

FINAL ENVIRONMENTAL ASSESSMENT AMENDMENT



JEFFRIES NO. 18 MINE TIPPLE RECLAMATION AND MUSSELSHELL RIVER RESTORATION PROJECT MUSSELSHELL COUNTY, MONTANA

PREPARED BY:

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

ABANDONED MINE LANDS PROGRAM

REMEDIATION DIVISION

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IN COOPERATION WITH

UNITED STATES DEPARTMENT OF THE INTERIOR

OFFICE OF SURFACE MINING RECLAMATION AND ENFORCEMENT

CASPER, WYOMING FIELD OFFICE

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Acronym List

<u>Acronym</u>	<u>Meaning</u>
AML	Abandoned Mine Lands
amsl	above mean sea level
ATP	Authorization to Proceed
bgs	Below Ground Surface
BMP	Best Management Practices
CFS	cubic feet per second
DEQ	Department of Environmental Quality
EA	Environmental Assessment
EE/CA	Expanded Engineering Evaluation/Cost Analysis
EPA	Environmental Protection Agency
EIQ	Environmental Impact Quotients
Ft	Feet/Foot
FONSI	Finding of No Significant Impact
gpm	gallon per minute
LMCD	Lower Musselshell Conservation District
MWC	Musselshell Watershed Coalition
NRHP	National Register of Historic Places
OSMRE	Office of Surface Mining Reclamation and Enforcement
PABFh	Palustrine, Aquatic Bed, Semi-Permanently Flooded
RCRA	Resource Conservation and Recovery
Rp1FO	Riparian Forested
Rp1SS	Riparian Scrub-Shrub

SMCRA	Surface Mining Control and Reclamation Act
SPA 124	Stormwater Permit
TMDL	Total Maximum Daily Load
USFS	United States Forest Service
USGS	United States Geological Survey
uS/cm	Micro Siemens per Centimeter
mg/L	Milligrams per Liter
ug/L	Micrograms per Liter
USFWS	United States Fish and Wildlife Services
USBLM	United States Bureau of Land Management
SHPO	State Historic Preservation Office

DESCRIPTION OF PROPOSED ACTION AND NEED FOR PROPOSED ACTION

The purpose of this Environmental Assessment (EA) is to document the potential environmental impacts that could result from the proposed Jeffries No. 18 Mine Tipple Reclamation Project (Figure 1). In accordance with the Montana Abandoned Mine Reclamation Plan, as amended July 19, 1995 (Federal Register Vol. 60 No. 138 pg. 36998), the Montana Department of Environmental Quality, Abandoned Mine Lands (DEQ-AML), is proposing to complete the removal of tipple remains and waste coal followed by the restoration of the Musselshell River floodplain. The tipple remains include a road prism, concrete foundation, and a railroad grade. The tipple and the railroad grade have prevented the Musselshell River from connecting with its floodplain. The site exacerbates flooding in the City of Roundup, Montana. Significant flooding occurred in 2011 and 2014. Flooding also results in waste coal eroding into the river, which degrades water quality. DEQ-AML has determined that there are significant negative potential impacts to the area due to the tipple remains. The proposal will need to be approved by an Authorization to Proceed (ATP) issued by the Office of Surface Mining Reclamation and Enforcement (OSMRE) after issuance of a Finding of No Significant Impact (FONSI) before grant funds can be expended to fund this project.

This effort will improve the quality of both public (City of Roundup) and private lands. Eligibility for the abandoned mine reclamation fund is based on extensive coal mining which included the installation of the tipple. The Jeffries No. 18 Mine (Jeffries No. 18 Mine) has had previous reclamation completed in 1990, which included sealing one adit opening, backfilling of a subsidence feature, neutralization of surface coal slack/waste, placement of topsoil and seeding and fertilizing. In 2011, an additional subsidence feature was identified. Access to the site was limited due to extensive flooding and damage to Number 4 Road. The subsidence was reclaimed in October 2011.

Following the 2011 flooding, the Musselshell Watershed Coalition (MWC) and the Lower Musselshell Conservation District (LMCD) completed an Engineering Evaluation and Cost Analysis (EE/CA) on the Roundup Reach of the Musselshell River (Pioneer, 2016). The EE/CA evaluated five projects along the Musselshell River, including the Jeffries No. 18 Mine site. The EE/CA states that under current conditions the tipple site is a high point in the floodplain and that removing the tipple and the road prism would alleviate the split flows caused by the fill and local increases in overbank flow velocities. The feature has been categorized as a Priority 1 Clogged Stream due to its potential risk to downstream resources, including property and environmental degradation and a Priority 2 hazardous equipment location due to the tipple foundation within the river.

Project Location

Jeffries No. 18 Mine is located approximately 0.5 miles east of the City of Roundup (Figures 1 and 2). The elevation of the tipple is approximately 3,150 feet above mean sea level (amsl). The tipple is in the Northwest $\frac{1}{4}$ of the Southwest $\frac{1}{4}$ of Section 18, Township 8 North, Range 26 East in Musselshell County, Montana. The tipple foundation is located at 46.445835° north and -108.523668° west. The tipple site is in the floodplain of the Musselshell River. The Musselshell River flows east-northeast to the Missouri River and Fort Peck Reservoir.

Project History

The Jeffries No. 18 Mine was first acquired by John W Newton in 1906 (GCM, 1984) (Figure 2). There is no evidence that Newton developed a mine on this site. The first mining on the site was completed on the site as the M&M Mine. This mine was unsuccessful and never went into commercial production.

The first mining at the site took place in the 1920s. In 1928, the mine was acquired by the Jeffries Coal Mining Company (Bull Mountain Coal Field Cultural Report, GCM 1984). Production began in March 1929 and continued until 1940 when the mine was flooded by spring runoff flooding the Musselshell River and the mine. High water during the 1940 spring runoff flooded the mine and it never reopened. There are no standing structures and only the foundation of the tippie remains in place. There is no physical evidence from the mine facility of significant historical or technological interest, therefore, the tippie was not recommended for listing on the National Register of Historic Places (NRHP). However, adjacent to the tippie location is the old grade of the Chicago, Milwaukee and St. Paul Railroad (C.M. & St. Paul), which has been determined Eligible under Criterion A of the NRHP. The proposed work to reclaim the tippie location would involve the removal of waste coal from the railroad grade as well as providing access for work at the site. Based on channel migration evaluations this area must be lowered to reduce flooding risks.

ALTERNATIVES CONSIDERED

Alternative 1 – Removal of Tipple, Road Prism, Waste Coal and River Restoration

Under this alternative, the OSMRE Field Office Director would approve removal of the tipple remains, road prism, waste coal, and restoration of the Musselshell River in the amount of \$242,000. Although site conditions have changed due to flooding in 2018, the approach to completion of this project is intact. The Applied Geomorphology Technical Memo in Attachment D summarizes current site conditions and the restoration goals. Under this alternative, OSMRE would authorize construction activities by Montana DEQ-AML in implementing the abandoned mine land reclamation proposal described below.

The purpose of this restoration project is to limit reduce the flooding impacts to the City of Roundup. The restoration project includes excavation and disposal of approximately 3,700 cubic yards of waste material from the road prism adjacent to the Musselshell River, removal of the tipple foundation, and restoration of the Musselshell River through excavation, shaping, and grading the meander tab to its approximate pre-mining condition. Once the road prism, tipple foundation, and waste coal are removed, the Musselshell River channel will be reconstructed and the site will be vegetated.

Excavated material not required for grading the site will be properly disposed of off site. Disturbed areas will be seeded, fertilized and mulched.

Work will include incidentals necessary to complete the project.

The proposed time schedule for this alternative is:

Summer 2017	Completed site investigation to determine volume of material, disposal opportunities for waste material, and collect stream and survey information for final design
Fall/Winter 2018	Complete site inspection with Applied Geomorphology, project engineer, and property owner. Complete technical memo and incorporate into final Environmental Assessment. Submit this Final Environmental Assessment following public comment. Finalize design documents, complete bid process, select contractor, and complete required permitting
Fall 2019	Complete construction activities and complete construction completion report

2019 - 2020

Project monitoring to include weed spraying as necessary

Under the oversight of DEQ-AML, a professional engineering firm licensed in Montana will complete an engineering design for the project and construction services will be solicited by a public bidding process. After the construction contract is awarded, and construction begins, a full-time construction inspector will be on-site to ensure quality control. Construction will be completed in a single construction season. Weed control and long-term maintenance will be completed by DEQ AML.

This alternative is considered in conjunction with other efforts planned by Musselshell County, which includes rerouting Number 4 Road to a location outside the floodplain. This will provide access to the Number 4 Road bridge and Route 12 during flood events.

Alternative 2 – No Action

Under this alternative, OSMRE would deny a Federal grant in the amount of \$242,000 to implement the Jeffries No. 18 Mine Tipple Reclamation and Musselshell River Restoration Project as described in Alternative 1. Under this scenario, the pre-Surface Mining Control and Reclamation Act (SMCRA) era disturbances within the Musselshell River would continue to exacerbate flooding in the City of Roundup and waste coal would continue to impact the surface water quality of the Musselshell River.

AFFECTED ENVIRONMENT

General Setting

The Musselshell River watershed covers 9,471 square miles. The watershed basin area from the headwaters to downstream of the City of Roundup is 3,998 square miles (Pioneer, 2016). Snowpack in the Crazy, Castle, Little Belt, and Big Belt mountain ranges are the primary source of water to the river (Figure 3).

Jeffries No. 18 Mine Tipple is located on a meander tab in the Musselshell River floodplain. The tipple area is designated as a riparian scrub-shrub wetland. The elevation of the site is approximately 3,150 ft. amsl. It is bounded to the north by a former C.M. & St. Paul railroad grade and to the south by the Musselshell River. The site is accessed by travelling 0.5 miles east of the City of Roundup on Number 4 Road.

The Musselshell River flows eastward in this reach. Flooding occurs throughout the drainage. However, it is exacerbated near the City of Roundup due to flow restrictions at the Jeffries No. 18 Mine and the Davis Mine on Meathouse Road. The restrictions are caused by changes in elevation of the floodplain during development of mining structures. The lowest flows in the river are during December and January (median flows 63 cubic feet per second (cfs)). The highest flows are in May and June (median flows of 352 and 701 cfs respectively). The highest flows recorded at the City of Roundup occurred in May 2011 (15,000 cfs) and May 2014 (10,800 cfs), each 100-year flood events ([U.S. Geologic Survey Water Data](#)) (Figures 4, 5, and 6). In 2011, the City of Roundup had two 100-year flood events in May and June respectively. The annual median discharge for the City of Roundup area from 1947 through 2016 is 161.25 cfs (USGS, 2017)



Figure 4 Aerial photo of City of Roundup during 2011 flood (Montana Department of Transportation 2011).



Figure 6 Aerial photo of City of Roundup during 2014 flood (Kestrel Aerial, 2014).

The meander tab has been modified to support the tipple. Coal was mined south of the river and transported across the river to the tipple where it was loaded on train cars. The modifications included placing an elevated road prism from the railroad grade to the tipple. The highest point on the tipple is 15 to 20 feet above the base flow of the river.

The Musselshell River is classified as a Class C-3 stream. Waters classified C-3 are to be maintained suitable for bathing, swimming and recreation, and growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl and furbearers. The quality of these waters is naturally marginal for drinking, culinary and food processing purposes, agriculture and industrial water supply. Degradation which will impact established beneficial uses will not be allowed (DEQ, 2007). The Musselshell River is fully supporting primary contact recreation, but not fully supporting aquatic life due to alteration in stream-side covers with probable sources including hydrostructure flow regulation-modification, channelization, streambank modifications-destabilization, habitat alterations and various metals impacts.

Regional and Local Geology

The City of Roundup and the Jeffries No. 18 Mine are in the Bull Mountain Basin (USGS, 1999). The Bull Mountain Basin is an east-west trending asymmetrical syncline within the Paleocene Fort Union Formation. The basin is relatively small (750 square miles) relative to other coal-producing basins in the region (e.g. Powder River) and the coal seam is thinner (approximately 17 feet). Coal was produced

continuously in the Bull Mountain Basin between 1907 and 1960 and between 1970 and mid-1997. Stratigraphically, the Bull Mountain Basin is located with the Tongue River member of the Fort Union Formation. The Tongue River is underlain by the Lebo Member.

Hydrogeologic Setting

Jeffries No. 18 Mine is located within the floodplain of the Musselshell River. Well logs indicate that alluvial deposits are found on the north side of the river. These deposits include clay, silt, and sand at the surface and gravels at depth. Overburden in the area is approximately 16 to 30 feet (ft.) in depth. The overburden overlays shale and siltstone of the Fort Union Formation. Depth to groundwater ranges from 6 to 8 ft. below ground surface (bgs) north of the river. Groundwater and surface water interaction varies with the time of year and the amount of rain and snow melt. The shallow depth to groundwater may result in some input into the river during periods of high precipitation. During late summer and fall the river is likely losing water to the subsurface.

Surface Water Hydrology

The Jeffries No. 18 Mine tippie lies within the floodplain of the Musselshell River. The Musselshell River flows east from its headwaters in the Snowy, Crazy, and Castle Mountains and then northeast to its confluence with the Missouri River at the Fort Peck Reservoir. The Musselshell River watershed includes mountains, valleys, and plains. The areas in the headwaters and along reaches of the river and its tributaries are forested while the plains are dominated by rangeland and cultivated lands. Elevations range from 8,000 feet in the mountains to approximately 2,000 feet at the Fort Peck Reservoir. Average precipitation in the City of Roundup, Montana since 1938 is [12.79 inches \(U.S. Department of Agriculture, 2017\)](#). Precipitation in the basin generally increases with elevation ranging from less than 15 inches on the plains to more than 50 inches annually in the mountains (USBR, 1998). Stream flows in the river are supplied by snowmelt. Peak flows occur in May and June and low flows occur in late summer and fall. Natural flow patterns have been altered by irrigation practices including the development of three reservoirs in the 1930s – Deadmans Basin, Martinsdale, and Bair. From upstream to downstream the towns of Ryegate, Roundup, and Melstone draw water from the river for public use and irrigation.

A summary of peak discharges of the Musselshell River is provided in Figure 7 from 1946 to 2016. Figure 8 illustrates the peak flows from the 2011 and 2014 floods.

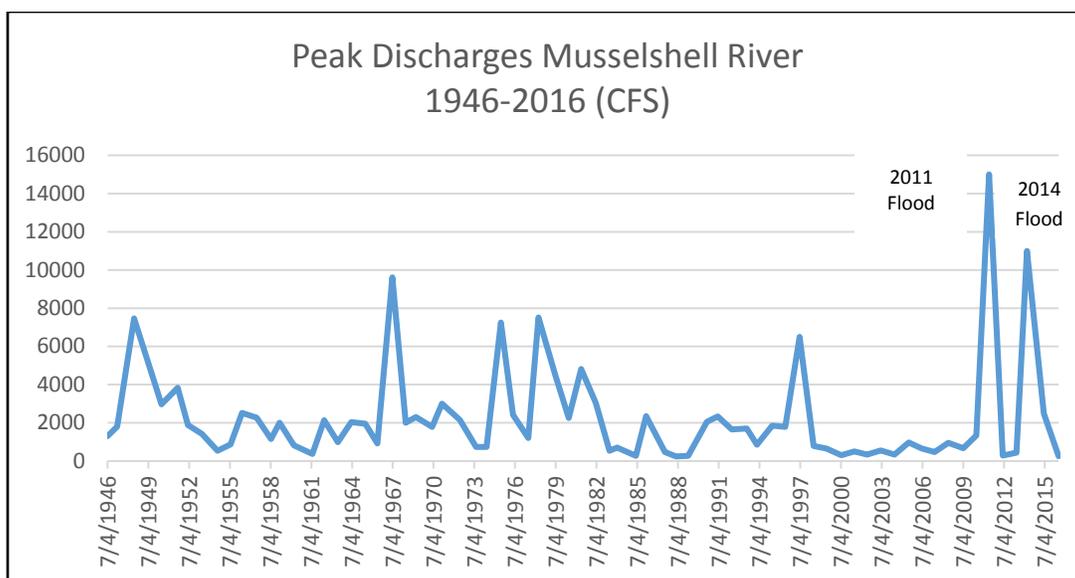


Figure 7 Peak discharges in Musselshell River near Roundup, Montana, 1946-2016 (USGS, 2018).

Significant alteration of the Musselshell River occurred during the construction of the C.M. & St. Paul Railroad. The railroad extended from Melstone upstream through Harlowton and up the South Fork Musselshell to Ringling (Pioneer, 2015). During construction, the river was straightened and shortened to accommodate the railroad right of way. Railroad construction shortened the river by about 19 percent upstream of Melstone, MT (AGI and RATT, 2012). During the 20th Century, the river became down cut and entrenched, with floodplain clearing for agriculture synchronously reducing perched floodplain integrity. The right of way isolated portions of the historic river channel and floodplain from the active channel. During the 2011 flood, flood flows spread across the entire floodplain. There was little resistance to the high shear stress causing many avulsions and channel shortening that left an over-steepened and erosive stream channel. Approximately 35 miles of channel length was removed in 2011. The result was the entrenchment of the river and elimination of its access to its floodplain. The river continues to migrate trying to access its floodplains. This is especially true in the downstream alluvial portions of the river.

While the rate of change was anticipated to be gradual, two successive floods in 2014 and 2018 have accelerated the process through additional downcutting and bank erosion (AGI, 2018). The downcutting and bank erosion resulted in massive volumes of bedload transported downstream. Increased sediment delivery coupled with high flows in 2014 and 2018 drove rapid point bar formation and bank erosion, causing channel migration, lengthening, and inset floodplain formation within the incised channel. These rapid changes have impacted landowners in the river corridor and accelerated the development of salt cedar which reduces development of woody riparian habitat.

A thorough evaluation of recent modification of the river corridor is provided in Attachment D..

Vegetation

Riparian and emergent wetland communities occur in the area immediately adjacent to the Musselshell River. The river is narrowly bounded by various wetland types including riparian scrub-shrub/forested (Rp1SS and Rp1FO), freshwater emergent wetlands (PEMF), and freshwater scrub-shrub (Figure 9). Rp1SS wetlands are located adjacent to streams with intermittent or perennial water flow that is dominated by woody vegetation that is less than 20 feet tall. An example of an Rp1SS wetland would be a wetland adjacent to a stream and dominated by willows. Rp1FO wetlands are also located adjacent to streams. However, the woody vegetation (typically cottonwoods) is greater than 20 feet tall. In Montana, PEMF wetlands includes all wetlands dominated by trees, shrubs, and emergent herbaceous vegetation with surface water present throughout the growing season. A good example is a cattail marsh with standing water most of the year.

Other groundcover in the area includes introduced vegetation, agricultural crops (hay), conifer and great-plains dominated woodlands, shrub lands/sagebrush steppe, and lowland prairie grasslands.

Fish and Wildlife

Fish in the Musselshell River include Brown Trout, Goldeye, Stonecat, Flathead Chub, Green Sunfish, Mountain Sucker, Sand Shiner, Flathead Minnow, and Channel Catfish. United States Fish and Wildlife Service (USFWS) consultation indicated that there are no threatened or endangered species within the area of the Jeffries No. 18 Mine. The USFWS consultation also indicated that there were no sensitive habitats in the areas. Though consultation with Montana Natural Heritage consultation noted six species as sensitive either by Montana, United States Forest Service (USFS), or United States Bureau of Land Management (USBLM), no threatened or endangered species were identified. After consultation with the Montana Sage Grouse Habitat Conservation Program it was determined that the site does lie within potential sage grouse habitat. Copies of the consultations are included in Attachment A.

Historic or Archeologically Significant Features

Cultural resources requirements were completed in accordance with Section 106 of the National Historic Preservation Act. Documentation is a part of the administrative record and is available at the Montana Department of Environmental Quality

Jeffries No. 18 Mine consists of the remnants of a coal mine located on both the north and south banks of the Musselshell River. The mine entrance was located on the south bank at the base of a steep hill. The tipple and scales for the mine were located on the north side of the river. GCM Services, Inc. noted that little remained from the mining operation (1984). GCM Services, Inc. also noted that coal slack was visible adjacent to the tipple foundation (1984). The flooding in 2011 and 2014 eroded a large portion of the material adjacent to the tipple depositing waste coal into the river (Figure 10). Prior to 2018, only portions of the tipple structure remain including the concrete footing, a concrete slab, and lumber debris. After the 2018 flooding, the tipple foundation collapsed to the river bottom as the river migrated through its floodplain. The flood exposed an additional foundation (Figure 11).

The 1984 GCM Services, Inc. study concluded that because there was little physical integrity of the mine itself it was not recommended for listing on the NRHP. However, adjacent to the tipple is the old grade of the C.M. & St. Paul Railroad which has been determined eligible for the NRHP under Criterion A. DEQ consulted with the Montana State Historic Preservation Office (SHPO), describing the need to complete the work and that the site railroad grade would be impacted in that area. The removal is necessary to allow the river to access its floodplain. SHPO agreed that the mine itself is not eligible for the NRHP. SHPO also concluded that the proposed undertaking will have no adverse effect on historic properties (SHPO, 2017).



Figure 10 Site conditions following the floods of 2011 and 2014. Flooding exposed the tipple foundation and eroded waste coal waste from the bank (DEQ, SL Graham 2016).



Figure 11 Foundation exposed during 2018 flood. The tipple foundation illustrated in Figure 10 is beneath the point bar located in the background of this photograph.

Soils

There are six soil types within the vicinity of Jeffries No. 18 Mine tipple (NRCS, 2017, Figure 12)

- Havre-Glendive Complex (Map Unit symbol 11A, National Map Unit Symbol cghh). This silt dominated soil is found on 0 to 2 percent slopes and is rarely flooded (Figure 12). This soil type is not considered prime farmland.
- Havre Loam (Map Symbol 9A, National Map Unit Symbol cgm7). This soil is composed of silt, sand, and clay and is located on 0 to 2 percent slopes and is rarely flooded. This soil type is considered prime farmland.
- Cabbart-Rock Outcrop-Blacksheep Complex (Map Symbol 83D, National Map Unit Symbol cglD). This soil is sandy and is located on 8 to 45 percent slopes. This soil type is not considered prime farmland.
- Harlake-Havre Complex (Map Symbol 108A National Map Unit Symbol 1vn89). This soil is composed of clay, silt, and sand and is found on 0 to 2 percent slopes and is rarely flooded. This soil type is considered prime farmland.
- Cabbart-Crago-Delpoint Complex (Map Symbol 181D, National Map Unit Symbol cgj5). This silt-rich soil includes clay and sand. This soil type is not considered prime farmland.

- Yamacall Loam (Map Symbol 41B, National Map Unit Symbol cgk7). This calcareous soil consists of silt and sand on 2 to 8 percent slopes. This soil type is not considered prime farmland.

Recreational Resource Values

The current land use of the area surrounding the Jeffries No. 18 Mine Tipple is primarily agricultural and includes hayfields and grazing lands (Figure 13). Recreational use of the Musselshell River includes fishing and swimming. North of the tipple is an area that was formerly a water treatment plant. The former water treatment plant lagoons area now used as a nature reserve.

The ecological site type in this area is classified as rangeland.

Air Quality

The Air Quality Index for Musselshell County was 4.84 in 2002 which was significantly better than the national average of 74.67, during the period from 1999 to 2009 ([Roundup, MT City Data](#), 2018).

Noise

This site is situated in agricultural land approximately 0.5 miles from the City of Roundup. Noise in the area is limited to traffic noise associated with the Number 4 Road that is adjacent to the site. Additional noise is likely from the operation of agricultural machinery.

Topography

Access to the area is from Number 4 Road. The tipple is in the center of the valley approximately 3,180 ft. amsl. Total relief within the proposed reclamation area is approximately 320 ft. The highest elevation on the road prism is approximately 20 ft. above the base of the river.

The area has been extensively altered through development of mines, roads, water treatment plants, and agricultural activities.

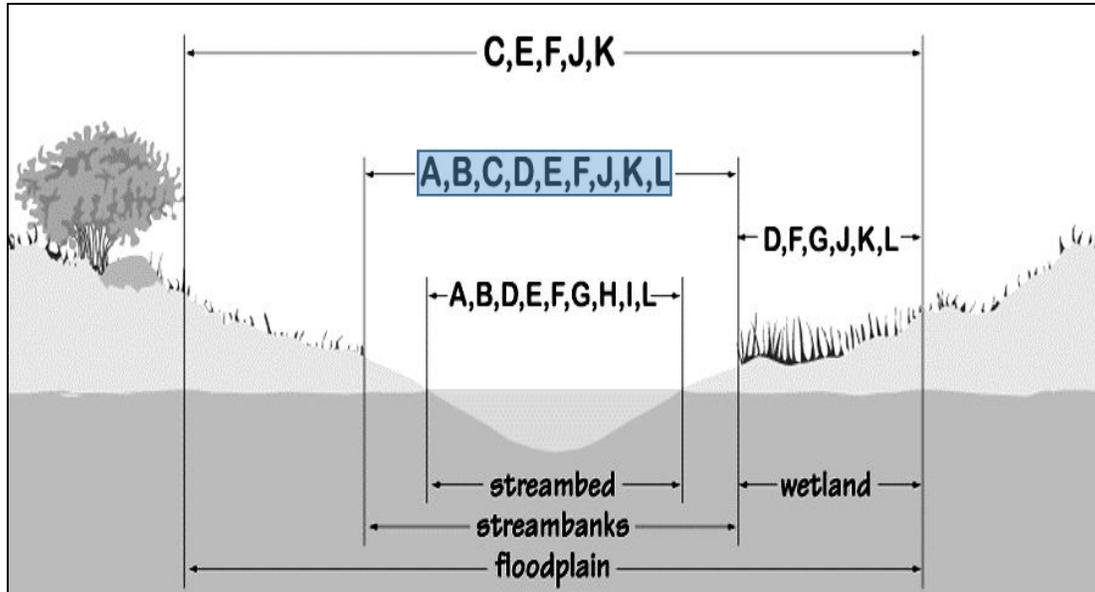
Social and Economic Values

Jeffries No. 18 Mine is on private property bounded by Number 4 Road to the north and the river to the south. The river is used recreationally for fishing and swimming. The river is also the primary source of irrigation water for ranches throughout its drainage area (Musselshell Watershed Coalition, 2018).

The economic impact of flooding in the watershed is significant. Flooding from 2011 to 2014 caused \$5 million in public and private property damage within the City of Roundup and Musselshell County (Musselshell Watershed Coalition and Musselshell County Department of Emergency Services, 2017).

Conformance with Federal, State, Regional, and/or Local Land Use Plans, Programs and Policies

Reclamation construction activities associated with Alternative 1 would comply with Montana's Abandoned Mine Reclamation State Plan. Two permits have been identified that will apply to this effort: The Joint Application for Proposed Work in Montana's Streams, Wetlands, Floodplains, and Other Water Bodies; and a DEQ Storm Water Discharge Permit. The following schematic identifies the potential required permits (DNRC 2018).



The streambank and floodplain within the Musselshell River will be affected by the project, therefore permits highlighted above are listed as potential permits. The name and contacts for each permit are listed below, with the underlined permits being required for the project.

- A. Montana Natural Streambed and Land Preservation Act (310), Local Conservation District
- B. Montana Stream Protection Act (SPA 124 Permit), MT Fish Wildlife and Parks
- C. County Floodplain Development Permit, County Floodplain Administrator
- D. Federal Clean Water Act (404 Permit), US Army Corps of Engineers
- E. Federal Rivers and Harbors Act (Section 10 Permit), US Army Corps of Engineers
- F. Short-Term Water Quality Standard for Turbidity (318 Authorization), Montana Department of Environmental Quality Water Protection Bureau
- G. Montana Land-Use License of Easement on Navigable Waters, Department of Natural Resources and Conservation or Real Estate Management Bureau
- H. Montana Water Use Act (Water Right Permit and Change Authorization), Department of Natural Resources and Conservation Water Rights Bureau
- I. Montana Water Use Act (Water Reservation), Department of Natural Resources and Conservation Water Reservation or Local Conservation District
- J. Storm Water Discharge General Permit, Montana Department of Environmental Quality Water Protection Bureau
- K. Streamside Management Zone Law, Department of Natural Resources and Conservation Forestry Division or Local Department of Natural Resources and Conservation Land Office
- L. Other Laws that May Apply.

Any other permits later identified as necessary for the project will be acquired, and DEQ-AML and its contractors will adhere to the applicable statutory or regulatory requirements for the project.

Environmental Justice

Based on [United States Government Census](#) figures the median household income in Musselshell County is \$57,519 (City Data.Com, 2018). The dominant race in Musselshell County is white with 98.3% of the population.

ENVIRONMENTAL IMPACTS OF THE PROPOSED ALTERNATIVES

Alternative 1 – Approval of the Proposed Abandoned Mine Restoration Project (The “Preferred Alternative”)

Alternative 1 will result in the removal of the tipple foundation, waste coal, and road prism and restore of the floodplain to natural conditions. Restoration of the site will improve river flow through (e.g. across the meander tab) and reduce flooding in this area. This work will have a direct economic impact on the City of Roundup by reducing impacts of flooding. It will also limit the erosion of waste coal into the river.

Resource Values

a. Cultural or Historic

Jeffries No. 18 Mine was not eligible for listing in the NRHP (GCM, 1984). The C.M. & St. Paul Railroad grade was determined eligible under Criterion A. After consultation with Montana SHPO, it was determined that the proposed alternatives will have no adverse effect on historic properties (SHPO, 2017).

b. Hydrology

Removal of mining related structures and waste will allow the Musselshell River to return to its approximate original morphology and create connectivity to the floodplain. By lowering the floodplain, the energy of the floodwater is dissipated, reducing the velocity of the water thereby reducing potential downstream damage. Short-term impacts to the stream channel and floodplain during construction are not considered a significant negative impact considering the long-term benefits of restoring the floodplain and reducing flooding downstream. Storm water runoff from construction activities may also cause short-term adverse impacts to water quality in the Musselshell River. Construction best management practices (BMPs) as required by the stormwater pollution prevention permit will be employed to address these sources, and will effectively reduce adverse impacts on surface water from the construction activities. Therefore Alternative 1 could have a minor, short-term, local negative impact to hydrology, but would have a major, long-term, regional positive impact to water quality and flood reduction once the restoration of the Musselshell River is achieved.

c. Fish and Wildlife

Based on consultations with the Montana Natural Heritage Program, Montana Sage Grouse Conservation Program, and USFWS no impact of federally listed species, designated critical habitat, or sage grouse habitat would occur with completion of either considered alternative. Within the vicinity of the project, Consultations were requested with USFS, USBLM, and the State of Montana Natural Heritage Program. Montana Natural Heritage Program identified seven species as sensitive. These include: Great Blue Heron, Golden Eagle, Greater Sage Grouse, Spotted Bat, Black-tailed Prairie Dog, Spiny Softshell Turtle,

and Greater Short-horned Lizard (Appendix A). No threatened or endangered species were identified in the project location.

Salinity and sedimentation are the basin's major impacts. Sedimentation stems from the basin's natural characteristics and land uses. Median sediment concentrations in the lower Musselshell had median concentrations of suspended sediment of 100 mg/L (DEQ, 2003). Short-term increases in sedimentation downstream of the site are possible. Erosion and sedimentation control best management practices will be implemented to limit the impacts to fish habitat.

Under Alternative 1, removing the mine structures and restoring the Musselshell River will improve the riparian vegetation and habitat for wildlife species. Therefore, there will be no significant negative impact to wildlife species because of the project. Any impacts to the species in the area by disturbance from construction will be minor and short term.

d. Grazing

Grazing will be prevented during completion of Alternative 1. The impacts to grazing will be minor, temporary and local due to the small foot print of the site.

e. Soils and Vegetation

The project itself is located within a riparian scrub-shrub area (Figure 9). This area is bounded by agriculture or otherwise developed land (Figure 12). Alternative 1 will remove mining structures and restore the river. Restoring the river will result in long-term improvement to soils and vegetation in the project area. The negative impacts to soils and vegetation in the project area will be minor, local, and short term. Once revegetation is completed, the soils will be placed on a trajectory to restore the natural soil properties of floodplain soils.

f. Recreational Resource Values

Alternative 1 would have no long-term impact on public recreational resources. The reclamation project is on private property. Short-term, local and temporary impacts include increased traffic and construction noise.

g. Air Quality

Alternative 1 is not expected to impact air quality through the implementation of construction. BMPs such as water application for dust control during reclamation activities would be implemented.

h. Noise

Alternative 1 would result in a slight increase in noise during construction. This impact would be minor, local and short-term. Noise increase will be a result of heavy equipment operation.

i Topography

Alternative 1 will eliminate the road prism and restore the site to its original topographic condition. These alterations will be permanent and improve water flow through the area.

j. Social and Economic Values

Alternative 1 would mitigate public health and safety hazards by reducing flooding hazards and direct exposure to humans and ecological receptors to waste coal. Jobs related to the construction project will provide a short-term economic boost to the local economy.

k. Environmental Compliance with Federal, State, Regional, and/or Local Land Use Programs

Completion of Alternative 1 would be in accordance with the Montana Abandoned Mine Reclamation Plan. In addition, the preferred alternative will be completed in accordance with applicable federal, state and local permitting; specifically, a Joint Application for Proposed Work in Montana's Streams, Wetlands, Floodplains, and Other Water Bodies; and Storm Water Discharge Permit.

l. Environmental Justice

Neither of the proposed alternatives in the Jeffries No. 18 Mine Tipple and Musselshell River Stream Restoration Project will have a disproportionate effect on any demographic population regarding either income level or minority status. DEQ-AML has provided the public with the opportunity for meaningful participation through a standardized public participation and comment process. Reclamation project reports, studies and work plans will be available for public inspection at the DEQ office at 1225 Cedar Street, Helena, MT 59620 or by request in writing.

Cumulative Impacts

For each of the resource values identified in the section above, cumulative impacts are considered. Each activity is evaluated to determine its short and long-term impacts to associated resources. The planned and/or ongoing projects near the Jeffries No. 18 Mine include road improvements, recreational activities, and the reclamation of the Davis Mine site on Meathouse Road. Each of the resource values identified above may not be relevant in the cumulative effects analysis. The resource values are considered in the following section.

Alternative 1

Removal of the mine structures and restoration of the river and its floodplain would increase the ability to withstand impacts from runoff associated with flooding. Under the preferred alternative, the meander tab on which the tipple was constructed would be restored to its original elevation and vegetation would be replaced to reproduce native scrub-shrub habitat. In addition, the removal of the waste coal in the former

railroad grade and subsequent bank stabilization would allow the river to access its floodplain, thereby removing flood water restrictions in this area. Stream bank vegetation would stabilize the river and allow it to withstand increased flows and sediment inputs.

Planned road improvements in the area include the obliteration of the current Number 4 Road and replacing it with an access road that connects with State Route 12 east of the tipple. Changing the road location will also improve the Musselshell River's access to its flood plain north of the current location of Number 4 Road. Recreational activities in the river will not be affected once the construction phase of the project is complete.

River restoration work may also be completed at the Davis Mine site on Meathouse Road. Davis Mine is approximately 1.25 miles upstream of Jeffries No. 18 Mine. During mining operations at Davis Mine, the river was disconnected from the floodplain. Currently, floodwaters get diverted around this location impacting the southern portion of the City of Roundup. This is also a potential source of additional sediment downstream.

Alternative 2 - Disapproval of the Proposed Abandoned Mine Construction Project (The "No Action Alternative")

Under the No-Action Alternative, the DEQ-AML would not perform removal of the mine structures (tipple foundation and road prism) or restoration of the river in this area, as described under Alternative 1. Presence of the pre-SMCRA mining structures exacerbates flooding in the area and impact water quality of the stream. Under the No-Action alternative, the structures and waste coal would continue to be a risk to public safety through flooding, fisheries, and water quality.

Resource Values

a. Cultural or Historic

Alternative 2 will result in no changes to the railroad grade in this area. The railroad grade would continue to be a factor in exacerbating flooding in this area.

b. Hydrology

Alternative 2 will result in continued water quality impacts and exacerbation of flooding. This would result in decreased stream and floodplain function of the river. The no-action alternative could have major, long-term, regional negative impacts to water quality and flooding.

c. Fish and Wildlife

While the no-action alternative would not create any temporary disturbance from construction, it would not improve riparian wildlife habitat.

d. Grazing

Alternative 2 would result in no changes in grazing uses of the property.

e. Soils and Vegetation

The no action alternative will leave the mine structures in place and not restore the stream to more natural conditions. Soils and vegetation would not return to more natural conditions.

f. Recreational Resource Values

Alternative 2 would have no impact on public recreational resources.

g. Air Quality

Alternative 2 would have no impact to air quality.

h. Noise

Alternative 2 would have no impact to noise values.

i. Topography

Alternative 2 would result in continued impacts from flooding and water quality issues from waste coal.

j. Social and Economic Values

Alternative 2 would not improve social or economic values the Musselshell River watershed.

k. Environmental Compliance with Federal, State, Regional and/or Local Land Use Programs

Alternative 2 would not be in accordance with the goals of the Montana Abandoned Mine Reclamation Plan.

I. Environmental Justice

Neither of the proposed alternatives in the Jeffries No. 18 Mine Tipple and Musselshell River Stream Restoration Project will have a disproportionate effect on any demographic population regarding either income level or minority status. DEQ-AML has provided the public with the opportunity for meaningful participation through a standardized public participation and comment process. Reclamation project reports, studies and work plans will be available for public inspection at the DEQ office at 1225 Cedar Street, Helena, MT 59620 or by request in writing.

Cumulative Impacts

Alternative 2

Alternative 2 will result in severe flooding and continued impacts to surface water quality, resulting in economic impacts to the City of Roundup and Musselshell County. This alternative will result in decreased stream function and floodplain function in the project area and downstream.

Ongoing road improvements undertaken by the City and County would not impact any of the resource values specified under Alternative 2.

SUMMARY

The purpose of the Jeffries No. 18 Tipple Reclamation and Musselshell River Restoration Project, is to reduce the mobility of mine waste; and mitigate flooding impacts to the local population. The restoration project includes removal of mine structures and waste coal and restoration of the Musselshell River to pre-mining conditions. The project will be limited to a single construction season which will minimize the impacts described above. Any other potential negative impacts will be mitigated through the implementation of BMPs (sediment and dust) and therefore, will be local, short-term and minor. The outcome of the project is expected to have a significant positive, long-term, regional impact by improving water quality in the Musselshell River and reducing flood impacts to the surrounding area.

Alternative 2, No Action, will result in no disturbance to wildlife or the public. No Action will result in continued impacts to water quality and exacerbated flooding. Alternative 2 represents potential long-term, regional and significant negative impacts.

In preparing this assessment the Montana Department of Environmental Quality Remediation Division consulted with the following agencies:

Montana National Heritage Program, Montana Sage Grouse Conservation Program, and USFWS on issues related to federally listed threatened and endangered species (Appendix B).

Montana State Historic Preservation Office on issues related to cultural resources and the eligibility of properties for listing on the National Register of Historic Places (Appendix C).

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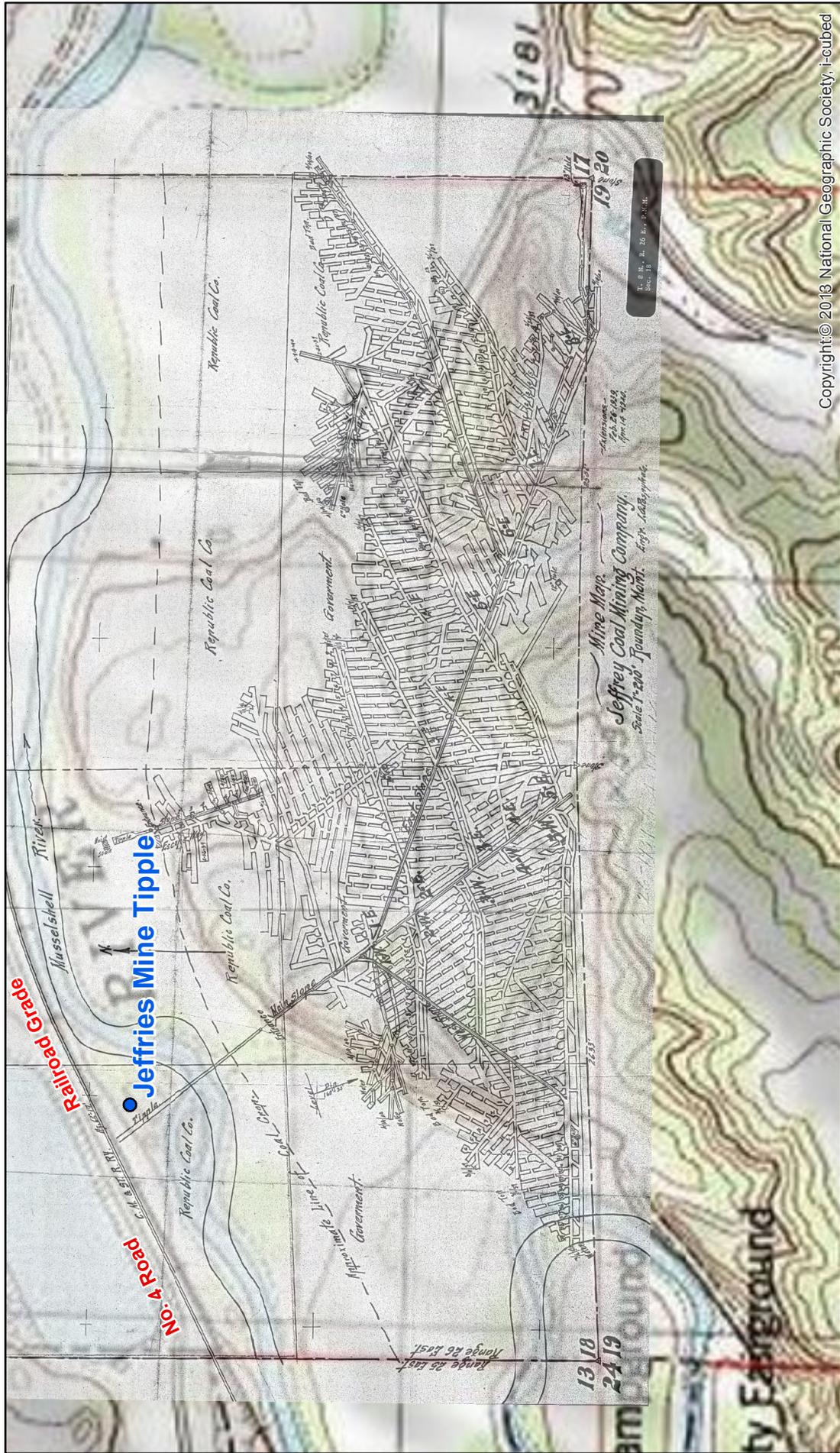
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USGS, 2003. Water-Quality Characteristics of Montana Streams in a Statewide Monitoring Network, 1999-2003.

U.S. Geologic Survey, 2006. Water-Quality Characteristics of Montana Streams in a Statewide Monitoring Network.

USGS, 2018. ([National Water Information System](#))

Figures and Tables



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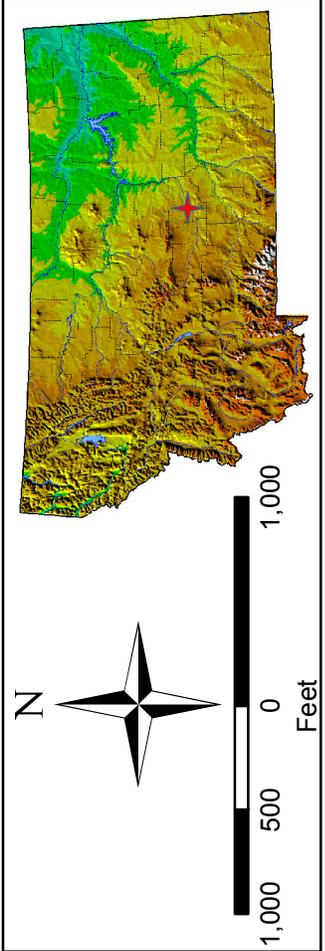
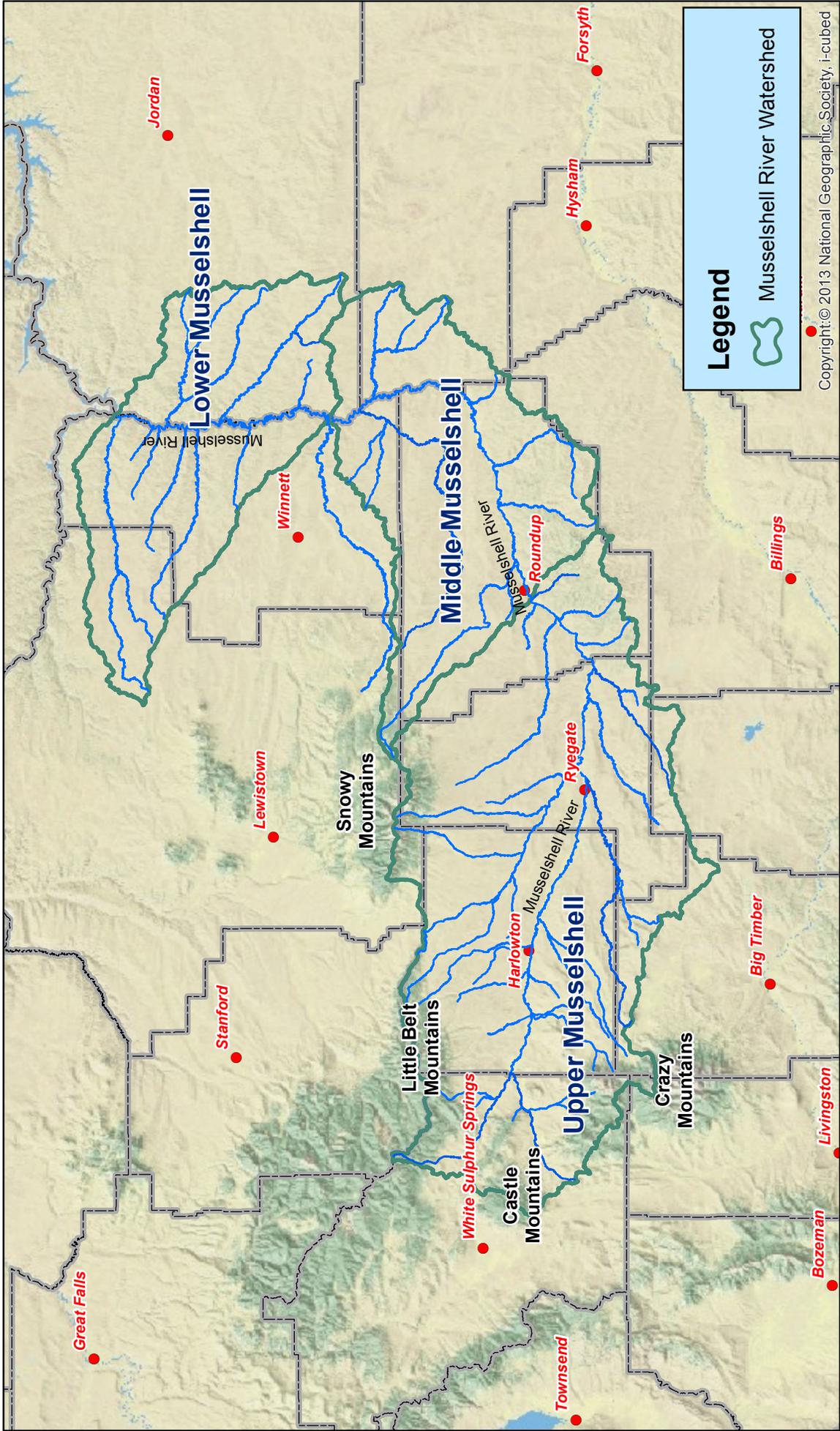


Figure 2
Jeffries No. 18 Mine
Tipple and Mine Map
Roundup, Montana



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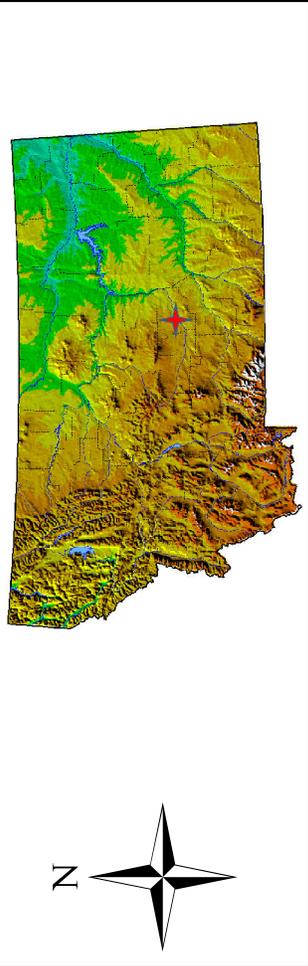
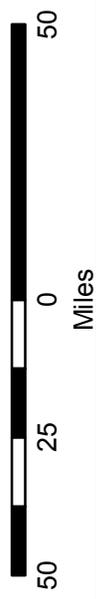


Figure 3 Musselshell River Watershed Map Montana





Document Path: L:\REM\CB0314\Musselshell County\Jeffries No. 18 Mine 2011 flooding.mxd

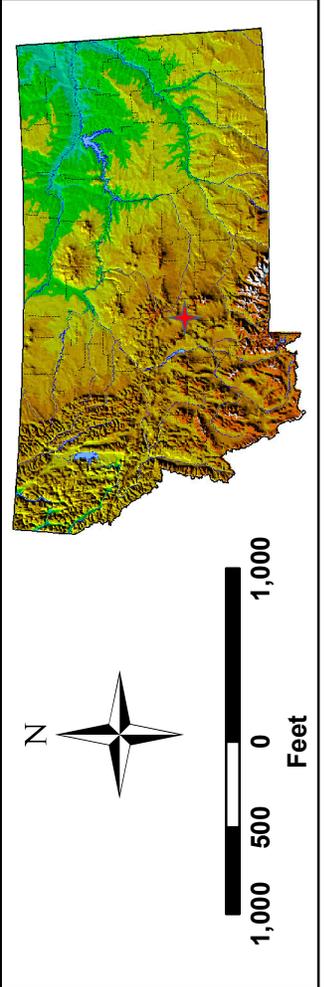
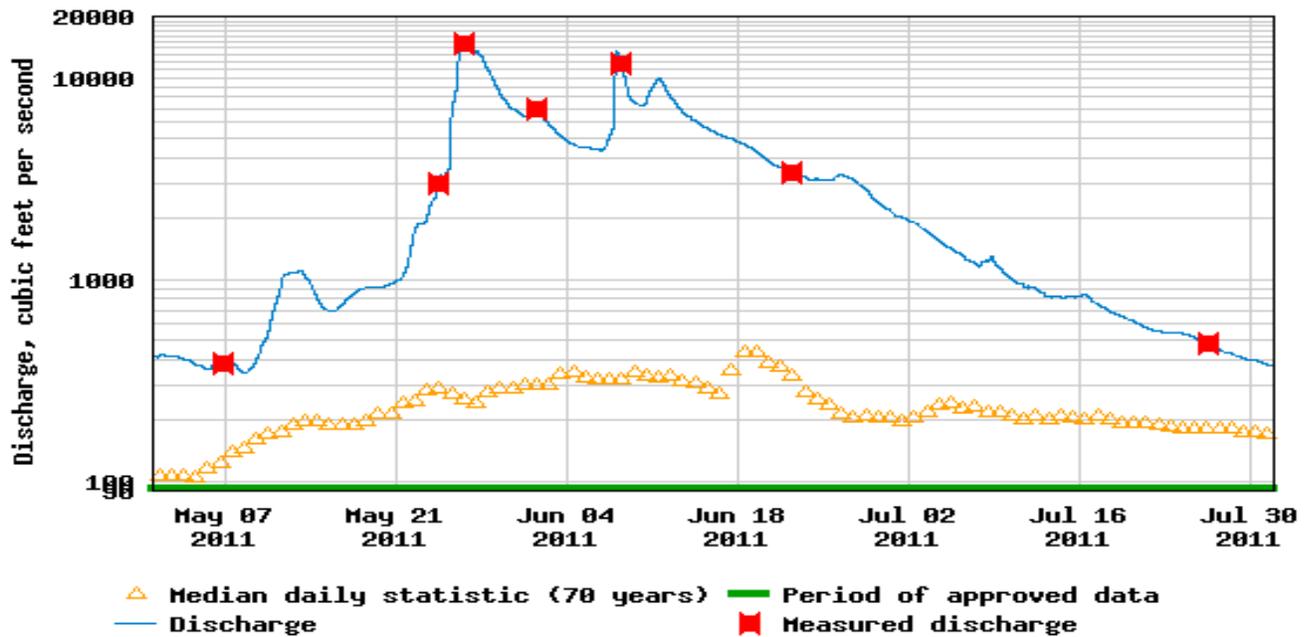


Figure 5
Extent of 2011 Flooding
Jeffries No. 18 Mine Tipple
Roundup, Montana



USGS 06126500 Musselshell River near Roundup MT



USGS 06126500 Musselshell River near Roundup MT

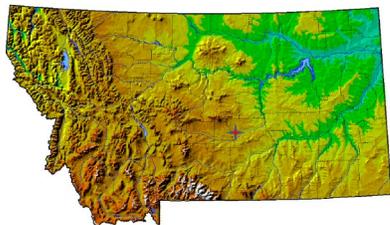
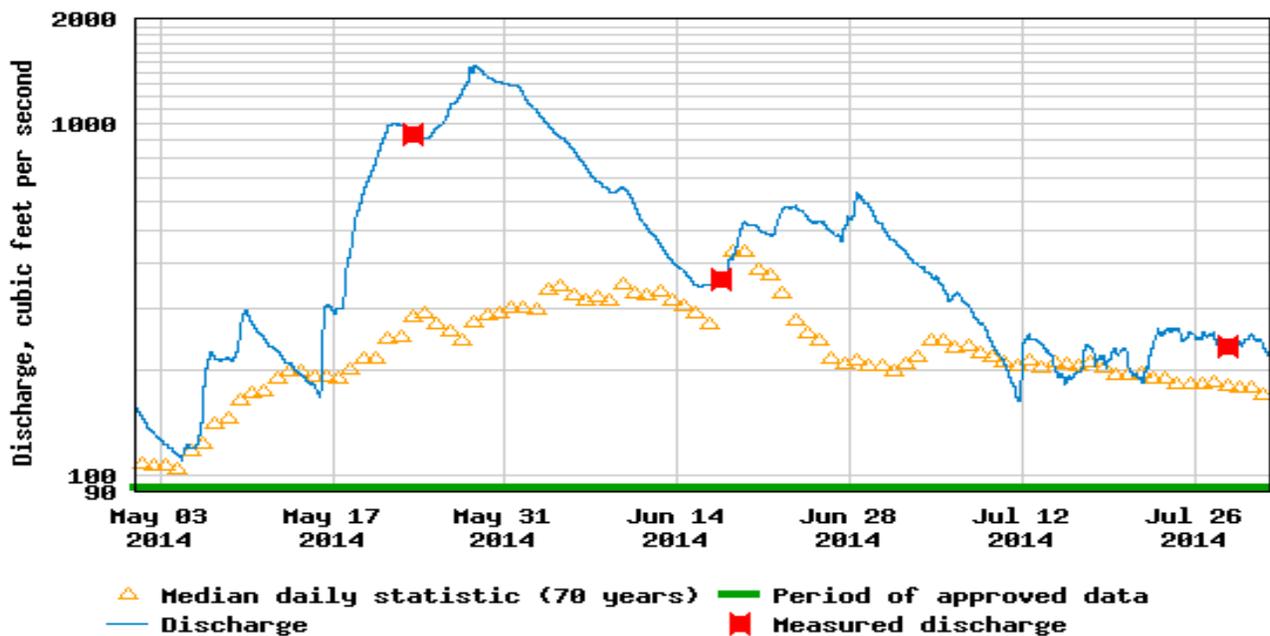


Figure 8
2011 and 2014
Discharge Data
Roundup,
Montana



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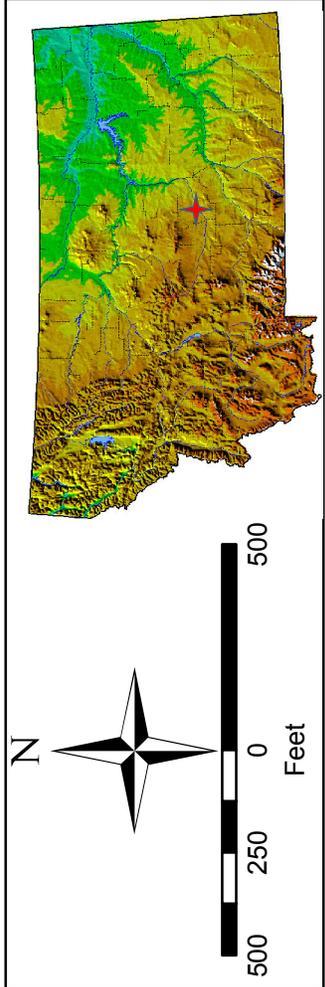


Figure 9
Jeffries No. 18 Mine
Riparian and Wetland Map
Roundup, Montana



Document Path: L:\REM\CB0314\Musselshell County\Jeffrey Mine Soils Map.mxd

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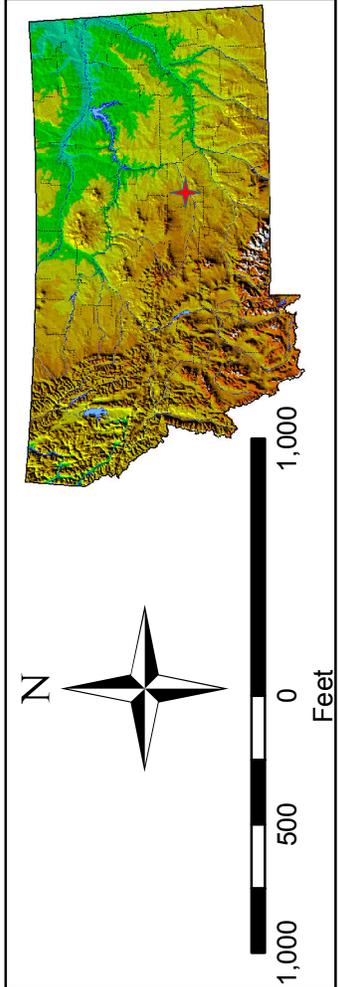
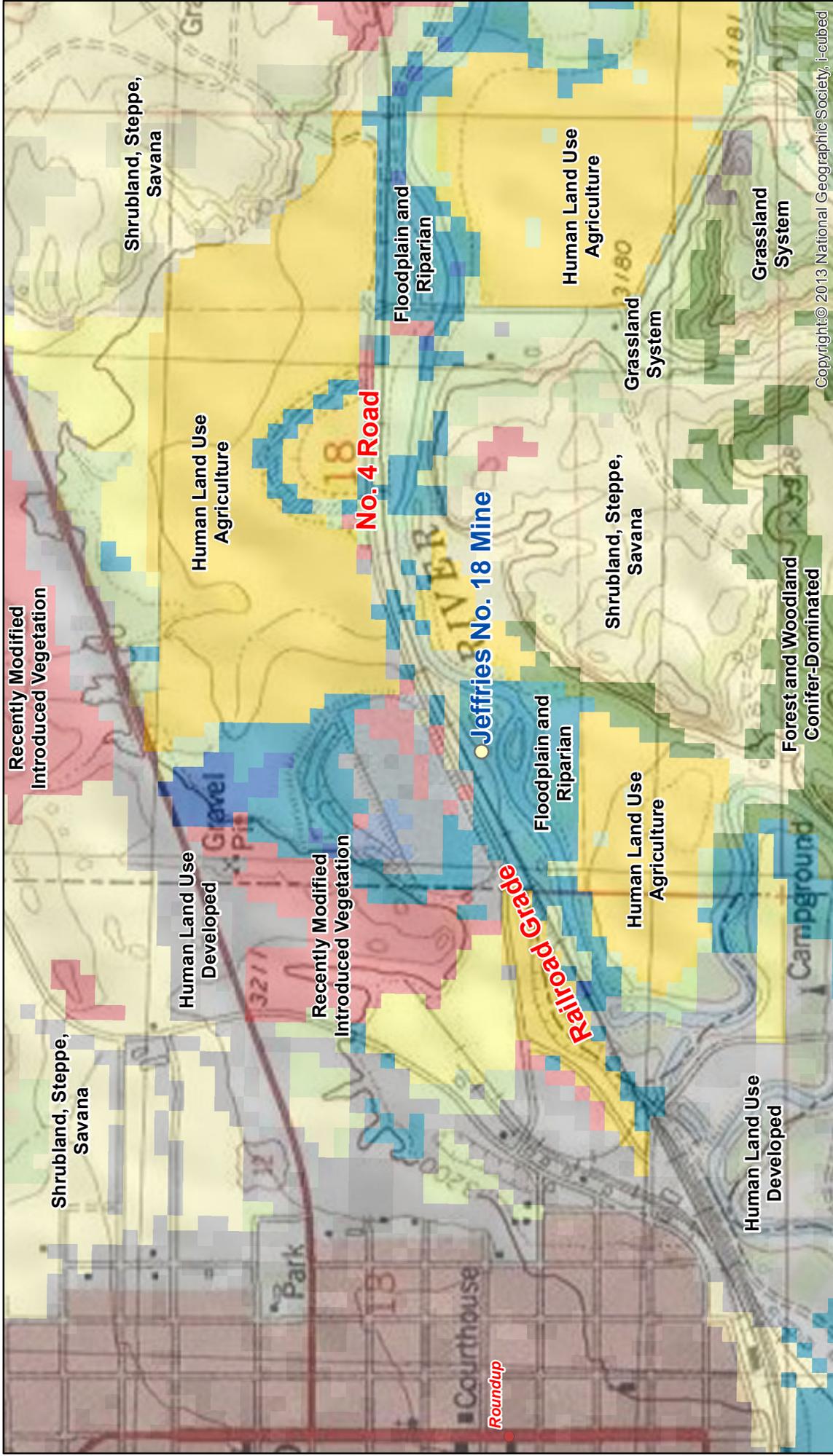


Figure 12
Jeffries No. 18
Soils Map
Roundup, Montana



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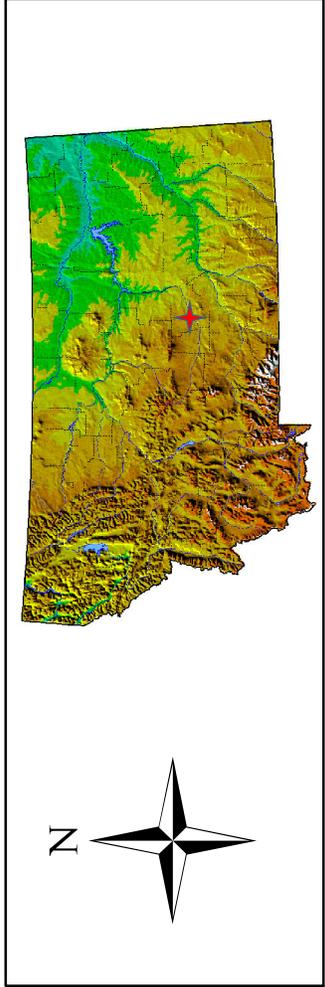


Figure 13
Jeffries No. 18
Landcover Map
Roundup, Montana

1,000 500 0 1,000
Feet

Attachment A
Fish and Wildlife



P.O. Box 201800 • 1515 East Sixth Avenue • Helena, MT 59620-1800 • fax 406.444.0266 • tel 406.444.5354 • <http://mtnhp.org>

December 6, 2016

Scott Graham
MT DEQ
Helena, MT

Dear Scott,

I am writing in response to your recent request regarding Montana Species of Concern in the vicinity of the Jeffries Mine Tipple, located at Latitude 46.445835, Longitude -108.523668. I checked our databases for information in this general area and have enclosed 11 species occurrence reports for 7 animal species of concern, a map depicting species of concern and wetland locations, and explanatory material, including agency contacts that may have additional information about the area. Note that the maps are in Adobe GeoPDF format. With the appropriate Adobe Reader, it provides a convenient way to query and understand the information presented on the map. Documentation is included.

Please keep in mind the following when using and interpreting the enclosed information and maps:

- (1) These materials are the result of a search of our database for species of concern that occur in an area defined by the requested latitude and longitude with an additional one-mile buffer surrounding the requested area. This is done to provide a more inclusive set of records and to capture records that may be immediately adjacent to the requested area. Please let us know if a buffer greater than 1 mile would be of use to your efforts. Reports are provided for the species of concern that are located in your requested area with a one-mile buffer. Species of concern outside of this buffered area may be depicted on the map due to the map extent, but are not selected for the SOC report.
- (2) On the map, polygons represent one or more source features and possibly additional extents associated with the source features. A source feature is a point, line, or polygon that is the basic mapping unit of a Species Occurrence (SO) representation. In addition to the base unit, the polygon may include additional extents tied to locational uncertainty (points always have locational uncertainty) and/or breeding territory. The recorded location of the occurrence may vary from its true location due to many factors, including the level of expertise of the data collector, differences in survey techniques and equipment used, and the amount and type of information obtained. Therefore, this inaccuracy is characterized as locational uncertainty,

and is now incorporated in the representation of an SO. If the extent of the source feature and uncertainty are smaller than published accounts of breeding territory extent of a species, the polygons of some SOs will be buffered to encompass that extent. If you have a question concerning a specific SO, please do not hesitate to contact us.

- (3) This report may include sensitive data, and is not intended for general distribution, publication, or for use outside of your organization. In particular, public release of specific location information may jeopardize the welfare of threatened, endangered, or sensitive species or biological communities.
- (4) The accompanying map(s) display land management status, which may differ from ownership. Features shown on this map do not imply public access to any lands.
- (5) In addition to the information you receive from us, we encourage you to contact state, federal, and tribal resource management agencies in the area where your project is located. Please see the list of relevant agency contacts in the accompanying document.
- (6) Additional information on animal, plant, and lichen species and ecological systems in Montana is available on the Montana Field Guide at <http://mtnhp.org>
- (7) Information on the status and spatial distribution of biological resources produced by MTNHP are intended to inform parties of the state-wide status, known occurrence, or the likelihood of the presence of those resources. These products are not intended to substitute for field-collected data, nor are they intended to be the sole basis for natural resource management decisions.
- (8) MTNHP does not portray its data as exhaustive or comprehensive inventories of rare species or biological communities. Field verification of the absence or presence of sensitive species and biological communities will always be an important obligation of users of our data.
- (9) The information is not intended as natural resource management guidelines or prescriptions or a determination of environmental impacts. MTNHP recommends consultation with appropriate state, federal, and tribal resource management agencies and authorities in the area where your project is located.
- (10) Because MTNHP constantly updates and revises its databases with new data and information, products will become outdated over time. Interested parties are encouraged to obtain the most current information possible from MTNHP, rather than using older products. We add, delete, and change records on a daily basis. Consequently, we strongly advise that you update your MTNHP data sets at a minimum of every three months for most applications of our information.

In order to help us improve our services to you, we invite you to take a simple survey. The survey is intended to gather some basic information on the value and quality of the information

and services you recently received from the Montana Natural Heritage Program. The survey is short and should not take more than a few minutes to complete. All information will be kept confidential and will be used internally to improve the delivery of services and to help document the value of our services. Use this link to go to the survey:

<http://www.surveymonkey.com/s/RYN8Y8L>.

I hope the enclosed information is helpful to you. Please feel free to contact me at (406) 444-3290 or via my e-mail address, below, should you have any questions or require additional information.

Sincerely,



Martin P. Miller
Montana Natural Heritage Program
martinm@mt.gov



Species of Concern Data Report

Visit <http://mtnhp.org> for additional information.

Report Date:

Tuesday, December 6, 2016

Ardea herodias

[View Species in MT Field Guide](#)

Common Name: Great Blue Heron

General Habitat: Riparian forest

Description: Birds

Mapping Delineation:

Confirmed nesting area buffered by a minimum distance of 6,500 meters in order to be conservative about encompassing the areas commonly used for foraging near the breeding colony and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3
Global: G5

Federal Agency Status:

[U.S. Fish & Wildlife Service:](#)

[U.S. Forest Service:](#)

[U.S. Bureau of Land Management:](#)

FWP SWAP Status: SGCN3

MT PIF Code:

Species Occurrences

Species Occurrence Map Label: 10199514

First Observation Date: 04/18/2013

SO Number:

Last Observation Date: 04/18/2013

Acreage: 32,799

Species Occurrence Map Label: 10199494

First Observation Date: 12/24/2007

SO Number:

Last Observation Date: 12/24/2007

Acreage: 32,799

Aquila chrysaetos

[View Species in MT Field Guide](#)

Common Name: Golden Eagle

General Habitat: Grasslands

Description: Birds

Mapping Delineation:

Confirmed nesting area buffered by a minimum distance of 3,000 meters in order to be conservative about encompassing the entire breeding territory and area commonly used for reneating and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3
Global: G5

Federal Agency Status:

[U.S. Fish & Wildlife Service:](#) BGEPA; MBTA; BCC

[U.S. Forest Service:](#)

[U.S. Bureau of Land Management:](#) SENSITIVE

FWP SWAP Status: SGCN3

MT PIF Code:



Species of Concern Data Report

Visit <http://mtnhp.org> for additional information.

Report Date:
Tuesday, December 6, 2016

Species Occurrences

Species Occurrence Map Label:	10274180		
First Observation Date:	03/22/2000	SO Number:	
Last Observation Date:	03/22/2000	Acreage:	6,987

Species Occurrence Map Label:	10274181		
First Observation Date:	05/10/2013	SO Number:	
Last Observation Date:	05/10/2013	Acreage:	6,987

Species Occurrence Map Label:	10274182		
First Observation Date:	06/12/2013	SO Number:	
Last Observation Date:	06/12/2013	Acreage:	6,987

Centrocercus urophasianus [View Species in MT Field Guide](#)

Common Name: Greater Sage-Grouse **General Habitat:** Sagebrush

Description: Birds

Mapping Delineation:

Confirmed breeding area based on the presence of a nest, chicks, juveniles, or adults on a lek. Point observation location is buffered by a minimum distance of 6,400 meters in order to encompass the latest research on the area used for breeding, nesting, and brood rearing and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S2
Global: G3G4

Federal Agency Status:

U.S. Fish & Wildlife Service:
U.S. Forest Service: SENSITIVE
U.S. Bureau of Land Management: SENSITIVE

FWP SWAP Status: SGCN2

MT PIF Code: 1

Species Occurrences

Species Occurrence Map Label:	10247640		
First Observation Date:	04/01/1988	SO Number:	
Last Observation Date:	05/15/2001	Acreage:	31,797

Species Occurrence Map Label:	10247975		
First Observation Date:	04/01/1988	SO Number:	
Last Observation Date:	05/15/2001	Acreage:	31,797



Species of Concern Data Report

Visit <http://mtnhp.org> for additional information.

Report Date:

Tuesday, December 6, 2016

Euderma maculatum

[View Species in MT Field Guide](#)

Common Name: Spotted Bat

General Habitat: Cliffs with rock crevices

Description: Mammals

Mapping Delineation:

Confirmed area of occupancy based on the documented presence (mistnet captures, definitively identified acoustic recordings, and definitively identified roosting individuals) of adults or juveniles. Point observation location is buffered by a distance of 10,000 meters in order to encompass the reported maximum foraging distance for the species in British Columbia. If the locational uncertainty associated with the observation is greater than 10,000 meters, the observation is not valid for creation of a species occurrence.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3
Global: G4

Federal Agency Status:

U.S. Fish & Wildlife Service:
U.S. Forest Service: SENSITIVE
U.S. Bureau of Land Management: SENSITIVE

FWP SWAP Status: SGCN3, SG

MT PIF Code:

Species Occurrences

Species Occurrence Map Label:	10174007
First Observation Date:	09/13/2003
Last Observation Date:	09/13/2003
SO Number:	
Acreage:	77,630

Cynomys ludovicianus

[View Species in MT Field Guide](#)

Common Name: Black-tailed Prairie Dog

General Habitat: Grasslands

Description: Mammals

Mapping Delineation:

Areas with recent evidence of activity (i.e. burrow entrances) visible on the 2005, 2009, or 2013 National Agricultural Imagery Program (NAIP) aerial color photographic imagery that are within a distance of 200 meters of definitive observations buffered by the locational uncertainty of less than or equal to 1,000 meters.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3
Global: G4

Federal Agency Status:

U.S. Fish & Wildlife Service:
U.S. Forest Service: SENSITIVE
U.S. Bureau of Land Management: SENSITIVE

FWP SWAP Status: SGCN3

MT PIF Code:

Species Occurrences

Species Occurrence Map Label:	10181472
First Observation Date:	07/25/2015
Last Observation Date:	07/25/2015
SO Number:	
Acreage:	32



Species of Concern Data Report

Visit <http://mtnhp.org> for additional information.

Report Date:

Tuesday, December 6, 2016

Apalone spinifera

[View Species in MT Field Guide](#)

Common Name: Spiny Softshell

General Habitat: Prairie rivers and larger streams

Description: Reptiles

Mapping Delineation:

Stream reaches where the species presence has been confirmed through direct capture or where they are believed to be present based on the professional judgement of a biologist due to confirmed presence in adjacent areas. In order to reflect the importance of adjacent terrestrial habitats to survival, stream reaches are buffered 100 meters into the terrestrial habitat based on PACFISH/INFISH Riparian Conservation Area standards.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3
Global: G5

Federal Agency Status:

U.S. Fish & Wildlife Service:
U.S. Forest Service:

FWP SWAP Status: SGCN3

U.S. Bureau of Land Management: SENSITIVE

MT PIF Code:

Species Occurrences

Species Occurrence Map Label:	10033205		
First Observation Date:	01/01/1873	SO Number:	
Last Observation Date:	08/03/2010	Acreage:	29,652

Phrynosoma hernandesi

[View Species in MT Field Guide](#)

Common Name: Greater Short-horned Lizard

General Habitat: Sandy / gravelly soils

Description: Reptiles

Mapping Delineation:

Confirmed breeding area based on the presence of a resident animal of any age. Point observation location is buffered by a minimum distance of 300 meters in order to encompass habitats supporting other individuals and documented distances moved between summer and winter habitats. Otherwise the point observation is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3
Global: G5

Federal Agency Status:

U.S. Fish & Wildlife Service:
U.S. Forest Service: SENSITIVE

FWP SWAP Status: SGCN3, SG

U.S. Bureau of Land Management: SENSITIVE

MT PIF Code:

Species Occurrences

Species Occurrence Map Label:	10272272		
First Observation Date:	08/14/1949	SO Number:	
Last Observation Date:	08/14/1949	Acreage:	49,683

Montana Species of Concern Jeffries Mine Tipple

SPECIES OCCURRENCE: A polygon feature representing only what is known from direct observation with a defined level of certainty regarding the spatial location of the feature.

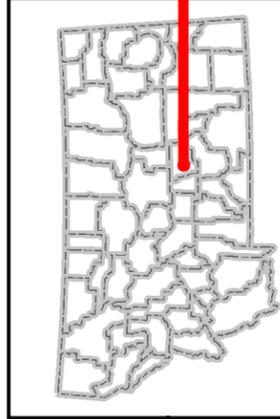
- Lichens
- Bryophytes
- Vascular Plants
- Invertebrates
- Amphibians
- Fish
- Reptiles
- Birds
- Mammals

Sites

- Sites

Wetland Types

- Lake
- River
- Freshwater Pond
- Freshwater Emergent Wetland
- Freshwater Scrub-Shrub Wetland
- Freshwater Forested Wetland
- Riparian Emergent
- Riparian Scrub-Shrub
- Riparian Forested



Montana State Library

Not all legend items may occur on the map.

Features shown on this map do not imply public access to any lands.

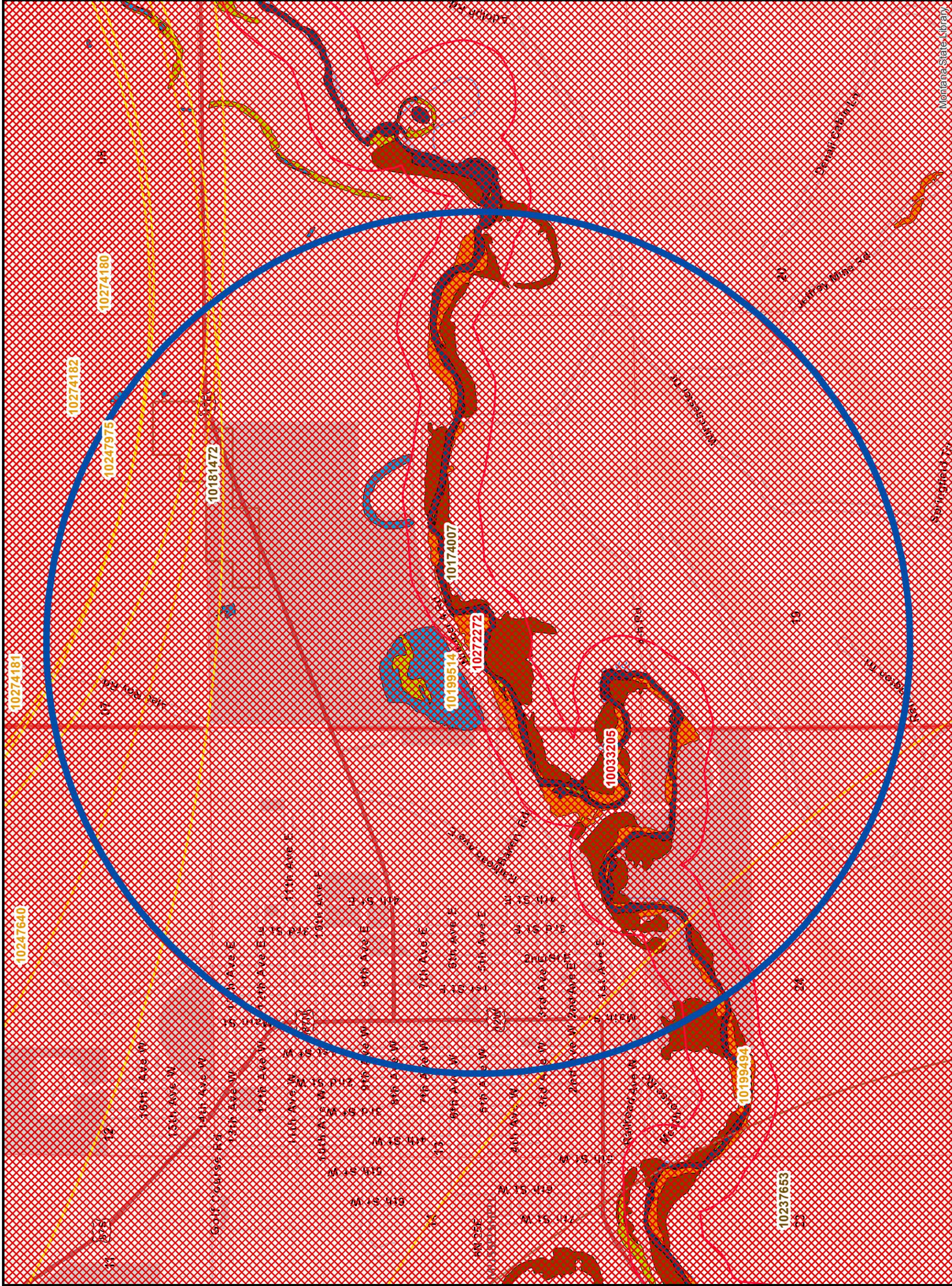
Land ownership information shown on this map is not suitable for legal purposes.



Montana Natural Heritage Program

Montana Natural Heritage Program, Montana State Library
1515 East Sixth Ave., Helena, MT 59620-1800

406 444-3280 <http://mnhp.org> mnhp@mt.gov



Map Document: K:\REQUESTS\Requests\17\MTSL17mts\000717mts\0007.mxd (12/6/2016)

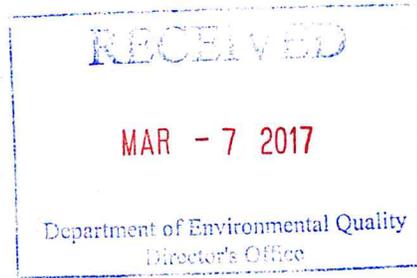
Attachment B

Cultural Resources

Big Sky. Big Land. Big History.
Montana
Historical Society

March 3, 2017

Mr. James Strait
Montana Department of Environmental Quality
1520 East 6th Ave
P.O. Box 200901
Helena, MT 59620-0901



*Historic Preservation
Museum
Outreach & Interpretation
Publications
Research Center*

RE: Jefferies 18 Mine and C.M. & St. Paul RR Project
Musselshell County, Montana

Dear Mr. Strait:

Thank you for the letter (received February 23, 2017) regarding the Jefferies 18 Mine and C.M. & St. Paul RR project in Musselshell County, Montana. We concur that the Jefferies Section 18 Mine (24ML0195) is Not Eligible for the National Register of Historic Places.

Based on the received documentation, we also concur with the determination that the proposed undertaking will have No Adverse Effect on Historic Properties.

If you have any questions or concerns do not hesitate to contact me directly at (406) 444-0388 or JBush2@mt.gov. Thank you for consulting with us.

Sincerely,

Jessica Bush, M.A.
Review and Compliance Officer
Montana State Historic Preservation Office

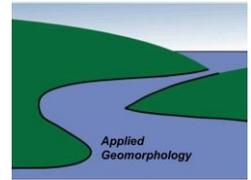
Attachment C

Public Comments

No public comments were received during the public comment period which ran from June 18, 2018 to July 18, 2018. A public meeting to discuss the draft EA was held on June 28, 2018.

Attachment D

Technical Memorandum



Technical Memorandum

To Scott Graham, Montana Department of Equality Abandoned Mine Lands Program

From Karin Boyd, Applied Geomorphology (AGI)

Date October 11, 2018

Subject Jeffries Number 18 Mine Site visit

Contract Environmental Services 414039, TO 1, Work Order 1

1 Introduction

This memorandum describes the results of a site visit to the Jeffries Number 18 Mine site on the Musselshell River near Roundup, Montana. The site visit was requested by the Montana Department of Environmental Quality (MTDEQ) Abandoned Mine Lands Program (AML). The site visit took place on August 21, 2018 and was attended by Scott Graham (MTDEQ), Colette Lemieux (Pioneer Technical), Donna Pedrazzi (Musselshell Conservation District), Dave Martin (MTDNRC) and myself (Karin Boyd, AGI). The intent of the site visit was to review existing conditions in light of recent flooding and consider optimal paths forward towards site remediation.

The project site is located about a half mile east of the City of Roundup on the north bank of the Musselshell River (Figure 1). A Draft Environmental Assessment prepared by MT DEQ in the spring of 2018 described the proposed reclamation to include the removal of tipple remains and waste coal followed by the restoration of the Musselshell River floodplain. Concerns associated with the site include the exacerbation of floods in Roundup, and entrainment of waste coal into the river. Previous reclamation efforts on site included sealing an adit opening, backfilling a subsided area, neutralizing surface coal slack/waste, placement of topsoil, seeding, and fertilizing (MTDEQ, 2018).

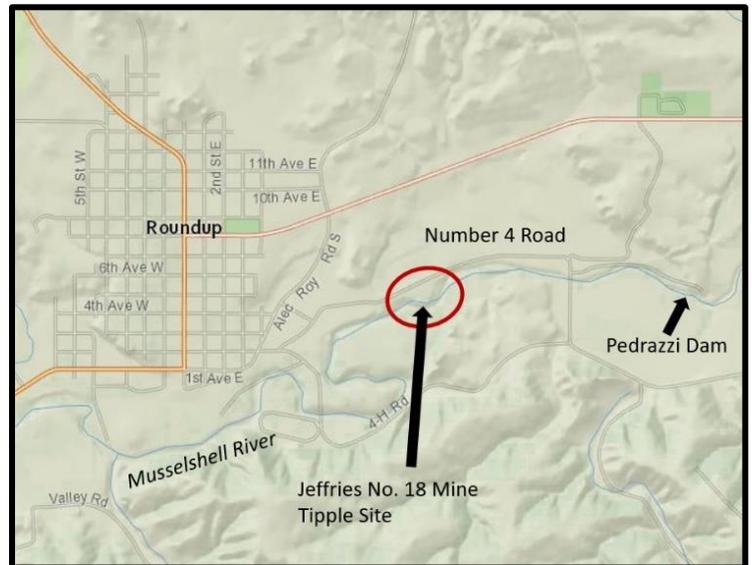


Figure 1. Project Location

Flood History

The USGS stream gage for the Musselshell River at Roundup has been operation since 1946. The two largest flood events documented over this 72-year period of record occurred in the last eight years; in the spring of 2011 and late winter of 2014. The 2011 event is the flood of record, having peaked at 15,000 cfs at Roundup (Figure 2). The 2011 flood crested in late May and was driven by spring rains on a late heavy snowpack. In contrast, the 2014 event occurred in early March and was driven by ice-related flooding.

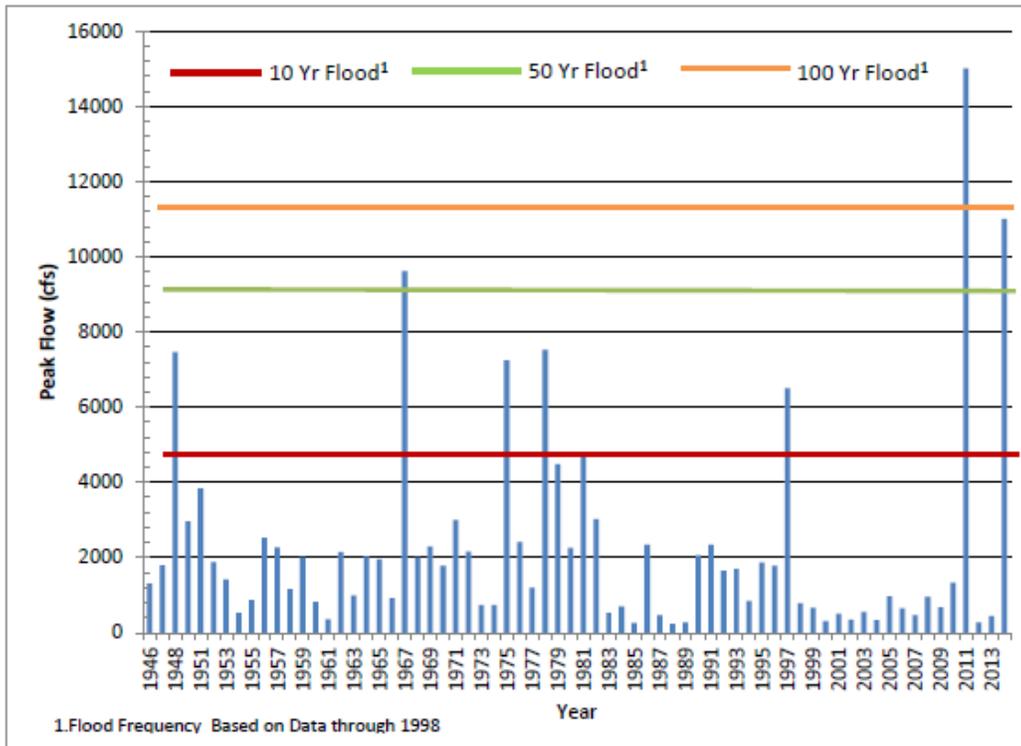


Figure 2. Flood history for Musselshell River near Roundup (Pioneer Technical Services, 2015); flood frequencies do not include post-1988 data.

Figure 2 shows that the 2011 event exceeded a 100-year flood. Although that was widely considered the case when the flood occurred, those flood frequencies were all based on pre-1988 data and thus did not integrate more recent events into the statistics. In 2015, Pioneer Technical Services (PTS) revised the flood frequency discharge values as part of a Musselshell River floodplain study using a more complete dataset that includes the 2011 and 2014 flood events (PTS, 2015). Their results indicated significantly higher peak discharge values for a given flood return interval than had been previously established at the Roundup gage. Whereas earlier studies indicated a 100-year flow event of about 11,500 cfs at Roundup, (Figure 2) the revised calculations increased that value to 15,750 cfs (Table 1, Pioneer, 2015). The PTS results indicate that, at Roundup, the 2011 event was just under a 100-year event, and the 2014 event was about a 50-year flood.

Table 1. Flood frequencies developed for Musselshell River at Roundup, USGS 06126500 (PTS, 2015).

Annual Chance of Occurrence	Return Interval	Discharge Musselshell River at Roundup (USGS 06126500) (cfs)
50%	2-year	1,229
10%	10-year	4,909
4%	25-year	8,252
2%	50-year	11,580
1%	100-year	15,750
0.2%	500-year	29,540

The geomorphic impacts of the 2011 flood had been massive along the entire length of the river, with extensive channel enlargement and rapid lateral migration. A total of 59 avulsions occurred during the flood which abandoned about 30 miles of channel (AGI and RATT, 2012). There were 31 locations where the river breached the abandoned Milwaukee Line railroad grade, which had been serving as a de-facto levee. Several diversion dams were breached. The geomorphic outcome of the 2011 event included a shorter, steeper, and wider river. The 2014 flood then caused additional geomorphic change in the previously destabilized river corridor.

In early June of 2018 another major flood occurred, the third in eight years (Figure 3 and Figure 4). Although this event recorded about half of the discharge measured at Roundup in 2011, it was still a 25-year flood event that had a long recessional limb throughout July, which provided a capacity to perform major geomorphic work in the river corridor. The relevance of flood history to the project is that, prior to the 2018 flood, the river was still in a state of post-2011 geomorphic adjustment. As such, subsequent 2018 flooding caused additional major geomorphic response which has affected site conditions and the appropriateness of previously developed remediation strategies.

Based on my observations of the river over the last decade, it appears that the 2011 flood response was magnified by pervasive straightening in the early 1900s, when the Milwaukee Railroad construction shortened the river by about 19% above Melstone (AGI and RATT, 2012). Over the 20th Century, the river had become somewhat downcut and entrenched, with floodplain clearing for agriculture synchronously reducing perched floodplain integrity. When the 2011 event spread flows across the entire floodplain, it showed little resistance to the high shear stress, causing a multitude of avulsions and channel shortening that left an over-steepened and erosive stream channel. The river then began to recover its length through bank erosion and channel migration. This was an expected post-2011 trajectory, however we had hoped the rate of change would be moderated by typical flows. Unfortunately, the two post-2011 floods caused the trajectory to be greatly accelerated, as additional downcutting and bank erosion generated massive volumes of bedload that were transported downstream. Accelerated sediment delivery

coupled with high flows in this reach drove exceedingly rapid point bar formation and bank erosion, causing channel migration, lengthening, and inset floodplain formation within the incised channel. Although these processes will progressively help the river return to a quasi-equilibrium state, the rapidity of the changes have created short-term havoc for those who occupy and use the river corridor. Furthermore, the prevalence of salt cedar in the reach is disappointing as it diminishes the value of inset floodplain development to woody riparian recovery.

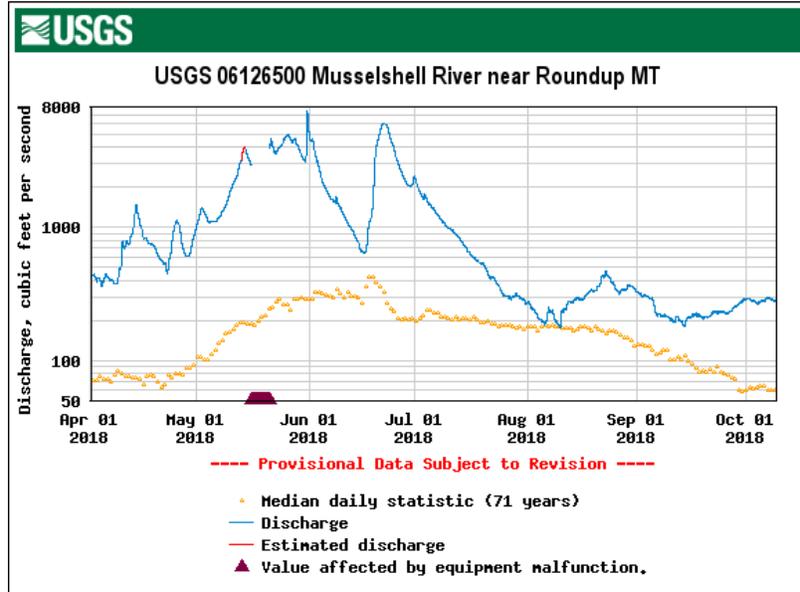


Figure 3. USGS hydrograph for spring and summer 2018 for Musselshell River at Roundup (USGS 06126500).

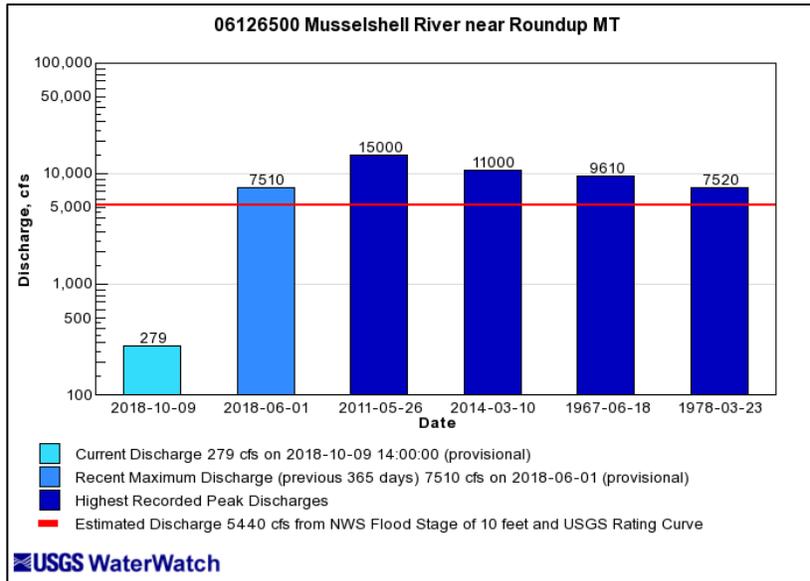


Figure 4. Major flood history for Musselshell River at Roundup (USGS 06126500).

2 Planform Evolution at Tipple Site

The Jeffries No. 18 Mine Tipple Site is located on a relatively small meander tab on the north bank of the Mussleshell River, confined between the abandoned Milwaukee Line railroad grade and the active streambank. In order to move coal from the south side of the river where it was mined to rail cars, an elevated road prism was constructed across the meander tab to intersect with the main rail line. Figure 5 shows an oblique view of the site prior to the 2018 flood. At this point the river had been widened substantially by the 2011 flood, and banklines were persistently raw and erosive. The Mine Tipple foundation can be seen in the air photo as a discrete concrete block, and the road prism crosses the meander tab at an angle just downstream.

Figure 6 shows the Tipple Foundation prior to the flood (MTDEQ, 2018). Also note the high road prism behind the Tipple Foundation and the identified waste coal in the foreground. Each of these areas were slated for remediation as described in a Draft Environmental Assessment of the site (MTDEQ, 2018).

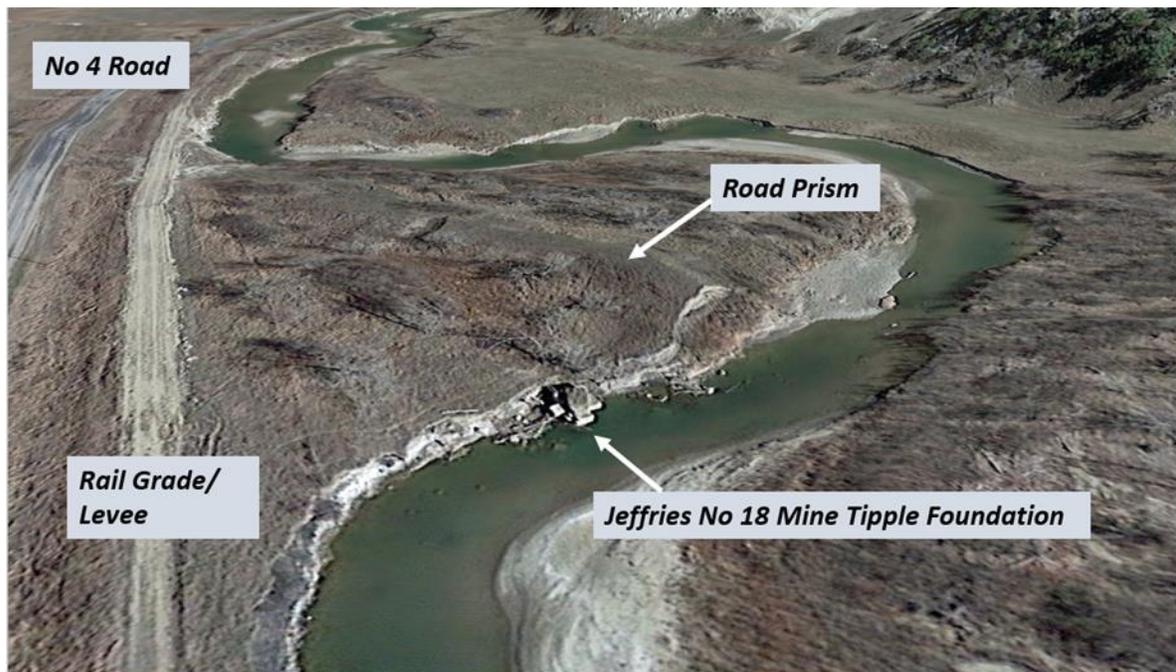


Figure 5. Oblique Google Earth image showing Mine Tipple Foundation and road prism downstream of Roundup; view is downstream (eastward).



Figure 6. View downstream of mine tipple and loading berm behind prior to 2018 flood; note how road prism behind tipple slopes to left (MTDEQ, 2018).

The 2018 flood drove dramatic planform changes at the site, which consisted primarily of unprecedented rates of lateral movement and associated bank migration. As the Tipple Foundation and high road prism were both located on the downstream limb of a meander, these areas were especially prone to bankline movement. Figure 7 shows the amount and patterns of bank movement since 1953 at the meander bend that hosts the Tipple Foundation and Road Prism. The meander shown by the 1953 banklines has essentially compressed and translated down valley (east) to its current configuration. Whereas the top image in Figure 7 shows the digitized banklines on a 2017 air photo, the lower image shows banklines overlain on a 2018 post-flood DEM provided by Pioneer Technical. Darker blue colors on the DEM that are dissected by yellow migration vectors show areas eroded during the 2018 flood that are now channel. This included erosion of the Tipple Foundation and Road Prism on the upstream end of meander, as well as extensive erosion of a previously productive hayfield downstream. Northward channel migration about a thousand feet downstream of the Tipple site breached the abandoned Milwaukee Rail grade which had been performing as a levee, allowing water to spill north of the Number 4 Road which runs parallel to the rail grade.

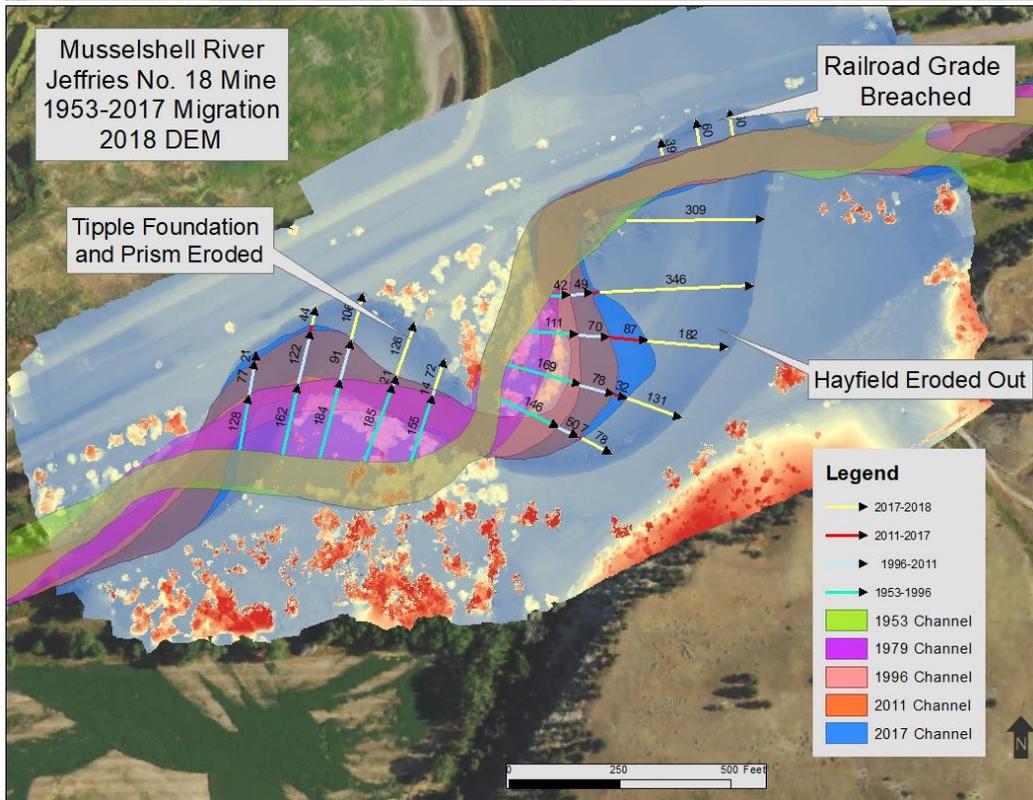
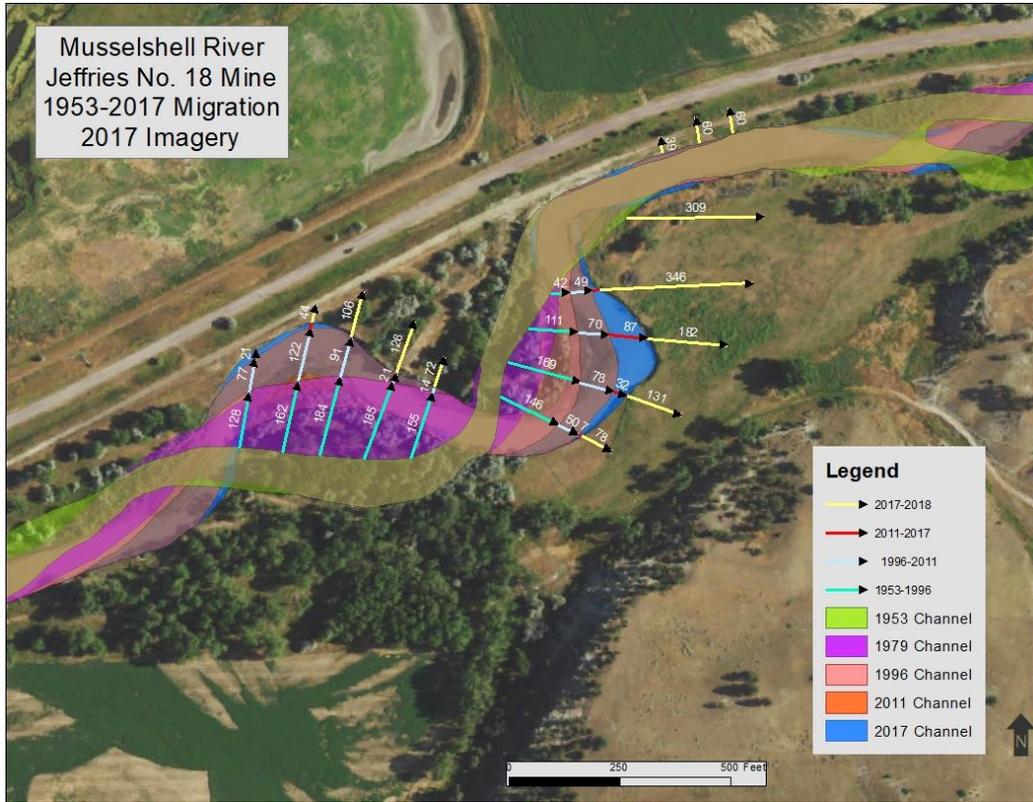


Figure 7. Bankline comparison showing pre-2018 conditions and post-flood erosion sites and extents.

Figure 8 shows the area where a hayfield eroded out on the lower limb of the meander, creating an overwidened channel/wetland complex that is actively being colonized by salt cedar. Figure 9 shows the rail grade breach located about 1,000 feet downstream of the project site.



Figure 8. View southward showing hayfield erosion on lower limb of tipple site bendway; colonizing vegetation on sand bars is primarily salt cedar.



Figure 9. View upstream showing railroad grade breach east of tipple site (site is located beyond Russian olive stand on left side of photo).

Although the 2011 flood was larger than that of 2018 with respect to discharge at Roundup, the geomorphic impact of the 2018 flood was far more substantial at the project site. Figure 10 and Figure 11 show the mean migration distances and mean migration rates at the site, respectively. Figure 10 shows that channel migration has been ongoing at the site as the 1953 bendway has been continuously compressing and translating in the downstream direction, which is a typical geomorphic trajectory for river meanders. When considered in terms of rates, however, Figure 11 shows the very high short-term rates of movement at the site. As the timeframes shown in these figures are not equivalent, the mean values are somewhat skewed, so the results are intended simply to show the general extent and high rate of movement during 2018 relative to the previous 65 years.

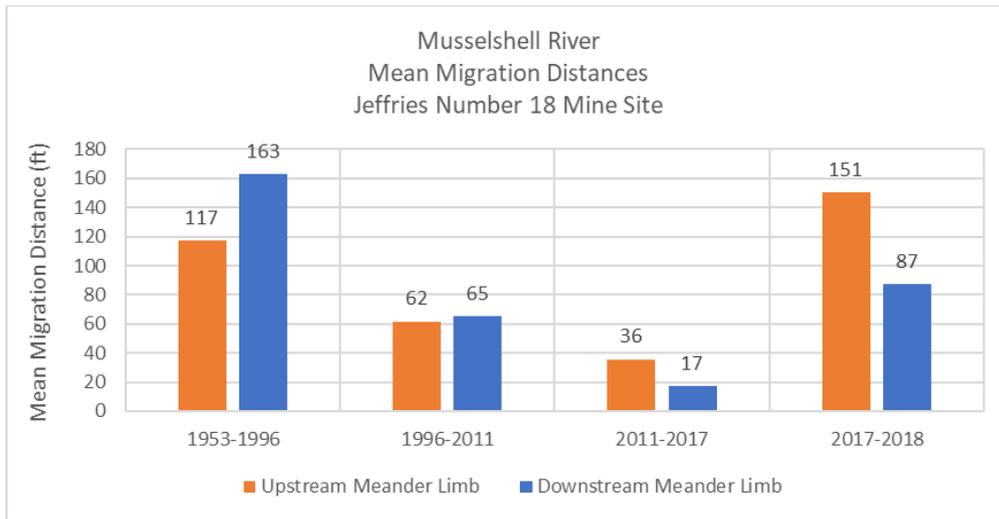


Figure 10. Mean migration distances at site for a range of timeframes.

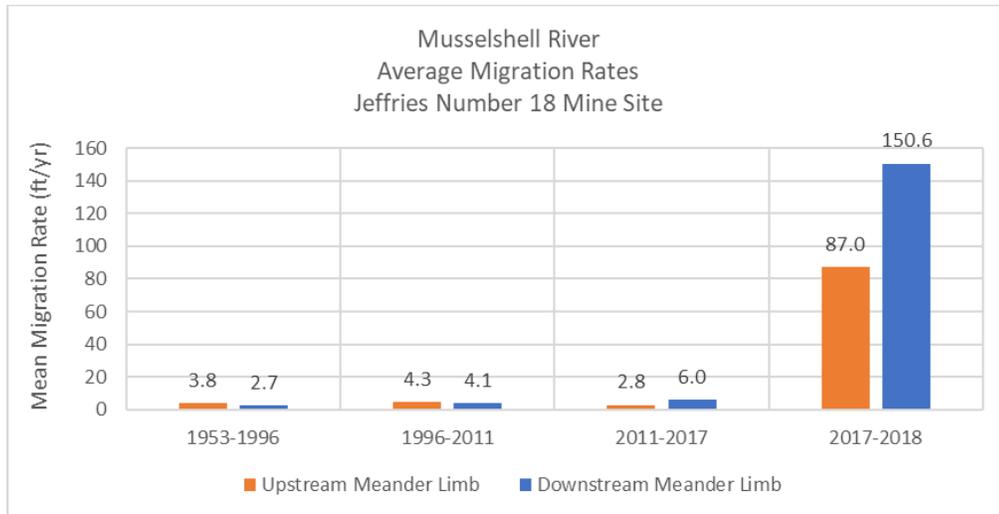


Figure 11. Mean migration rates at site for a range of timeframes.

3 Recommendations

The 2018 changes at the project site warrant a wholesale reconsideration of previously developed remediation strategies. Most importantly, the river channel has migrated through and beyond the Tipple Foundation, leaving it presumably buried under a newly developed point bar on the opposite bank (Figure 12). Additionally, about 0.2 acres of the road prism as well as floodplain areas identified as having waste coal were also eroded out (Figure 13).



Figure 12. Physical features relative to channel location in 2017 (top) and 2018 (bottom).



Figure 13. View upstream from road prism remnant showing point bar accretion over old tipple foundation and bank erosion that removed mapped waste coal.

Figure 14 shows a cross section drawn through the road prism to compare condition from a 2012 LiDAR dataset and the 2018 DEM. The comparison of cross sections was possible using an ARCVIEW 3-D analyst tool, although the vertical results are considered somewhat approximate due to inconsistent vertical datums (Figure 15). The cross sections show that, with about 40 feet of lateral migration, the high projection of the road prism shown in Figure 6 was eroded out, reducing the maximum prism height by about 10 feet. Presuming no downstream transport, the Tipple Foundation shown in Figure 6 is buried by several feet of recent sedimentation on the opposite bank. It is also interesting to note that the lateral migration shown in Figure 15 has exposed another concrete foundation that now sits at the bank toe (Figure 16).

Based on these observations, I recommend the following approaches for moving forward with site remediation:

- Remove the remainder of the road prism to promote floodplain connectivity and allow for further unimpeded channel migration without increasing natural sediment loads;
- Remove the concrete remnant shown in Figure 16;
- Identify and remove any additional coal waste material per MTDEQ's recommendations;
- Consider collaborative discussions with other stakeholders regarding north bank erosion, rail grade stability, and floodplain access. Consider broader context of floodplain connectivity (exit and return flow points) before plugging breaches or constructing elevated bank armor that inhibits overflows.
- Support weed management on site.

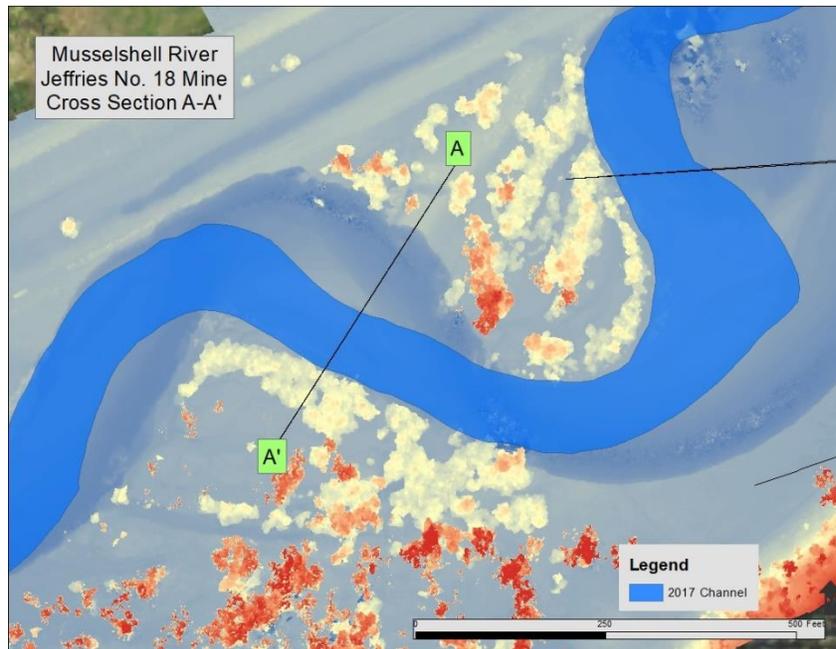


Figure 14. Digitized 2017 banklines overlain on 2018 DEM showing Cross Section A-A'.

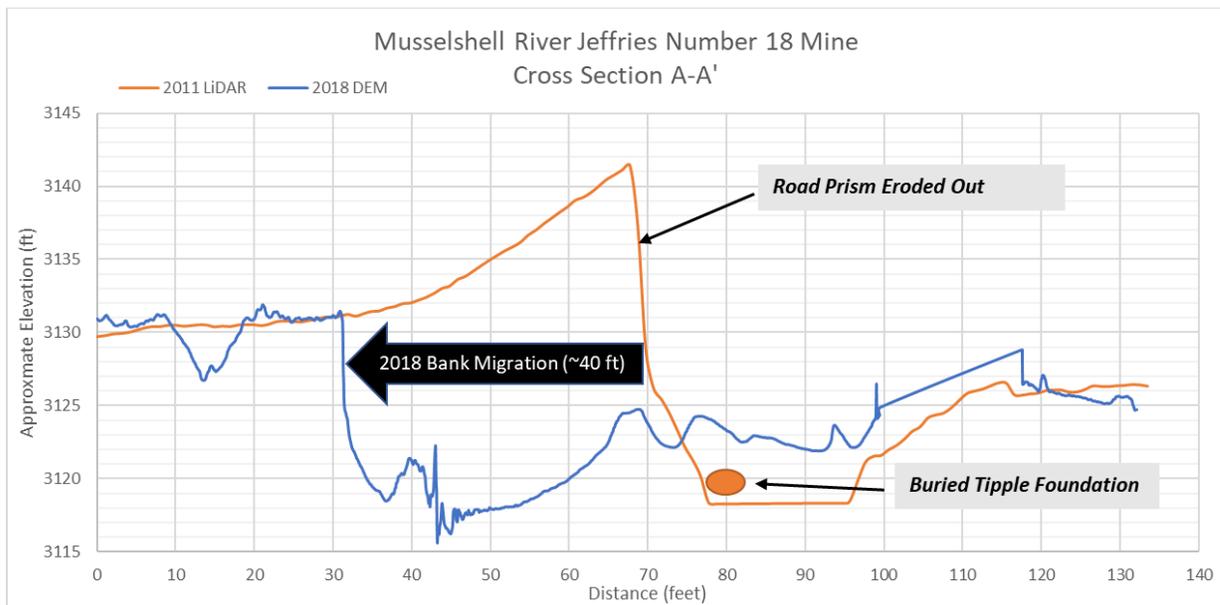


Figure 15. Comparison of 2011 LiDAR data (orange) with 2018 DEM showing bank migration at Cross Section A-A'; view is downstream.



Figure 16. Post-2018 view downstream of eroding bankline at project site showing exposure of concrete slab

4 References

AGI and RATT, 2012. Musselshell River Flood Rehabilitation River Assessment Triage Team (RATT) Summary Report.

Montana Department of Environmental Quality (MTDEQ), 2018. Jeffries No. 18 Mine Tipple Reclamation and Musselshell River Restoration Project, Musselshell County, Montana: Draft Environmental Assessment, 18p.

Pioneer Technical Services, Inc, 2015. Musselshell River Floodplain Study, Phase 1—Musselshell River Hydrologic Analysis: Report Prepared for Montana Department of Natural Resources and Conservation, 47p.