat for Canada Lynx on or near the Refuge nor has a Canada Lynx ever been sighted on the Refuge. The proposed project would occur on the floodplain of North Burnt Fork Creek which is not suitable habitat for Canada Lynx.

Grizzly Bear

Grizzly bears were extirpated from the Bitterroot Valley prior to their listing as threatened in 1975. The Bitterroot Valley, which encompasses the Refuge, as well as the Bitterroot and Sapphire Mountains that enclose the Valley are included in the Bitterroot Ecosystem, one of the six landscape Grizzly Bear Recovery areas. Grizzly bears are known to periodically move through the Bitterroot and Sapphire mountains and, in October of 2018, a two year old male grizzly bear was trapped by the Montana Department of Fish, Wildlife, and Parks on the Whitetail golf course, a private inholding in the Refuge. There are no known home-ranges of grizzly bear in the Bitterroot Valley. Because of the urban and agricultural development on the Bitterroot Valley floor, grizzly bears travelling through this area would likely be dispersing and nomadic in nature.

Because the proposed project area is within the Wildlife Viewing Area, a portion of the Refuge that receives intense public visitation throughout the year, it is highly unlikely that a grizzly bear would establish a home-range that included this habitat. It is possible however, that a dispersing grizzly bear would use the habitat adjacent to the WVA transitionally as it moved across the Bitterroot Valley.

Wolverine

Wolverines are solitary and avoid roaded or open areas and areas of development. They are opportunistic feeders and rely on a variety of carrion, small mammals, birds, eggs, and fruits. Wolverines are primarily limited to alpine tundra and boreal and mountain forests and depend on deep, persistent, and reliable spring snow cover. They also prefer habitats with abundant snags and downed logs, high topographic complexity and low to no human activity. This type of habitat is found at the higher elevations of the Bitterroot and Sapphire Mountain ranges and wolverines do inhabit these ranges.

Wolverines have not been documented on the Bitterroot Valley floor nor on the Refuge. It is highly unlikely that a wolverine would use the Refuge, yet remotely possible that a dispersing individual would travel through the Refuge. Because the proposed project is within the intensely visited Wildlife Viewing Area, it is highly unlikely that the proposed project would affect wolverine.

Bull Trout and Bull Trout Critical Habitat

On September 30, 2011, the Service designated 18,795 miles of streams and 488,252 acres of lakes and reservoirs in Idaho, Oregon, Washington, Montana, and Nevada as critical habitat for bull trout. The Bitterroot River and Burnt Fork Creek are both located within this designation. Bull trout are primarily restricted to the upper reaches of North Burnt Fork Creek, approximately 11 miles upstream of the Refuge and mainly on U.S. Forest Service (Forest) land, because of dammed and diverted waterflows, sedimentation, and increased water temperatures in the creek. North Burnt Fork Creek is also co-mingled with Supply Ditch water, upstream of the Refuge, where at times, the entire creek flow is captured by the Ditch. This junction of co-mingling creates an impassable fish barrier. Upstream of the Supply Ditch and downstream of the Forest, creek realignment to facilitate irrigation has decreased the suitability of habitat by making multiple shallow, narrow, and ditch-like channels of the creek.

The proposed project would help re-connect the lower portion of North Burnt Fork Creek to its historical channel alignment and eliminate one fish barrier. The proposal would restore riverine habitat to a portion of the creek that has been impounded and managed as wetland habitat for many years.

Yellow-billed Cuckoo

The Refuge is within the range of the yellow-billed cuckoo and supports habitat that could be used by Yellow-billed Cuckoos. Despite tens of thousands of avid birders visiting the Refuge annually, the species has never been documented on the Refuge. The proposed riparian restoration associated with the project would, over decades, increase the suitability of the Wildlife Viewing Area habitat for yellow-billed cuckoo.

Monarch Butterfly


Adult monarch butterflies require nectar rich flowers for feeding and milk weed (*Asclepias* spp. and *Funastrum* spp.) for egg-laying. Monarch butterfly larvae are obligate feeders of milk weed plants. In 2019, an inventory of the Refuge’s showy milkweed (*Asclepias speciosa*) was conducted weekly from June through September to determine Monarch butterfly presence. The Refuge’s seven dominate patches of showy milkweed were monitored, none of which occur within the Wildlife Viewing Area of the Refuge. One monarch larvae was documented on the Refuge, approximately 1.5 miles north of the Wildlife Viewing Area. The proposed project would not affect the Refuge’s showy milkweed stands nor nectar-rich native wildflowers.

(B) Determination. Determine the anticipated effects of the proposed project on species and critical habitats listed in item IV. Check all applicable boxes and list the species (or attach a list) associated with each determination.

	Determination
<p><i>No Effect:</i> This determination is appropriate when the proposed project will not directly or indirectly affect (neither negatively nor beneficially) individuals of listed/proposed/candidate species or designated/proposed critical habitat of such species. No concurrence from ESFO required.</p>	
<p>Canada Lynx, Wolverine, Yellow-billed Cuckoo</p>	<p><u> X </u></p>
<p><i>May Affect but Not Likely to Adversely Affect:</i> This determination is appropriate when the proposed project is likely to cause insignificant, discountable, or wholly beneficial effects to individuals or listed species and/or designated critical habitat. Concurrence from ESFO required.</p>	
<p>Grizzly Bear, Bull Trout, Bull Trout Designated Critical Habitat, Monarch Butterfly</p>	<p><u> X </u></p>
<p><i>May Affect and Likely to Adversely Affect:</i> This determination is appropriate when the proposed project is likely to adversely impact individuals of listed species and/or designated critical habitat. Formal consultation with ESFO required.</p>	
<p><i>May affect but Not Likely to Jeopardize candidate or proposed species/critical habitat:</i> This determination is appropriate when the proposed project may affect, but is not expected to jeopardize the</p>	

continued existence of a species proposed for listing or a candidate species, or adversely modify an area proposed for designation as critical habitat. Concurrence from ESFO optional.

Likely to Jeopardize candidate or proposed species/critical habitat: This determination is appropriate when the proposed project is reasonably expected to jeopardize the continued existence of a species proposed for listing or a candidate species, or adversely modify an area proposed for designation as critical habitat. Conferencing with ESFO required.

Signature  Date 8/17/22
Tom Reed, Refuge Manager

Reviewing Ecological Services Office Evaluation (check all that apply)

A. Concurrence _____ Nonconcurrence _____

Explanation for nonconcurrence:

B. Formal consultation required _____

List species or critical habitat unit

C. Conference required _____

List species or critical habitat unit

Signature _____

Date _____

Ecological Services Supervisor

Endangered Species Act Species

There is a total of 6 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Canada Lynx <i>Lynx canadensis</i> Population: Wherever Found in Contiguous U.S. There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3652	Threatened
Grizzly Bear <i>Ursus arctos horribilis</i> Population: U.S.A., conterminous (lower 48) States, except where listed as an experimental population There is proposed critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/7642	Threatened
North American Wolverine <i>Gulo gulo luscus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5123	Proposed Threatened

Birds

NAME	STATUS
Yellow-billed Cuckoo <i>Coccyzus americanus</i> Population: Western U.S. DPS There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Fishes

NAME	STATUS
Bull Trout <i>Salvelinus confluentus</i> Population: U.S.A., conterminous, lower 48 states There is final critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8212	Threatened

Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Bull Trout <i>Salvelinus confluentus</i> https://ecos.fws.gov/ecp/species/8212#crithab	Final