319 Nonpoint Source Final Application

FY2017 Final Applications are due Monday, September 26, 2016 by 2:00 pm

Section I: General Information

Project Title: Big Hole River NPS Pollution Reduction Project

Project Sponsor Information

Sponsor Name: Big Hole Watershed Committee (BHWC)

Registered with the Secretary of State? Yes

Registered with SAM? Yes

County: Anaconda-Deer Lodge

Website: http://bhwc.org

Tax Identification #: 11-3737644

DUNS #: 623593147

Primary Contact: Jennifer Downing
Title: Executive Director
Address: PO Box 21
City: Divide State: Montana Zip Code: 59727
Phone Number: 406-960-4855
Fax Number: NA
E-mail Address: info@bhwc.org
Signature: Jennifer Downing

Signatory: Jennifer Downing
Title: Executive Director
Address: PO Box 21
City: Divide State: Montana Zip Code: 59727
Phone Number: 406-960-4855
Fax Number: NA
E-mail Address: info@bhwc.org
Signature: Jennifer Downing

Project Location

12 Digit HUC #(s): Big Hole, 10020004

(1) Waterbody Name from 2016 List of Impaired Waters: French Creek (headwaters to mouth)

(1) Probable cause(s) of impairment to be addressed (ex. metals): Copper, Sedimentation/Siltation

(2) Waterbody Name from 2016 List of Impaired Waters: Oregon Creek (Headwaters to Mouth (California Crk-French Crk-Deep Crk)

(2) Probable cause(s) of impairment to be addressed (ex. metals): Sediment/Siltation; Physical Habitat Alt; littoral vegetation

(3) Waterbody Name from 2016 List of Impaired Waters: Lower Big Hole River (Divide Creek to Mouth (Jefferson River))

(3) Probable cause(s) of impairment to be addressed (ex. metals): Physical Substrate Habitat Alterations; Temperature, Water

Activity 1 Name	Oregon Creek Restoration	Latitude (1)	45.984361	Longitude (1)	-113.006657
Activity 2 Name	Lower Big Hole River Riparian	Latitude (2)	45.631871	Longitude (2)	-112.684468
Activity 3 Name		Latitude (3)		Longitude (3)	

Nonpoint Source (NPS) Information

Which WRP does the project implement? Middle-Lower Big Hole

What is the WRP status? DEQ-Accepted

Does the project address impairments identified in a TMDL? Yes

Waterbody Type: River/Stream

Functional Category: Riparian Projects

1st Pollution Category	Resource Extraction (Placer Mining)	Percent of Total (%)	70
2nd Pollution Category	Hydromodification (Channel Erosion/Incision)	Percent of Total (%)	10
3rd Pollution Category	Hydromodification (Removal of Riparian Vegetation)	Percent of Total (%)	20
4th Pollution Category		Percent of Total (%)	

Project Funding

319 Funds Requested	$300,000.00	Does the project sponsor have any open 319 contracts?	Yes
Matching Funds		Project Title	French and Moose Creek Restoration
State Cash Match	$250,000.00	DEQ Contract Number	216003
Local Cash Match	$5,000.00	319 Award	$225,000.00
In-Kind Match	$3,500.00	Projected Closing Date	December 31, 2017
Total Match	$258,500.00	Project Title	California Creek Restoration Project
Other Federal Funds	$0.00	DEQ Contract Number	214009
Total Project Budget	$558,500.00	319 Award	$216,400.00
Administrative Fee	$30,000.00	Projected Closing Date	Jun 30, 2017

Section II: Project Description

Goal and Objectives: Describe the overall goal and specific objectives for this project.

Project goal is to deliver NPS pollutant reductions and improved riparian and floodplain processes in two priority areas of the Big Hole River Watershed identified in the Middle-Lower Big Hole River Watershed Restoration Plan. Specific objectives are to to: 1) continue our priority sediment reduction work in the Mount Haggin WMA by executing the the Oregon Creek Restoration Project; 2) Deliver NPS improvements on private lands in the Lower Big Hole River by permitting, engineering and implementing projects on private ownerships that fall outside payment mechanism of existing Incentive Program.

Methods: Describe the approach selected to address/correct the problem(s), e.g. types of BMPs to be installed, and other important activities.

Oregon Creek: Remove placer mining remnants, re-establish natural stream meanders, reconnect floodplain and wetlands to reduce sedimentation/siltation at the lowest downstream portion of Oregon Creek near French Creek. This project is part of a larger watershed improvement project repairing damages and reducing sediment in the Deep Creek drainage.
Lower Big Hole River: Contract with engineering company to provide hydrologic assessment and designs for streamside projects on private lands, particularly the removal of rip-rap and establishment of natural vegetation on streambanks that increase in strength over time. As the incentive program is a payment program based on sediment, several projects- particularly involving removal of rip-rap or infrastructure-related impairments- are beyond the scope of current program. Funding allows for coordination with Madison County engineers where county infrastructure is source of problem, as is the case at two bridges. Funding provides means to design more ambitious projects with substantial NPS reduction. Results of physical habitat improvement and sediment load reductions will be monitored and reported on in coordination with DEQ TMDL program as part of transition to a private-sector funded Incentive Program.

Summary: Provide a brief summary of the project.

Oregon Creek Restoration: Oregon Creek is located on state-owned Mount Haggin WMA. Project site is mouth of Oregon Creek as it enters French Creek floodplain. Project would address excess sediment entering French Creek due to loss of riparian and wetland habitat function from placer mining. Oregon Creek and French Creek are impaired streams for sediment. Placer piles would be removed and stream sinuosity and floodplain area would be increased, enhancing natural sediment capture of the system through enhanced wetland and pool habitat. This work joins a complex of sediment reduction in French Creek, with California Creek and French/Moose Creek projects completed 2013-2016.
Lower Big Hole River: The lower river section is impaired by alterations to streambank vegetation and subsequent temperature increases, mainly from agricultural practices. An existing Incentive Program has attracted landowner interest on 12 properties to implement projects that address these NPS impairments, but some projects fall outside program scope. Funding would allow for the needed permitting, engineering and more implementation of more ambitious projects, particularly involving county infrastructure and removal of rip-rap on at least 600' of bank. Project also provides continuity of incentive as program evolves to a privately-funded model.

Each project implements the Middle-Lower Watershed Restoration Plan, addresses needs identified in the Middle-Lower Big Hole River TMDL. Work identified is designed to address water quality impairments and causes listed in the Non-Point Source Pollution Integrated Report. Each project also meets goals of the Montana State Water Plan and are supported by the goals communicated by the National Drought Resiliency Project.

Section III: Background Information

Statement of Project Need and Intent

Oregon Creek: BHWC has demonstrated technical and administrative capacity to pull off large-scale projects in the Mount Haggin WMA and is successfully restoring its top priority landscape for sediment reduction in the French Creek drainage. Work on Mount Haggin provides focused effort on a distinct area for a high volume of sediment load reduction in a localized area.

Lower Big Hole River Projects: Existing payment for ecosystem service program has limitations and cannot address the demand generated for incentive payments. The initial question of this program, will landowners take advantage of incentive payments for streamside projects if they are offered, has been answered affirmatively. However, payments for specific sediment reduction projects miss opportunity to remove rip-rap, re-establish native vegetation or mitigate infrastructure-related erosion issues on some portions of stream. Program is currently grant funded but BHWC seeks to create sustainable and market-driven mechanisms to fund restoration on private lands and move away from grant-funded program. This program echoes similar efforts being undertaken nationwide.

Describe the pre-project planning that has already occurred.

Oregon Creek:
1. MFWP released an Environmental Assessment June 2016 that includes the Oregon Creek and French Creek project area work.
2. Cultural Inventory completed by GCM, Fall 2015.
3. Project Development Report completed by RESPEC Spring 2016 including site survey, soil sampling for metals, alternatives analysis of potential restoration options, selection of alternative, preliminary design of selected alternative, cost estimates and next steps.
4. Funding request submitted to DNRC RDGP program May 2016 with sponsor Deer Lodge Valley Conservation District.

Lower Big Hole River:
1. Big Hole River Incentive Program was drafted 2012 and developed 2012-2016 to design a program that incentived landowner engagement in ecosystem benefits. This included a strategic plan developed in 2013.
2. Big Hole River Floodplain Maps state adopted 2014, county adoption 2015-2016 delineated floodprone areas at risk for sediment.
3. DNRC funded pilot program 2016-2017 including program development, outreach, payment of incentives to landowners.
4. Program launched 2016, bringing forth landowners with innovative efforts to improve and sustain Big Hole River. Includes close work with DEQ to align sediment load reduction in program with TMDL sediment load estimates and monitoring.

Collaborative Effort: Describe the collaborative effort you have engaged in to ensure support from all appropriate partners.

BHWC has a standing philosophy that inclusion in project partnerships is a critical part of long-term conservation success. By incorporating critical partners early and often, project work can realize greater success and with less conflict among differing stakeholders. The BHWC was built by this concept and we incorporate it into every project we take on, often serving as a coordination or communication hub. BHWC has a long-standing successful relationship with MFWP, MDT, MDEQ and Anaconda-Deer Lodge County. This relationship extends to private landowners, who value BHWC as a their trusted representative in front of funding agencies. Our partners buy in to watershed restoration and work to include water quality improvement into each opportunity. Our work together up to this point has been smooth and we expect it to continue.

In addition to partners listed below, our work on Mount Haggin also works closely with George Grant Trout Unlimited, The Nature Conservancy, Natural Resources Damages Program, and contractors Watershed Consulting, Morrison Maierle, Inc., RESPEC.

Partners and Roles: Identify the project partners and their roles.

Partner	Role
Montana Fish, Wildlife and Parks Jim Olsen, Fish Biologist Vanna Boccadori, WMA Manager	Landowner Project catalyst, Big Hole River Fish Biologist Mt. Haggin Wildlife Management Area (WMA) Manager, Wildlife Biologist
Montana Department Transportation	MT Highway 569 road relocation project lead/point of contact.
Deer Lodge Valley Conservation District	Deer Lodge Valley Conservation District is supportive of the project and is project sponsor for requested matching project funds.
Anaconda-Deer Lodge County	Project is located in Anaconda-Deer Lodge County. Project was coordinated with Doug Clark, Planning Director until he left his position June 2016. Position remains vacant.
Montana DEQ Wetlands & Water Quality Eric Trum Steve Carpenedo	Point of contacts for water quality and wetland improvement projects.

Technical and Administrative Qualifications

This contract and project work is led by BHWC, a non-profit watershed group for the Big Hole River Watershed. The BHWC is led by a 22 member Governing Board made up of diverse stakeholders and operated by three full-time and 2-part time staff. The full-time staff include Jennifer Downing, Executive Director with the organization for 6 years and experience operating large restoration projects successfully. Projects will be managed by Pedro Marques, Restoration Program Manager who has led Mount Haggin Restoration work for 7 years and has 10+ years work experience implementing innovated solutions for complex restoration problems. Work is also supported by Tana Nulph, with 2 years experience supporting reporting and contracting for state grants. Our organization utilizes appropriate resources for legal oversight, insurance, employee health and safety, budgeting and financial controls, payments. We also have a long track record of working with partners and leveraging resources. Where BHWC does not have the expertise or resources, BHWC successfully solicits and manges outside support of the highest quality contractors, including project designs, construction, oversight, and other needs. We are project ready, already possessing the tools, skills and resources to operate highly effective projects.

BHWC is trusted by landowners, partners, and the public who look to group for leadership and guidance.

The current partnership between MFWP, NRDP, MDT, BHWC and funders is a prime opportunity for successfully implementing these projects, where each is currently leading large scale project work that by 2016 had reached a $10 million investment with more to come.

Past and Current Projects

Funding Organization	Award Amount	Project Description	Project Status	Contact Information
Montana Department of Environmental Quality 319 2015 - 2017 216003	$225,000.00	French and Moose Creek Restoration: Project improved impaired French Gulch and Moose Creek placer mine and physical habitat alterations 2016. Construction occurred July-October 2016, with final monitoring and E&O to occur in 2017. Funds were part of a matrix of funds from DNRC RDGP, FFIP, and conservation groups totaling $1.2 million.	Open - End December 2017	Eric Trum Water Quality Specialist Montana Department of Environmental Quality (406) 444-0531 ETrum@mt.gov
Montana Department of Environmental Quality 319 2014 - 2017 214009	216,400	California Creek Restoration: Project improved impaired riparian and upland conditions resulting in heavy influx of sediment into California Creek, tributary to French Creek. In partnership with Natural Resources Damages Program (NRDP), Montana Fish, Wildlife & Parks (MFWP), and Watershed Consulting, Inc. DEQ added funds to this project 2016 and extended contract to 2017.	Open - End June 2017	Eric Trum Water Quality Specialist Montana Department of Environmental Quality (406) 444-0531 ETrum@mt.gov
Montana DNRC RDGP Planning Grant 2015-2016 RITP-16-0106	$20,000.00	Oregon Creek Planning Grant was sponsored by Deer Lodge Valley Conservation District and managed by BHWC. Grant supported project development for Oregon Creek including survey, alternatives analysis, cultural inventory, and basic project design all of which were used to create and submit an Oregon Creek RDGP request May 2016.	Closed 6/2016	Stephanie Hester RDG Program Manager DNRC P.O. Box 201601 Helena, MT 59620-1601 406.444.0547 shester@mt.gov
Montana Livestock Loss Board 2016	$30000.00	Upper Big Hole Livestock-Predator Conflict Programs: Supports Range Riders on USFS allotments, carcass removal (to reduce predator attractant), carcass composting all to alleviate conflict with wolves and grizzly bears. In partnership with Wildlife Conservation Society, People & Carnivores, MFWP, USFS. Third consecutive year of funding.	Open - End December 2016	George Edwards Montana Department of Livestock Helena, Montana (406) 444-5609 gedwards@mt.gov
Future Fisheries Improvement Program 2014-2016	274,061	French Gulch restoration support grants. Total is from three phased program grants, one of which is under MFWP, two under BHWC. BHWC is administering the three grants for the French Gulch project.	Open	Michelle McGree FFIP Program Officer MFWP Helena, MT 59620-0701 406-444-2432 mmcgree@mt.gov

Section IV: Scope of Work

Task 1 Title Oregon Creek - Project Development, Final Design, Construction Oversight, Construction

Description

This task includes steps required to develop and manage project, complete a final design, oversee construction, and support construction on large-scale project with estimated cost over $650,000. Work and cost is based on preliminary design and cost estimate created in 2016 by RESPEC, Inc.. This task will be matched with other funds to complete:
1. Oversee and develop project: BHWC will be lead and point of contact on this project, including soliciting and manging fund additional funds, working with partners, stakeholders, hire and oversee contractors, ensure project meets stated goals and objectives in a timely, efficiently, and completely. Maintain tools, resources, support required for project.
2. O&M: BHWC will work with landowner MFWP to enact Landowner Agreement.
2. Finalize Design & Oversight - Oregon Creek final design, permitting support, construction solicitation bid, oversight of construction.
3. Construction: Total cost estimate is $1.75 million. Remaining fund sources are state and private funds, specifically the DNRC RDG program. Implementation includes removal of placer and dredge piles, reconnect stream with floodplain, stream channel restoration, reinstate wetlands. Complete in 2018.
4. Provide results in "Oregon Creek Restoration Final Report" including design documents, deviations from design, photos and monitoring results from Task 3. Complete in 2018.

Deliverables

1. O&M: MFWP Landowner Agreement
2. Final Oregon Creek Design, including DEQ review of draft design.
3. Final Oregon Creek Restoration Final Report, including DEQ review of draft
4. All permits, including Wetland delineation, Army Corps and State permits

Task 1 Funding

319 Funds	$162,243.00
Non-Federal Match	$250,000.00
Other Federal Funds	
Total Cost	$412,243.00
Is Match Secured?	No

Timeline July 2017- December 2018

Match Source DNRC RDGP Program; MFWP permitting in-kind support

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Task 2 Title Education & Outreach

Description

BHWC will provide public outreach for the project including progress, status and results during the life of the project. This will include:

1. Status Reports/Media: BHWC will publish content related to the project goals and scope, progress and results on the BHWC website, social media, and public media outlets.

2. Newsletter: BWHC will create, publish, and distribute 1 BHWC mailing and include project status or results.

3. Public Meeting: Project status or results will be presented at 1 BHWC monthly meeting.

4. Public Tour: 1 stakeholder tour of the project site will be created and hosted by BHWC near project completion.

Target audience: Residents and Recreationists of the Big Hole Valley, BHWC Partners, Mining reclamation professionals or interested parties.

Deliverables

1. One BHWC Newsletter - provide copy
2. One BHWC Public Meeting - provide meeting notes.
3. One BHWC Public Tour of project site - provide attendance roster, agenda, advertising/agenda

Task 2 Funding

319 Funds	$7,000.00
Non-Federal Match	$2,500.00
Other Federal Funds	
Total Cost	$9,500.00
Is Match Secured?	No

Timeline Summer-Fall 2017-2018

Match Source Participation in public outreach and eduction events

Task 3 Title Monitoring & Sampling Analysis Plan

Description

1. SAP: Develop a Sampling & Analysis Plan (SAP) for project monitoring. SAP will include pre- & post- implementation channel cross sections and sediment loading reduction estimates, and photos. Background information provided by the TMDL, cultural inventory and project development report.

2. Monitoring: Post-project monitoring and implementation of the SAP. To include pre and Post-project aerial imagery of project site from survey-grade UAS (Unmanned Aerial System, aka "drone".)

3. Results: Monitoring results to be reported as part of the "Oregon Creek Restoration Final Report" in Task 1.

This work will be completed in partnership with design contractor, MFWP and BHWC.

Deliverables

1. Oregon Creek Restoration Sampling & Analysis Plan Final, include draft review by DEQ

2. Monitoring results reported in "Oregon Creek Restoration Final Report" in Task 1

Task 3 Funding

319 Funds	$15,000.00
Non-Federal Match	$1,000.00
Other Federal Funds	$0.00
Total Cost	$16,000.00
Is Match Secured?	No

Timeline July 2017-July 2019

Match Source None

Task 4 Title Lower Big Hole River Riparian Habitat and Water Temperature Improvement Projects

Description

This task fills critical gaps to deliver on-the-ground stream restoration projects on private lands in the Lower Big Hole River and provides critical bridge funding that allows the BHWC to continue delivering on-the-ground projects after pilot funding ends in 2017.

1. Engineering and hydrological analysis and design consultation for difficult projects that have no margin for failure
2. Permitting support to landowners
3. Effectiveness monitoring to document reduction of impairments against TMDL listings
4. Education and outreach to demonstrate proof of concept to transition this program to its desired future condition: a funding source available to landowners for streamside vegetation and erosion improvements derived from the private sector, specifically the anglers, hospitality and tourist economy that depends on a healthy river system in this agriculture-dominated river valley.

Deliverables

1) Engineered design for streamside vegetation improvement projects involving the replacement or avoidance of rip-rap and installation of bio-engineered banks on at least 800 feet of stream in the lower river
2) Permitting for all projects enrolled under the existing Incentive Program that currently lacks funding to support this essential component of streamside vegetation improvement projects
3) A report, coordinated with DEQ TMDL personnel on effectiveness of Incentive Program projects for NPS reductions and vegetation enhancement, linking restoration outcomes, TMDL reductions, and payments for ecosystem services
4) Participation in two conferences or public events related to PES programs

Task 4 Funding

319 Funds	$85,757.00
Non-Federal Match	$5,000.00
Other Federal Funds	$0.00
Total Cost	$90,757.00
Is Match Secured?	No

Timeline July 2017-December 2019

Match Source none

Task 5 Title Administration

Description

BHWC will hold the 319 contract and provide administration duties for the contract. This includes:
- Track work completed under contract between 319 & BHWC to meet contract requirements;
- Submit quarter, annual and final reports to MDEQ;
- Report to and work with MDEQ staff;
- Document expenses and match dollars for project;

Administrative funds also provide support for BHWC insurance.

Deliverables

1. Quarter reports for life of contract
2. Annual reports for life of contract
3. Final contract report

Task 5 Funding

319 Funds	$30,000.00
Non-Federal Match	$0.00
Other Federal Funds	$0.00
Total Cost	$30,000.00
Is Match Secured?	No

Timeline July 2017-December 2019

Match Source None

Task 6 Title

Description

Deliverables

Task 6 Funding

319 Funds	
Non-Federal Match	
Other Federal Funds	
Total Cost	
Is Match Secured?	

Timeline

Match Source

Section V: Supporting Documents

Detailed Project Budget

Task Number and Specific Action	319 Funds	State Cash Match	Local Cash Match	In-Kind Match	Federal Funds	Total Costs
Task 1: Final Design and Oversight	$144,743	$250,000				$394,743
Task 1: Permitting, Implementation, Coordination	$17,500					$17,500
Task 2: Education and Outreach	$7,000			$2,500		$9,500
Task 3: Monitoring and Sampling and Analysis Plan	$15,000			$1,000		$16,000
Task 4: Engineering/Permitting Support	$15,000		$5,000			$20,000
Task 4: Project Implementation	$58,757					$58,757
Task 4: Effectiveness Monitoring	$7,000					$7,000
Task 4: Education and Outreach	$5,000					$5,000
Task 5: Administration	$30,000		$0			$30,000
TOTAL	$300,000	$250,000	$5,000	$3,500		$558,500

Project Milestone Table: Complete the following Project Milestone Table by entering task numbers and titles in the left hand column, then check the box(es) for the appropriate quarter(s) and years(s) in which you will be working on the task.

Milestone	Spring 2017	Summer 2017	Fall 2017	Winter 2017	Spring 2018	Summer 2018	Fall 2018	Winter 2018	Spring 2019	Summer 2019	Fall 2019
Task 1: Oregon Project Management	■	■	■	■	■	■	■	■	■	■	■
Task 1: Oregon Creek Final Design	☐	☐	■	■	■	☐	☐	☐	☐	☐	☐
Task 1: Oregon Creek Construction and Oversight	☐	☐	☐	☐	■	■	■	☐	■	☐	☐
Task 1: Oregon Creek Final Report	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	■
Task 2: Oregon Creek Public Outreach	☐	☐	☐	☐	☐	■	■	☐	■	■	☐
Task 3: Oregon Creek Aerial Survey and Monitoring	☐	☐	☐	☐	■	■	☐	☐	■	■	☐
Task 4: Lower Big Hole River analysis, design, developement for streambank projects o private lands	■	■	■	■	■	■	☐	■	☐	☐	☐
Task 4: Lower Big Hole River - install projects on private lands	☐	☐	☐	☐	■	■	☐	☐	■	■	☐
Task 4: Coordinate effectiveness monitoring criteria with DEQ for NPS reductions and report results publicly	☐	■	☐	☐	■	■	■	☐	■	☐	☐
Task 5: Administration	■	■	■	■	■	■	■	■	■	■	■
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Submit **project map(s)** and **letters of support (at least 3)** along with the Final Project Proposal form. If your organization is not the author of the WRP you hope to implement, you must request a letter of support from the original authoring entity. If the authoring entity refuses to provide a letter of support, use the additional space at the end of the application to describe their response. If design drawings are available, provide those as well. For on-the-ground work, include copies of applicable permits if available.

- ☒ Project Map
- ☒ Letters of Support
- ☒ Design Drawings
- ☒ Applicable Permits
- ☐ Draft of amended WRP (if applicable)
- ☒ Photos
- ☐ Landowner Agreements

Use the space provided for any additional information that may not have been captured elsewhere in this Final Project Proposal

The BHWC, established 1995, seeks understanding and agreement among individuals with diverse viewpoints on water use and management in the Big Hole River watershed. Our education, planning, restoration, and partnerships work in Land Use Planning, Weeds, Wildlife, and Water Quality. We have implemented six DEQ contracts successfully since 2010, five of which were 319 contracts. We are experienced at operating state, federal, and private grants. Improving water quality is a top priority of the BHWC. We have two approved watershed restoration plans, operate an active drought management plan to maintain river flows and water temperatures, and have implemented many projects in education and outreach, on-the ground restoration, and partnerships. Learn more at http://bhwc.org. BHWC is a key coordinating force for landscape-scale restoration in the Mount Haggin Wildlife Management Area, a trusted partner by key personnel at MFWP, Jim Olsen (Fish Biologist) and Vanna Boccadori (Wildlife Biologist). This partnership is widely recognized in the restoration and resource management community, and the BHWC is regularly called upon to host tours of its work highlighting its project work.

The BHWC is uniquely qualified among non-profit watershed groups in Montana to push and demonstrate the next generation of NPS restoration initiatives being discussed across the country and around the world- namely privately funded payment programs based on the delivery of ecosystem services. We seek to leverage our world class fishery and recreation economy to fund a permanent incentive program available to the agricultural community for improvements to NPS pollution on their lands.

Big Hole Watershed Committee
Post Office Box 21
Divide, MT 59727
(406) 960-4855
info@bhwc.org
bhwc.org

BIG HOLE
WATERSHED COMMITTEE
Conservation Through Consensus.

September 26, 2016

Montana Department of Environmental Quality
Water Quality Planning Bureau
PO Box 200901
Helena, Montana 59620

Dear Mr. Robert Ray,

Please accept the Big Hole Watershed Committee's submission of a 319 grant proposal. Our request supports the reduction of sediment inputs into Oregon Creek on the Mount Haggin Wildlife Management Area and physical habitat, sediment and temperature in the Lower Big Hole River.

A hard copy version of our proposal is included:

- 1 Hardcopy DEQ Final Proposal Form
- 3 Letters of Support
- Attachments:
  - Big Hole Watershed – Project Locations and Images
  - Oregon Creek Project Files – Maps, preliminary design, photos
  - MFWP EA Decision Notice

An electronic version of these files were e-mailed to rray@mt.gov 9/26/2013 via the State File Transfer Service.

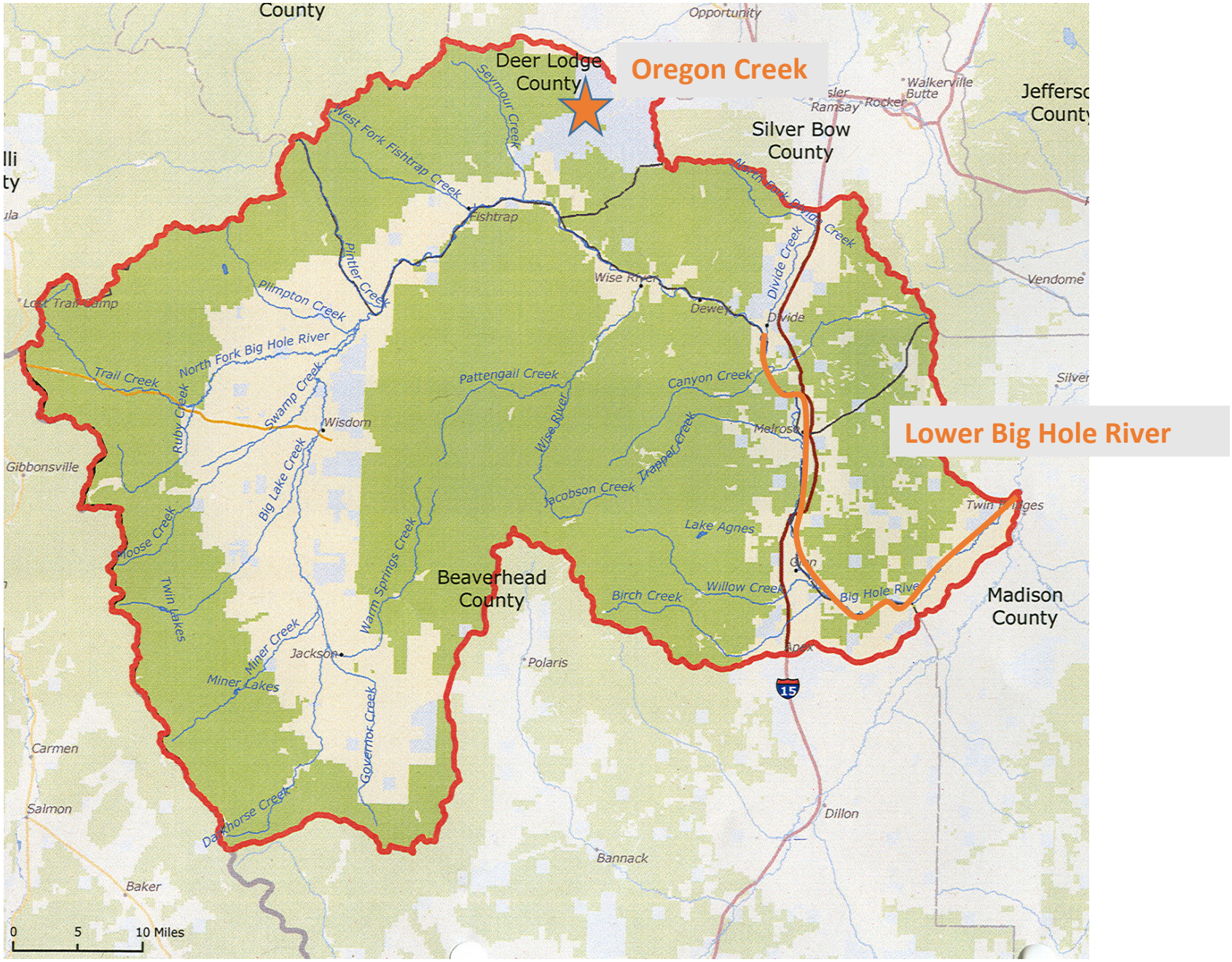
We look forward to visiting and discussing this project October 20. Thank you and MDEQ staff for assisting us with this application and all our efforts in the Big Hole.

Sincerely,

Jennifer Downing
Executive Director

Big Hole River NPS Pollutant Reduction Project 2016

Project Locations



Task 4: Big Hole River Incentive Program Projects

Diversity and spatial distribution of landowner interest in NPS pollutant reduction when offered incentive

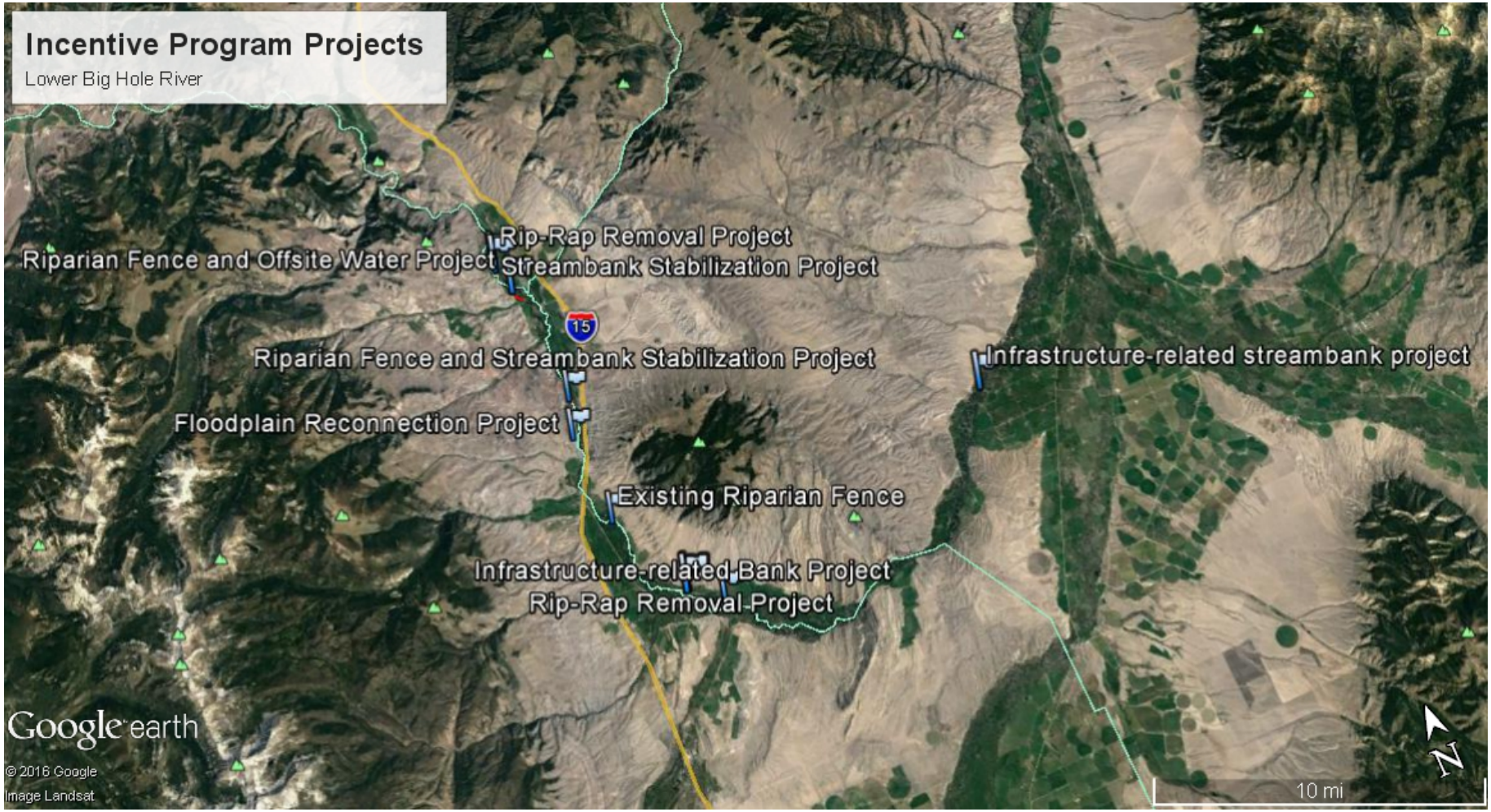


Figure 1. Infrastructure-related Bank Stability Project

Figure 2. DEQ TMDL personnel supporting incentive program to fine-tune sediment payment metrics on proposed project area

Figure 3. Rip-rap removal project

Figure 4. Infrastructure-related bank stability and rip-rap removal project

Montana Fish, Wildlife & Parks

1820 Meadowlark Lane, Butte, MT 59701

18 September 2016

Montana Department of Environmental Quality
PO Box 200901
Helena, Montana 59620

Dear Mr. Robert Ray,

On behalf of the wildlife program in Fish, Wildlife & Parks' Region 3, I'd like to state my support for the Oregon Creek Project. As the wildlife biologist that manages Mount Haggin Wildlife Management Area (WMA), I look for projects that will improve habitat conditions for native wildlife. Sometimes it is the case that on-the-ground efforts have broader ramifications and provide benefits to fisheries and water as well. The Oregon Creek project is such a case.

The main goals of this project are to remove placer mining remnants, re-establish the stream channel, and reconnect the floodplain and wetlands to reduce sedimentation and siltation in French Creek as well as in Oregon Creek. This work will undo a century of past mining practices that channelized the creeks and greatly reduced the wetland and riparian function. The habitat in this area supports moose, elk, deer, ruffed grouse, and numerous small mammals and song bird species. Restoring the floodplains and stream meanders will expand the riparian zone and wetland areas, this increasing the capacity to support more wildlife.

Further benefits to water, fish and wildlife will be realized as the proposed project work adds to the larger body of restoration work on Mount Haggin including the uplands and California Creek upstream, the road relocation nearby as well as the extensive work downstream in the French Creek area. The work on Mount Haggin is a cooperative effort with Montana Fish, Wildlife and Parks, Natural Resources Damages Program, Big Hole Watershed Committee and Montana Department of Transportation. Through collaboration and expertise of the group, we have been able to develop and implement a sound restoration plan for each project area that provides a landscape scale improvement. The Oregon Creek addition will help add to this effort.

Thank you for the opportunity to provide support for the Oregon Creek project. If I can be of further assistance, please don't hesitate to contact me at 406-498-2082.

Sincerely,

Vanna Boccadori
Montana Fish, Wildlife & Parks, Butte Area Wildlife Biologist

George Grant TU
PO Box 563
Butte, MT 59703

September 25, 2016

Montana Department of Environmental Quality
Attn. Robert Ray
PO Box 200901
Helena, Montana 59620

Dear Mr. Ray,

I'm writing to you on behalf of the George Grant Chapter of Trout Unlimited (GGTU) in regard to the Oregon Creek Project, near Mill Creek Pass, MT ST HWY 569.

GGTU represents over 300 active member who live near and recreate on the Big Hole Watershed which is impacted by these projects. These projects seek to restore streams damaged by the mining legacy and timber over-harvesting of the late 1800's and early 1900's. The area is fascinating due to its mining and logging history. Unfortunately we are now are left with streams that have been so abused they can no longer hold back the sedimentation that's carried by high flows during high water events. The streams in this drainage no longer act as healthy normal streams do as they meander through a gulch. Consequently the fish and wildlife are greatly impacted by the legacy of mining and timber over-harvesting. The good news is that a number of groups have partnered together and have made significant strides to remediate and restore the Watershed. The Big Hole Watershed Committee (BHWC), Montana Fish Wildlife and Parks (MFWP) and GGTU in cooperation with the Montana Department of Transportation have spent significant resources in terms of time and money contributing to Montana's Law that states the citizens of Montana have a right to

a clean and healthy environment. It is projects like these and particularly these that are critical to the health of the Big Hole River and the people who live here. It's been a wonderful thing to work with and beside the fine folks who live in this area; ranchers, fishermen, business men and women, miners from Butte, guides and outfitters and legislators representing the broad spectrum of the citizens in our area on these projects. I've sat with these people through meetings (which seem interminable), cut willow stakes to plant in the reconstructed stream bottoms, done business with them, fished with them, drank with them in the local establishments, ate with them at conventions and worked with generations of them. These projects are universally important to everyone. But as hard as we work, as many fundraiser as we have, as much as we give we still need financial assistance to get the job done. It's our privilege to be able to work together and it's our right as citizens of Montana to expect a clean and healthy environment. That's why our cooperative groups need the funding to complete the work that's been started. It's good, important work. We're almost there. We urge you to approve the funding to finish the work we've begun.

Respectfully,

Roy Morris

Roy Morris
President
George Grant TU
PO 563
Butte, MT 59703

Montana Fish, Wildlife & Parks
1820 Meadowlark Lane, Butte, MT 59701

September 20, 2016

Montana DEQ
PO Box 200901
Helena, Montana 59620

Dear Mr. Ray,

I am writing this letter in support of the Big Hole Watershed Committee's application for funding to restore the impacts of placer mining on the water quality and aquatic and riparian habitat in Oregon Creek. I am the Fisheries Management Biologist for MT FWP who covers the Big Hole River drainage and I have been involved with the project lead from its inception. Working with the Deer Lodge Valley Conservation District we secured a DNRC grant to develop a restoration design for Oregon Creek. When implemented, this design will restore natural function to the stream in the areas most impacted by mining which have resulted in impacts to water quality and aquatic habitat. A functioning stream channel and floodplain will reduce stream bank erosion and sediment loading downstream and create higher quality aquatic habitat. The risk of mercury contaminated sediments entering the stream will also be greatly reduced or eliminated by relocating the newly constructed stream channel and floodplain away from contaminated sediments.

French Creek, which Oregon Creek drains into, has been a priority watershed for restoration by the Big Hole Watershed Committee because of the potential for significant improvements in water quality. Work is currently underway in the headwaters (California Creek) to improve water quality affected by atmospheric deposition from the Anaconda Smelter and a project is being completed in French Gulch to restore the impacts of placer mining in that stream. French Creek is also slated for native fish restoration including Arctic grayling and westslope cutthroat trout. Native salmonids are not as tolerant to habitat alterations and fine sediment loading as non-native brook trout. The mining in the Oregon Creek area was likely a significant contributor to the demise of native fish in the drainage. Once restored to a native fish population, French Creek will represent the second largest interconnected stream system (over 40 miles of stream) in the upper Missouri River drainage with a native fish community. The project will also result in achieving approximately 25% of the westslope cutthroat trout restoration goal of 400 miles of stream restored to westslope cutthroat trout in the Big Hole Drainage (Statewide Fisheries Management Plan 2011). Oregon Creek is also home to a native population of pearlshell mussels. No pearlshell mussels have been documented in Oregon Creek, but they are present farther downstream. It is likely that the altered habitat conditions and fine sediment inputs in the mined reaches of Oregon Creek limits mussel colonization of the area. It may be possible to restore pearlshell mussels to Oregon Creek once water quality and aquatic and riparian habitat is improved.

The collaboration between FWP, the Big Hole Watershed Committee and other partners to improve the water quality and fisheries in the French Creek drainage including Oregon Creek represents a huge step in the right direction in this area. While noteworthy healing has occurred over the past 100 years, there are still significant impacts to water quality due to past practices in the area and many areas of stream and surrounding landscape have not healed. Efforts such as those proposed in the 319 grant application will make great strides in reducing fine sediment loading to Oregon Creek and will prevent mercury contaminated sediments from the stream. I would hope that Montana DEQ funds this grant proposal because of the potential improvements to water quality and stream and floodplain function of the area.

Sincerely,

Jim Olsen
Fisheries Biologist
Montana Fish Wildlife and Parks

Montana Fish, Wildlife & Parks

Region Three
1400 South 19th
Bozeman, MT 59718

June 13, 2016

To: Governor's Office, Tim Baker, State Capitol, Room 204, P.O. Box 200801, Helena, MT 59620-0801
Environmental Quality Council, State Capitol, Room 106, P.O. Box 201704, Helena, MT 59620-1704
Dept. of Environmental Quality, Metcalf Building, P.O. Box 200901, Helena, MT 59620-0901
Dept. of Natural Resources & Conservation, P.O. Box 201601, Helena, MT 59620-1601
Montana Fish, Wildlife & Parks:

Director's Office	Parks Division	Lands Section	FWP Commissioners
Fisheries Division	Legal Unit	Wildlife Division	Design & Construction

MT Historical Society, State Historic Preservation Office, P.O. Box 201202, Helena, MT 59620-1202
MT State Parks Association, P.O. Box 699, Billings, MT 59103
MT State Library, 1515 E. Sixth Ave., P.O. Box 201800, Helena, MT 59620
James Jensen, Montana Environmental Information Center, P.O. Box 1184, Helena, MT 59624
Janet Ellis, Montana Audubon Council, P.O. Box 595, Helena, MT 59624
George Ochenski, P.O. Box 689, Helena, MT 59624
Jerry DiMarco, P.O. Box 1571, Bozeman, MT 59771
Montana Wildlife Federation, P.O. Box 1175, Helena, MT 59624
Wayne Hurst, P.O. Box 728, Libby, MT 59923
Jack Jones, 3014 Irene St., Butte, MT 59701
Jack Atcheson, 2309 Hancock Avenue, Butte MT 59701
U.S. Army Corp of Engineers, Helena
U.S. Fish and Wildlife Service, Helena
U.S. Fish and Wildlife Service, 420 Barrett Street, Dillon, MT 59725
Big Hole Watershed Committee, P.O. Box 931, Butte, MT 59703
Montana Trout Unlimited, P.O. Box 7186, Missoula, MT 59807
Dan Vermillion, FWP Commissioner, Livingston MT
Earnest and Colleen Bacon, 2215 Fishtrap Creek Road, Wisdom, MT 59761
Dept. of Natural Resources and Conservation, 730 N. Montana Street, Dillon, MT 59725-9424
George Grant Chapter of Trout Unlimited, P.O. Box 563, Butte, MT 59703
Skyline Sportsmen, P.O. Box 173, Butte, MT 59703
Anaconda Sportsmen, 2 Cherry, Anaconda, MT 59711
E.T. Bud Moran, Chairman CSKT, PO Box 278, Pablo, MT 59855
Al Lubeck, 2710 Amherst, Ave, Butte, MT 59701
Adam Rissien, ORV Coordinator, Wildands CPR, PO Box 7516, Missoula, MT 59807
Josiah Pinkham, Tribal Arch., Nez Perce Tribe, PO Box 365, Lapwai, ID 83540
John and Sandy Gordon, Juniper Acres Rd, Butte, MT, 59750
Phil Ralston, 54289 MT Highway 43, Wise River, MT 59762
Martin White, 3308 46th Ave. SE, Mandan ND, 58554-4730
Jerry Lussie, 305 Main Street, Anaconda, MT 59711
Jim Schmeller, Montana Living Trust, 4935 Everett Rd, Akron, OH 44333
Kieth and Jean Rankin, P.O. Box 28, Anaconda, MT 59711
Richard Seddon, 2017 Harrison Ave# 237, Butte, MT 59701
Haddox Ventures LLC, 9141 Briar Forest Dr., Huston, TX 77024

Ladies and Gentlemen:

Montana Fish Wildlife & Parks (FWP) is proposing to restore habitat and native aquatic species to the French Creek watershed in the Big Hole River drainage. The habitat restoration component of the project would consist of reclaiming areas in the upper watershed impacted by atmospheric deposition of harmful substances from the Anaconda Smelter.

This restoration work would focus on establishing vegetation on unvegetated slopes of Sugarloaf Mountain and the creation of sediment retaining structures to reduce copper and arsenic laden sediments from reaching California Creek. Habitat would also be restored in placer mined reaches of French Creek, French Gulch Oregon Creek and Moose Creek. The goal of this restoration would be to restore stream function, a floodplain and fish passage in mined reaches of the streams. Pasture fences and water development would be created to improve grazing managment.

Native fish species restoration is being proposed as part of the overall watershed restoration. Native fish restoration would consist of the construction of a fish migration barrier on French Creek near the downstream boundary of the Mount Haggin Wildlife Management Area (WMA). This fish barrier would consist of an earthen dam with a concrete spillway that forms a small waterfall and precludes upstream fish passage. Upstream of the fish barrier there are more than 40 miles of stream that currently contain fish. Once the fish barrier is in place non-native trout (brook trout and rainbow trout) would be removed from the stream using the piscicide rotenone in the formulation of CFT Legumine (5% rotenone). Once non-native fish are removed, native westslope cutthroat trout (WCT) and Arctic grayling would be stocked into the stream.

A total of 2 written comments were received.

It is my decision to proceed with the proposed restoration actions in the French Creek watershed.

Questions regarding these Decision Notices should be mailed to:

Montana Fish, Wildlife & Parks
French Creek Restoration
Attn: Jim Olsen
1820 Meadowlark Ln.
Butte, MT 59701

or e-mailed to: jimolsen@mt.gov

Sincerely,

Sam B. Sheppard
Region Three Supervisor

c: Travis Horton

Environmental Assessment for Watershed Restoration in French Creek, Big Hole River Drainage

ENVIRONMENTAL ASSESSMENT DECISION NOTICE

Montana Fish, Wildlife & Parks
Region Three, Bozeman
June 14, 2016

Proposed Action

Montana Fish, Wildlife & Parks is proposing to restore habitat and native aquatic species to the French Creek watershed in the Big Hole River drainage. The habitat restoration component of the project would consist of reclaiming areas in the upper watershed impacted by atmospheric deposition of harmful substances from the Anaconda Smelter. This restoration work would focus on establishing vegetation on unvegetated slopes of Sugarloaf Mountain and the creation of sediment retaining structures to reduce copper and arsenic laden sediments from reaching California Creek. Habitat would also be restored in placer mined reaches of French Creek, French Gulch, Oregon Creek and Moose Creek. The goal of this restoration would be to restore stream function, a floodplain and fish passage in mined reaches of the streams. Pasture fences would be relocated to reduce livestock impacts to the riparian area and stream channel. Native fish species restoration is being proposed as part of the overall watershed restoration. Native fish restoration would consist of the construction of a fish migration barrier on French Creek near the downstream boundary of the Mount Haggin Wildlife Management Area (WMA). This fish barrier would consist of an earthen dam with a concrete spillway that forms a small waterfall and precludes upstream fish passage. Upstream of the fish barrier there are more than 40 miles of stream that currently contain fish. Once the fish barrier is in place non-native trout (brook trout and rainbow trout) would be removed from the stream using the piscicide rotenone in the formulation of CFT Legumine (5% rotenone). Once non-native fish are removed, native westslope cutthroat trout (WCT) and Arctic grayling would be stocked into the stream.

Montana Fish, Wildlife & Parks is required by the Montana Environmental Policy Act (MEPA) to assess significant potential impacts of a proposed action to the human and physical environment. In compliance with MEPA, an Environmental Assessment (EA) was completed for the proposed project by FWP and released for public comment on April 29th, 2016.

Public comments on the proposed project were taken for 30 days (through May 29th, 2016). The EA notice was mailed to 31 individuals and groups; legal notice was printed in the Montana Standard (Butte) newspaper and the Dillon Tribune. A draft EA was posted on the FWP webpage: http://fwp.mt.gov//publicnotices/. Two written comments were received.

Comment 1. *I am in favor of this project. I am in favor of the reintroduction of WCT and Arctic grayling.*

Response: No response necessary.

Comment 2. *Comment on Environmental Assessment for Watershed Restoration in French Creek, Big Hole River drainage. Reference I made to page 7 of the document as follows:*

F. Narrative Summary of the Proposed Action and Purpose of the Proposed Action.
1. Placer Mining.

"The Mount Haggin Wildlife Management Area (WMA, Figure 1) was acquired by Montana Fish, Wildlife & Parks (FWP) in 1976 from the Mount Haggin Livestock Company through the Nature Conservancy. Prior to state ownership the land was used for multiple purposes. Gold was first discovered 1864 in French Gulch and a sizable mining camp was established in that drainage with year-round occupants. The French Gulch area including First Chance Creek, Moose Creek, and parts of French Creek were mined on and off through the early 1900's. Two hard rock mines were also present at the headwaters of French Gulch at French Town."

The last sentence above is incorrect. The two hard rock mines referred to are the Spain Mine. French Town is located about 2 miles to the northwest near the confluence of First Chance and French Creek. The Spain is located in Township 2 North; Range 11 West; Section 8 while the French Town on the USGS Topo and USGS map is incorrect. Original government surveys of the area to establish the Township boundaries are dated 1868 and 1878. The survey plats show the location of the "Town of French Gulch". Those Original Surveys can be viewed on the General Land Office Website (website given). I am unable to print or copy the survey plats but I have printed and attached pages 204-206 of the 1868 field notes that place French Gulch Town at the "confluence of First Chance and French Gulches" and describes "the town of French Gulch through which the line passes as a village containing about twenty houses strung along the main street...". I have also attached a copy of page 271 of the 1878 field notes for T2N R 12W that states: "French Gulch which is situated on the eastern boundary of Sec 1 is a thriving little mining town...".

Supporting documentation can be found in William R. Allen's book the "Chequemegon" published in 1949. On page 23 he describes a tribe of Indians approaching when he, as a child, was playing on a hillside above the family cabin. Read that and try to visualize the scene where you have place French Town. Can't be done. Now try it near the confluence of First Chance and French Creek. Additionally, if you will view the 19—Mineral Survey plat made when Allen Mining Co. patented the mining claims, including the Spain, the stream you refer to as the headwaters of French Gulch is labeled Fenian Creek". W. R. Allen pg 19, credits the name to an Irishmen who operated there.

From the detail given in the subject document I can't tell if the project will impact the old town of French Gulch, aka French Town. I do think you need to be aware of where the town site actually is.

Response: The survey maps referenced above were obtained and reviewed and the comments above were found to be accurate and the information in the EA incorrect. The town of French Gulch was located at the confluence of First Chance Gulch and French Gulch and not at the headwaters of French Creek. This decision notice will stand as the correction to the error in the EA.

The project will not affect the French Town site. All construction activities in the vicinity of French town or any other building sites or other historical features (with the exception of the gravel piles themselves) will take place in the stream bottom and not in the uplands where these features are located.

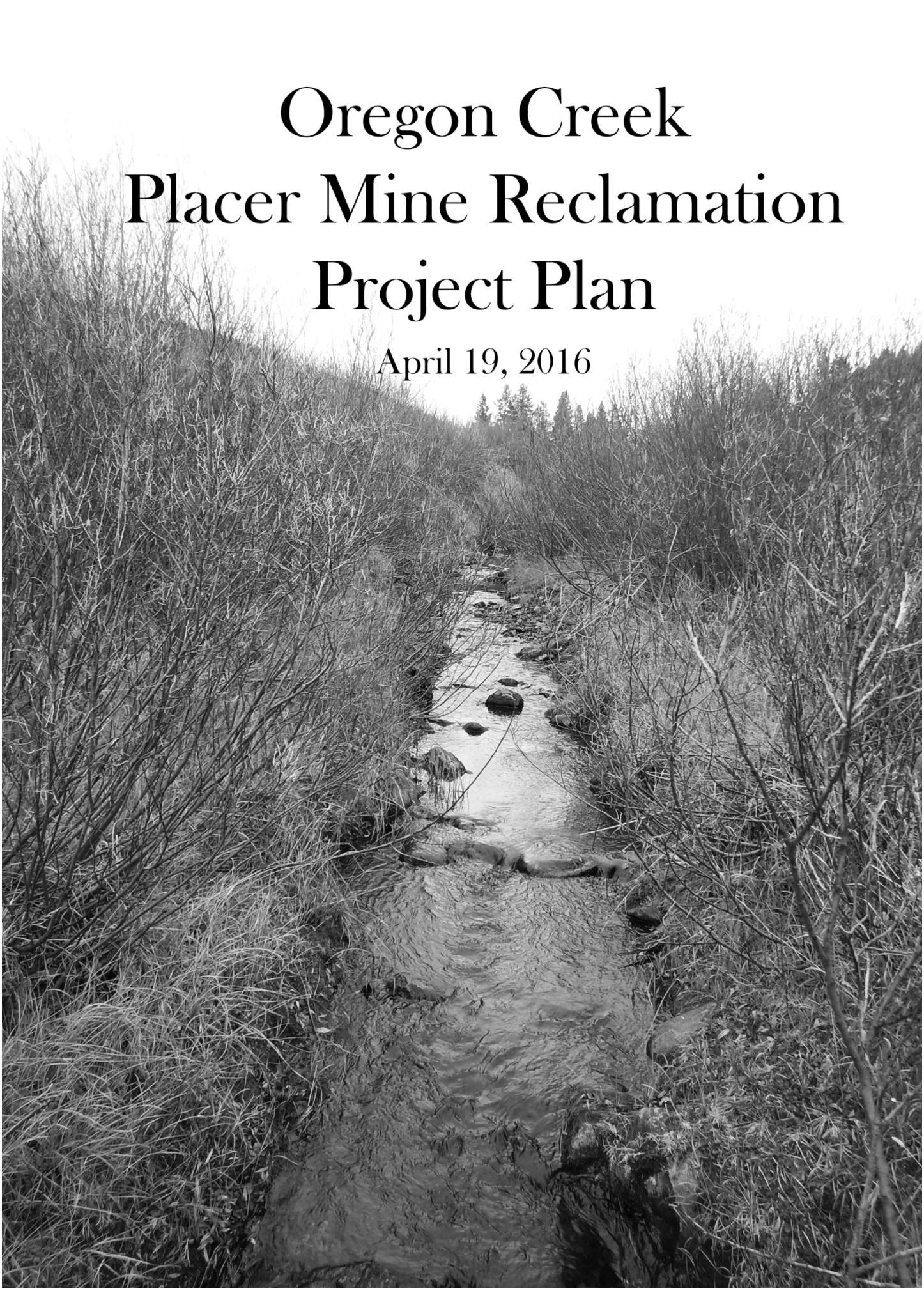
Decision

Based on the Environmental Assessment and the public comments received, and benefits and risks associated with this project, it is my decision to go forward with the Proposed Action as outlined in the Draft Environmental Assessment. I find there to be no significant impacts on the human and physical environments associated with this project. Therefore, I conclude that the Environmental Assessment is the appropriate level of analysis, and that an Environmental Impact Statement is not required.

Sam B. Sheppard
Region Three Supervisor

Oregon Creek Placer Mine Reclamation Project Plan

April 19, 2016



OREGON CREEK
PLACER MINE RECLAMATION
PROJECT PLAN

Prepared by

Jeff Dunn, Watershed Hydrologist
Mike Rotar, Water Resources Engineer
Matt Johnson, Water Resources Engineer

RESPEC

3810 Valley Commons Drive, Suite 4
Bozeman, Montana 59718

Prepared for

Big Hole
Watershed Committee

PO Box 21
Divide, Montana 59727

April 19, 2016

1.0 PROJECT BACKGROUND

The Oregon Creek Placer Mine Reclamation Project addresses the lower reach of Oregon Creek that is historically impacted by placer mining. This project is one of a suite of projects in the French Creek watershed designed to address basin-wide water quality and habitat issues, as well as native fishery restoration. The overall goal of the placer mine restoration project along Oregon Creek is to restore stream, wetland and riparian function to the mining-impacted reaches of Oregon Creek. To achieve this goal, stream restoration will be undertaken to increase channel sinuosity and reduce channel slope, which will result in more frequent and higher quality pool habitat for fish and allow for the deposition of smaller gravels that could provide potential spawning for westslope cutthroat trout and Arctic grayling. In addition, floodplain reconnection will promote proper stream function through time and self-maintenance of the riparian area and floodplain adjacent to the stream.

1.1 PROJECT AREA

Oregon Creek is a headwater tributary of California Creek, which flows into French Creek, and then into Deep Creek, which feeds into the Big Hole River upstream of Dickie Bridge. Oregon Creek is located approximately 12 miles southeast of Anaconda in Deer Lodge County. The project area is located in the Mount Haggin Wildlife Management Area (WMA) and includes approximately 0.5 miles of Oregon Creek, extending downstream from the Highway 569 crossing to the confluence with California Creek. Historic placer mining within the project area has resulted in a straightened channel with entrenched channel conditions, a lack of channel complexity, and a lack of floodplain access. The channel pattern transitions from an entrenched channel downstream of the Highway 569 crossing (**Figure 1-1**) to a mountain meadow stream in a beaver created wetland complex at the confluence with California Creek (**Figure 1-2**). Current land use activities in the project area include livestock grazing, recreation and wildlife habitat.

Figure 1-1. Entrenched Channel Conditions Downstream of the Highway 569 Crossing

Figure 1-2. Wetland Complex at the Oregon Creek and California Creek Confluence

2.0 PROJECT SITE EXISTING CONDITIONS

Within the placer mined reach of Oregon Creek, visual evidence suggests that the elevation of the streambed was six to eight feet higher than its current configuration and that, historically, Oregon Creek had a 200 to 300 foot wide floodplain. During placer mining activities, stream gravels were excavated and placed on the hill slopes to the east of the stream. The historic floodplain is intact on the west side of the stream, but it is isolated by the incised nature of the stream below. The straightened and incised stream channel cannot access its floodplain, which has impacted the quantity and quality of wetland features in the area. In addition, the lowering of the stream channel has caused a headcut to migrate upstream toward the Highway 569 crossing and degraded stream habitat conditions. Downstream of the placer mined area, before its confluence with California Creek, Oregon Creek braids into multiple channels as it flows through a large beaver created wetland complex. There is no visible evidence of mining in the lower reach of Oregon Creek, though the large quantities of sediment generated by the mining that occurred immediately upstream, along with accelerated watershed scale sediment loading following extensive logging operations, have likely caused aggradation of the valley bottom.

2.1 HYDROLOGY

Streamflow measurements were performed downstream of the Highway 569 crossing during spring runoff in 2005 and 2006 and during baseflow conditions in 2005. On June 6, 2005 a flow of 6.6 cfs was measured during spring runoff, while a flow 0.4 cfs was measured on August 2, 2005 during baseflow conditions. On April 18, 2006, a flow of 9.0 cfs was measured during spring runoff.

2.2 GEOMORPHOLOGY

Geomorphic data was collected within the project area on July 31, 2006 and October 30, 2015. In July of 2006, a stream survey was conducted along a 600-foot reach within the project area and included channel measurements at five cross-section locations, including one surveyed cross-section. With slight to moderate entrenchment, low to moderate sinuosity, low width-to-depth ratios, a median streambed particle size of 28 mm, and a gradient exceeding 2%, the assessed reach was classified as a Rosgen B4/E4b stream type with a potential of a Rosgen E4/E4b stream type. In October of 2015, in-stream habitat was assessed progressing from downstream to upstream along the entire project area and a total of 49 pools were identified along the flowing portion of Oregon Creek over a length of 2,139 feet, equating to 121 pools per mile (**Figure 2-1**). The majority of the pools evaluated in 2015 were low quality, lacked a sufficient residual pool depth, and lacked spawning sized gravels in the pool tail-outs. During the stream habitat assessment, gradient and bed material size decreased visibly progressing downstream with larger gravels and cobbles in the upper reaches and smaller gravels and finer granitic materials in the lower reaches.

2.3 RIPARIAN VEGETATION

Riparian vegetation consists primarily of willows along the channel margin and on the elevated floodplain to the west of Oregon Creek, which are likely maintained through groundwater feeding the area from the west. Sedges line the channel margin in areas with low streambanks and become more abundant in the lower reaches as Oregon Creek transitions into a wetland complex. To the east of Oregon Creek, the plant community is limited by the gravel spoil piles, or “placer tails”, which are primarily colonized by upland species such as lodgepole pine with periodic pockets of willows.

3.0 PROJECT SITE RESTORATION PLAN

The goal of the placer mine restoration project along Oregon Creek is to restore stream, riparian and wetland function to the mining-impacted reaches of Oregon Creek. The following objectives will be accomplished to meet this goal:

- Increase channel sinuosity
- Decrease channel slope
- Decrease channel entrenchment
- Increase floodplain connectivity
- Increase riparian and wetland habitat
- Eliminate channel headcutting
- Revegetate eroding streambanks

Accomplishment of these objectives will meet the project goal and lead to improved fish habitat and water quality within Oregon Creek. Specifically, fish habitat improvements will be achieved through increased channel sinuosity and reduced channel slope, which will create more frequent high-quality pool habitat and improved potential spawning habitat for westslope cutthroat trout and Arctic grayling. Riparian and wetland habitat improvements will be achieved through increased floodplain connectivity and moving the channel away from the existing placer tails. Riparian and wetland enhancements will increase the natural storage capacity of the floodplain, which will help support late season flows and mitigate the impact of drought cycles. Restoration activities will reduce sediment loading by eliminating the observed channel headcutting and addressing streambank erosion at two sites. In addition, restoration activities will reduce the potential for metals-contaminated sediment to enter Oregon Creek through surface runoff, which will provide additional water quality improvements.

To facilitate restoration planning, the project area was divided into 9 reaches as depicted on **Figure 3-1**. Restoration activities for each reach are described in the following sections and summarized in **Table 3-1**, including:

- Floodplain reconnection and channel realignment
- Riparian buffer enhancement and wetland creation
- Pool enhancement using log structures
- Streambank bioengineering
- Development of sustainable cattle crossings

Reach overview photographs, along with photographs of each pool, are included in **Attachment D** to provide additional information for each project reach.

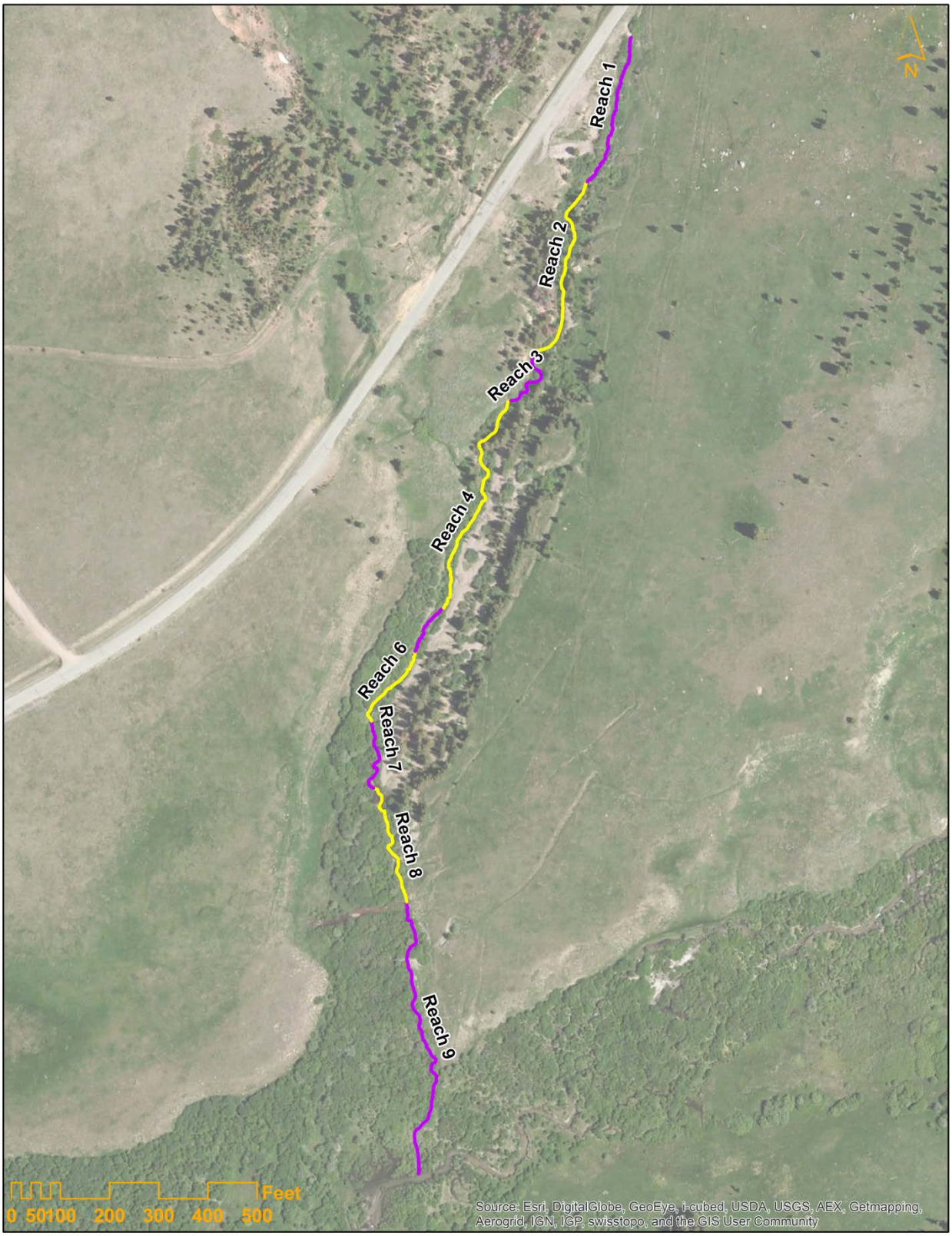


Figure 3-1. Oregon Creek Restoration Planning Reaches

Reach 1

Reach 1 includes the entrenched portion of channel downstream of the Highway 569 crossing. Channel entrenchment is likely the result of highway construction and past land-use activities within the watershed. The highway culvert is slightly perched and is likely a fish passage barrier. A gate provides access within this reach and the fence crossing the stream is currently in disrepair. There are periodic willows along the channel margin, though there is no floodplain and the riparian buffer is solely comprised of this narrow band of vegetation. In addition, there is a large eroding streambank along river left at the toe of the hillslope where cattle cross the stream and this streambank is a source of sediment to the channel on an annual basis. The channel within Reach 1 is relatively straight with nearly continuous riffle habitat, relatively course substrate and several large boulders. This reach lacks high quality pools and spawning sized gravels (**Figure 3-2, Figure 3-4** and **Attachment D**).

Restoration alternatives for Reach 1 include no-action, installation of log "step" structures, and channel realignment and floodplain reconnection (**Table 3-1**). Under the no-action alternative, the channel would likely retain its current condition due to channel confinement. No improvements in fish habitat or riparian buffering of upland sediment loads would be realized under the no-action alternative. Installing log "step" structures would improve fish habitat and improve stream function, but not meet the project goal of enhanced riparian function, nor provide filtering of upland sediment loads. Installation of log "step" structures would also not address sediment loading from streambank erosion. Channel realignment and floodplain reconnection would improve stream and riparian function and is the preferred alternative since it meets the project goal and provides substantially greater natural resource benefits.

The preferred alternative for restoring stream and riparian function in Reach 1 includes channel realignment and development of a small floodplain, along with developing a sustainable cattle crossing (**Attachment C Sheet 3**). Channel realignment will include increased channel length, which will allow for greater channel sinuosity and reduced channel slope. A meandering channel planform will allow for the development of high quality pools and the deposition of spawning gravels in pool tail-outs. Floodplain reconnection will allow for greater willow density along the channel, which will further enhance pool creation and quality. Increasing the width of the riparian buffer will also provide improved filtering of sediment erosion from upland areas. In addition, the preferred alternative will address streambank erosion by lowering the streambanks, moving the channel away from the toe of the hillslope, and enhancing riparian vegetation along the channel.

Figure 3-2. Entrenched Channel Conditions and Streambank Erosion in Reach 1

Reach 2

Reach 2 flows through a relatively confined canyon with a narrow valley bottom. The channel is slightly over-widened with low quality shallow pools. The low streambanks are lined with willows which extend onto the narrow floodplain. Placer tails align the channel along river left at the lower end of the reach, though the channel is not entrenched in Reach 2 (**Figure 3-3, Figure 3-4** and **Attachment D**).

Restoration alternatives for Reach 2 include no-action and the installation of log "step" structures combined with willow plantings and the placement of sedge mats (**Table 3-1**). No improvements in fish habitat or riparian function would be realized under the no-action alternative. Installing log "step" structures would improve fish habitat and improve stream function. Willow planting along the channel and on the floodplain would improve riparian function and provide additional improvements to fish habitat by increasing overhead vegetative cover and enhancing streambank stability. The placement of sedge mats along the channel margin in over-widened areas would also enhance fish habitat by reducing channel width-to-depth ratios.

The preferred alternative for Reach 2 involves installation of log "step" structures combined with willow plantings and the placement of sedge mats and meets the project goal of improved stream and riparian function at a relatively low implementation cost.

Figure 3-3. Over-widened Channel Conditions and Shallow Pools in Reach 2

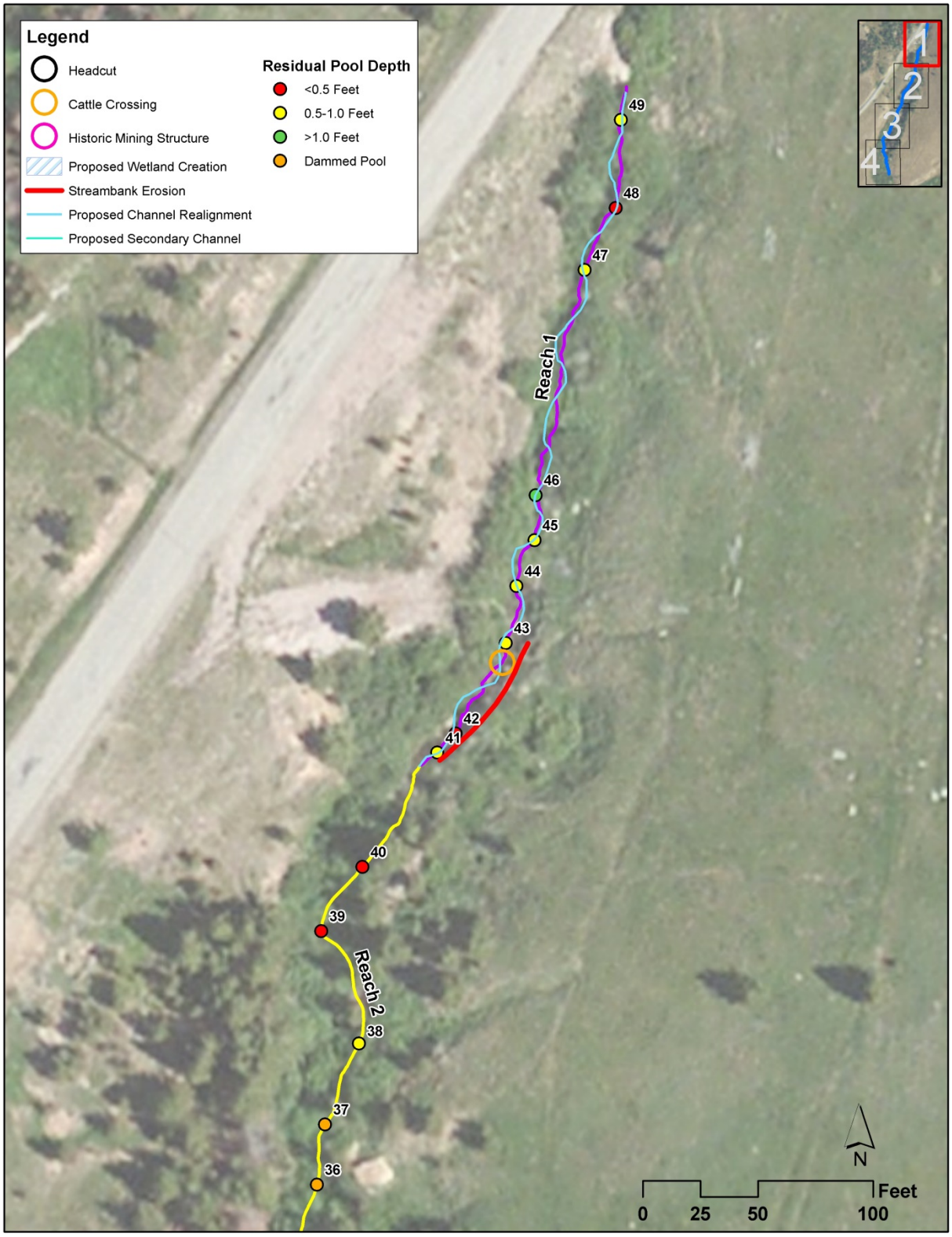


Figure 3-4. Reach 1 Restoration Activities

Reach 3

Reach 3 is a short reach that flows through a relatively confined canyon with a narrow valley bottom containing willows. Reach 3 contains an approximately 2-foot high headcut, which is likely a result of historic placer mining activities and is a fish passage barrier for the typically small fish found within this system, particularly during low flows. There is a large boulder downstream of the headcut, along with placer tails along the river left side of the valley (**Figure 3-5**, **Figure 3-7** and **Attachment D**). Enhancing stream function by removing the headcut is the primary restoration goal for Reach 3.

Restoration alternatives for Reach 3 include no-action, the installation of log "step" structures, the installation of beaver mimicry structures, and channel realignment combined with wetland creation (**Table 3-1**). No improvements in fish habitat or riparian function would be realized under the no-action alternative. Installing log "step" structures or beaver mimicry structures would improve fish habitat and improve stream function, but would not provide a long-term solution to channel headcutting. Channel realignment and wetland creation would improve both stream and riparian function, while also addressing channel headcutting. Channel realignment would also move the channel away from the toe of the hillslope and provide for an increase in the riparian buffer width, which would reduce sediment loading from upland sources.

The preferred alternative for restoring stream and riparian function within Reach 3 includes realigning the channel around the existing headcut and creating wetlands. The realigned channel will be created on the existing low floodplain and the existing channel will be converted to a series of wetlands. The preferred alternative was selected since it meets the project goal and provides long-term natural resource benefits.

Figure 3-5. Headcut Viewed from Downstream (Left) and Upstream (Right) in Reach 3

Reach 4

Reach 4 marks the start of the large scale impacts of historic placer mining along Oregon Creek with extensive tailings piles covering the river left side of the valley bottom. Reach 4 is confined by the toe of the hillslope on river right and by large piles of placer tails on river left, which abut the stream channel at pool 25 and pool 18. The channel within Reach 4 is relatively straight with a predominance of riffle habitat and relatively course substrate. This reach lacks high quality pools and spawning sized gravels. There is moderate willow density within a narrow floodplain corridor and streambank erosion is occurring along river right in one location at the upper end of the reach (**Figure 3-6, Figure 3-7** and **Attachment D**).

Restoration alternatives for Reach 4 include no-action, tailings removal along pools 25 and 28, streambank bioengineering, installation of log "step" structures, willow plantings, and the placement of sedge mats (**Table 3-1**). No improvements in fish habitat or riparian function would be realized under the no-action alternative. Tailings removal along pools 25 and 28 would help meet the project goal, but may degrade the cultural characteristics of the site. Thus, tailings removal is not considered a restoration alternative for this project. Streambank bioengineering at one site would enhance stream and riparian function by reducing sediment loading and enhancing the riparian buffer. Installing log "step" structures would improve fish habitat and improve stream function. Willow planting along the channel and on the narrow floodplain would improve riparian function and provide additional improvements to fish habitat by increasing overhead vegetative cover and enhancing streambank stability. The placement of sedge mats along the channel margin in over-widened areas would also enhance fish habitat by reducing channel width-to-depth ratios.

The preferred alternative for Reach 4 involves several treatments, including streambank bioengineering, installation of log "step" structures, willow plantings, and the placement of sedge mats. In combination, these treatments will meet the project goal of improved stream and riparian function at a relatively low implementation cost. Restoration activities in Reach 4 will address the historic mining impacts by enhancing the riparian buffer, reducing sediment loads from eroding streambanks, and improving in-stream habitat conditions.

Figure 3-6. Streambank Erosion (Left) and Placer Tails along the Floodplain (Right) in Reach 4

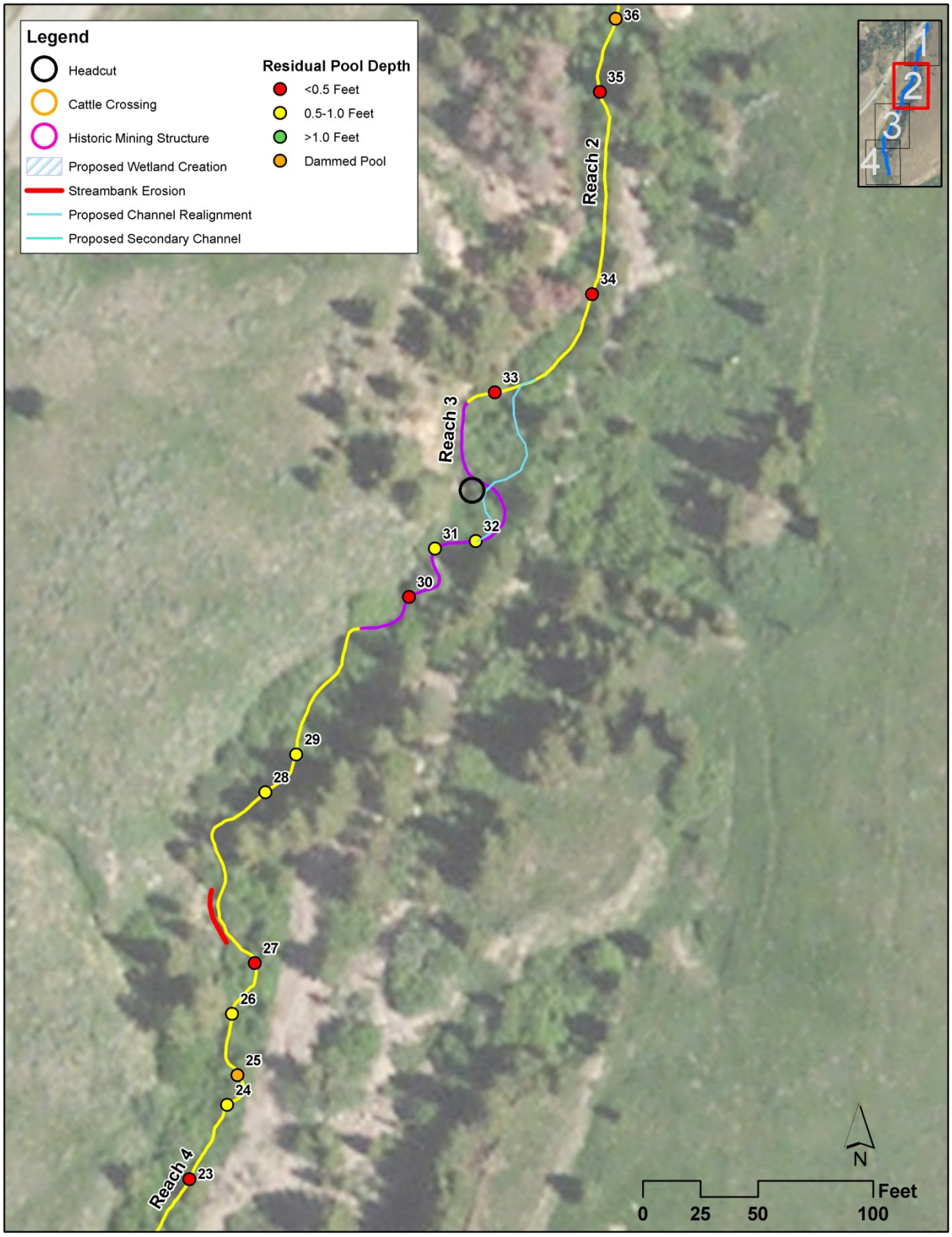


Figure 3-7. Reaches 3 and 4 Restoration Activities

Reach 5

Reach 5 is confined along river right by the elevated floodplain and river left by extensive placer tails. The confined and relatively straight channel contains a nearly continuous riffle and lacks high quality pools. The elevated floodplain along river right contains willows, but is not accessed by flood flows. Along river left, the placer tails contain periodic vegetation primarily consisting of conifers, with willows limited to along the channel margin (**Figure 3-8**, **Figure 10** and **Attachment D**).

Restoration alternatives for Reach 5 include no-action, installation of log "step" structures, and channel realignment and floodplain reconnection (**Table 3-1**). Under the no-action alternative, the channel would likely retain its current condition due to channel confinement. Installing log "step" structures would improve fish habitat and improve stream function, but would not meet the project goal of enhanced riparian function. Channel realignment and floodplain reconnection would improve both stream and riparian function and is the preferred alternative since it meets the project goal and provides substantially greater natural resource benefits.

The preferred alternative for restoring stream and riparian function in Reach 5 includes channel realignment and development of a small floodplain along river right. Channel realignment will include increased channel length, which will allow for greater channel sinuosity and reduced channel slope. A meandering channel planform will allow for the development of high quality pools and the deposition of spawning gravels in pool tail-outs. Floodplain creation along river right will allow for greater willow density along the channel, which will further enhance pool creation and quality. The preferred alternative retains the tailings piles along river left, but moves the channel away from the placer tails, thereby increasing the width of the riparian buffer and providing improved filtering of potential metals inputs from the tailings piles. Thus, the potential negative impacts of historic mining activities will be addressed, while retaining the cultural characteristics of this site.

Figure 3-8. Entrenched Channel Conditions in Reach 5

Reach 6

In-stream channel conditions within Reach 6 resemble conditions within Reach 5, while the floodplain elevation relative to the channel decreases progressing downstream. The confined and relatively straight channel contains a nearly continuous riffle and lacks high quality pools (**Figure 3-9**). The elevated floodplain along river right contains willows, but is not accessed by flood flows. Placer tails on the floodplain align the river left streambank and include a historic wooden mining structure where ore was possibly processed (**Figure 3-9**, **Figure 3-10**, **Attachment D**, and the report cover).

Restoration alternatives for Reach 6 include no-action, installation of log "step" structures, willow plantings and the placement of sedge mats, and channel realignment and floodplain reconnection (**Table 3-1**). Under the no-action alternative, the channel would likely retain its current condition due to channel confinement. Installing log "step" structures would improve fish habitat and improve stream function, but would not meet the project goal of enhanced riparian function. Willow planting and the placement of sedge mats along the channel will improve riparian function, but not address the channelized conditions of this reach. Channel realignment and floodplain reconnection would improve both stream and riparian function and is the preferred alternative since it meets the project goal and provides substantially greater natural resource benefits.

The preferred alternative for restoring stream and riparian function in Reach 6 includes channel realignment and development of a small floodplain along river right. Channel realignment will include increased channel length, which will allow for greater channel sinuosity and reduced channel slope. A meandering channel planform will allow for the development of high quality pools and the deposition of spawning gravels in pool tail-outs. Floodplain creation along river right will allow for greater willow density along the channel, which will further enhance pool creation and quality. The preferred alternative retains the tailing piles and historic wooden mining structure along river left (depicted in **Figure 1-3**), but moves the channel away from the placer tails, thereby increasing the width of the riparian buffer and providing improved filtering of potential metals inputs from the tailings piles. Thus, the preferred alternative addresses the negative impacts of historic mining activities, while retaining the cultural characteristics of the site.

Figure 3-9. Floodplain Placer Tails and Straightened Channel in Reach 6

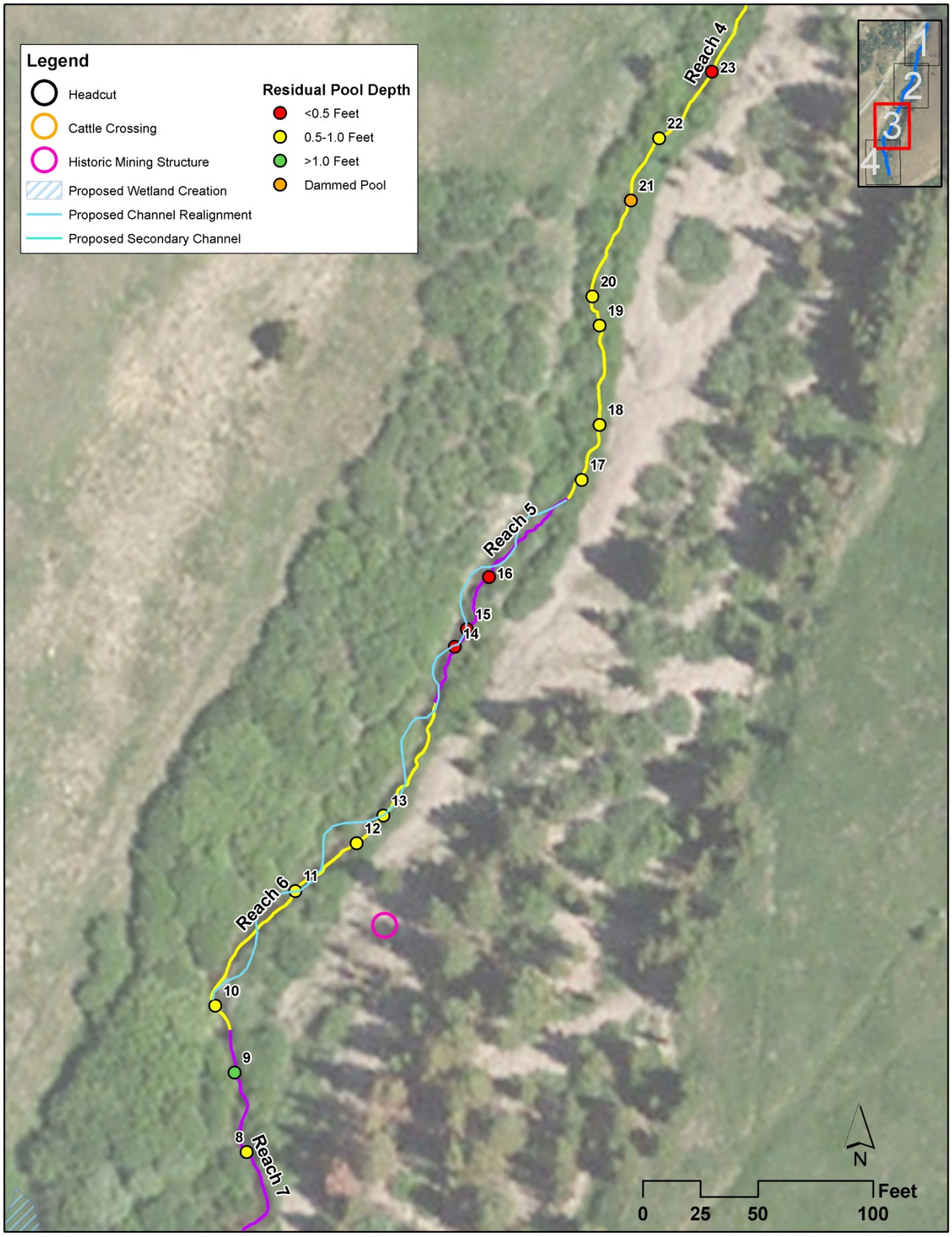


Figure 3-10. Reaches 5 and 6 Restoration Activities

Reach 7

Progressing into Reach 7, the floodplain on river right is more closely connected with the stream channel, while the placer tails on river left are also at an elevation closer to a natural floodplain. Within Reach 7, channel pattern is thought to represent the potential natural condition for lower Oregon Creek in which a meandering channel is lined by sedges and willows and deep pools are formed at meander bends with willow roots providing undercut streambank habitat. Substrate size begins to decrease within Reach 7 as a result of the lower channel slope and greater sinuosity, which provides for spawning sized gravels to deposit in pool tail-outs (**Figure 3-11**, **Figure 3-16** and **Attachment D**).

Restoration alternatives for Reach 7 include no-action, willow plantings and the placement of sedge mats, and channel realignment and floodplain reconnection (**Table 3-1**). Under the no-action alternative, the channel would likely retain its current condition due to channel confinement. Since this reach was identified as the potential natural channel condition, performing channel realignment and floodplain reconnection is not necessary. However, additional willow planting along the channel and on the floodplain would further improve riparian function and provide additional improvements to fish habitat by increasing overhead vegetative cover and enhancing streambank stability. The placement of sedge mats along the channel margin in would also enhance fish habitat by reducing channel width-to-depth ratios.

The preferred alternative for Reach 7 involves willow plantings and the placement of sedge mats, which will improve the riparian buffer, maintain the existing high quality pool habitat, and meet the project goal of improved stream and riparian function at a relatively low implementation cost.

Figure 3-11. Meandering Channel and Deep Pool Habitat in Reach 7

Reach 8

Reach 8 is located along the lowermost portion of the placer tails on river left and ends where the stream is intercepted by a stream ford that is also used as a cattle crossing (**Figure 3-12**). As with Reach 7, the floodplain on river right is more closely connected with the stream channel, while the placer tails on river left are also at an elevation closer to a natural floodplain. However, unlike Reach 7, Reach 8 has extensive fine sediment deposits and an over-widened channel due to blown out beaver dams and the cattle crossing (**Figure 3-13**). At the lower end of Reach 8, a stream ford used as a cattle crossing directs a significant portion of the streamflow toward the west side of the valley, where it then enters the large wetland complex that makes up Reach 9.

Restoration alternatives for Reach 8 include no-action, willow plantings and the placement of sedge mats, channel realignment and floodplain reconnection, and wetland creation (**Table 3-1**). Under the no-action alternative, the channel will likely retain its current over-widened condition with excess sediment deposits. Willow planting and the placement of sedge mats along the channel will improve riparian function, but may not address the excess sediment deposits. The relatively low floodplain in Reach 8 provides an opportunity for moving the channel away from the placer tails and the creation an entirely new floodplain with an enhanced riparian buffer and wetland features (**Figure 3-14**). In addition, wetland creation within Reach 8 will increase the natural storage capacity of the floodplain, which will help support late season flows. Channel realignment, floodplain reconnection and wetland creation would improve both stream and riparian function and is the preferred alternative since it meets the project goal and provides substantially greater natural resource benefits.

The preferred alternative for restoring stream and riparian function in Reach 8 includes channel realignment and floodplain reconnection, along with wetland creation and the development of a sustainable cattle crossing point (**Figure 3-16** and **Attachment C Sheet 4**). Channel realignment will include increased channel length, which will allow for greater channel sinuosity, the development of high quality pools, and the deposition of spawning gravels in pool tail-outs. The realigned channel would be created to the west of the existing channel and the existing channel would be converted to a series of wetlands. In addition, a small secondary channel will be developed that will connect into the west side of the floodplain in Reach 9. Additional wetland creation will also occur along the west side of the valley bottom through the enhancement of existing floodplain swales. Restoration activities in Reach 8 will result in greater channel sinuosity, increased pool frequency and quality, increased wetland habitat, improved riparian buffer conditions, and improved livestock management. Over time, restoration activities in Reach 8 will allow the channel and floodplain to evolve in concert with beaver dam construction and evolution, leading to multiple smaller channels across a broad riparian area as observed in Reach 9.

Figure 3-12. Stream Ford and Cattle Crossing between Reach 8 and Reach 9

Figure 3-13. Over-widened Channel Conditions in Reach 8

Figure 3-14. Opportunities for Wetland Creation and Floodplain Expansion in Reach 8

Reach 9

Reach 9 is comprised of a large wetland complex that is fed by the main Oregon Creek channel on the east side of the valley and a secondary channel on the west side of the valley, which flows across the stream ford and cattle crossing (**Figure 3-15**). The primary restoration action for Reach 9 involves addressing the historic stream ford and cattle crossing at the upstream end of the reach and tying in the channel realignment through Reach 8 into the large wetland complex.

Figure 3-15. Wetland Complex in Reach 9

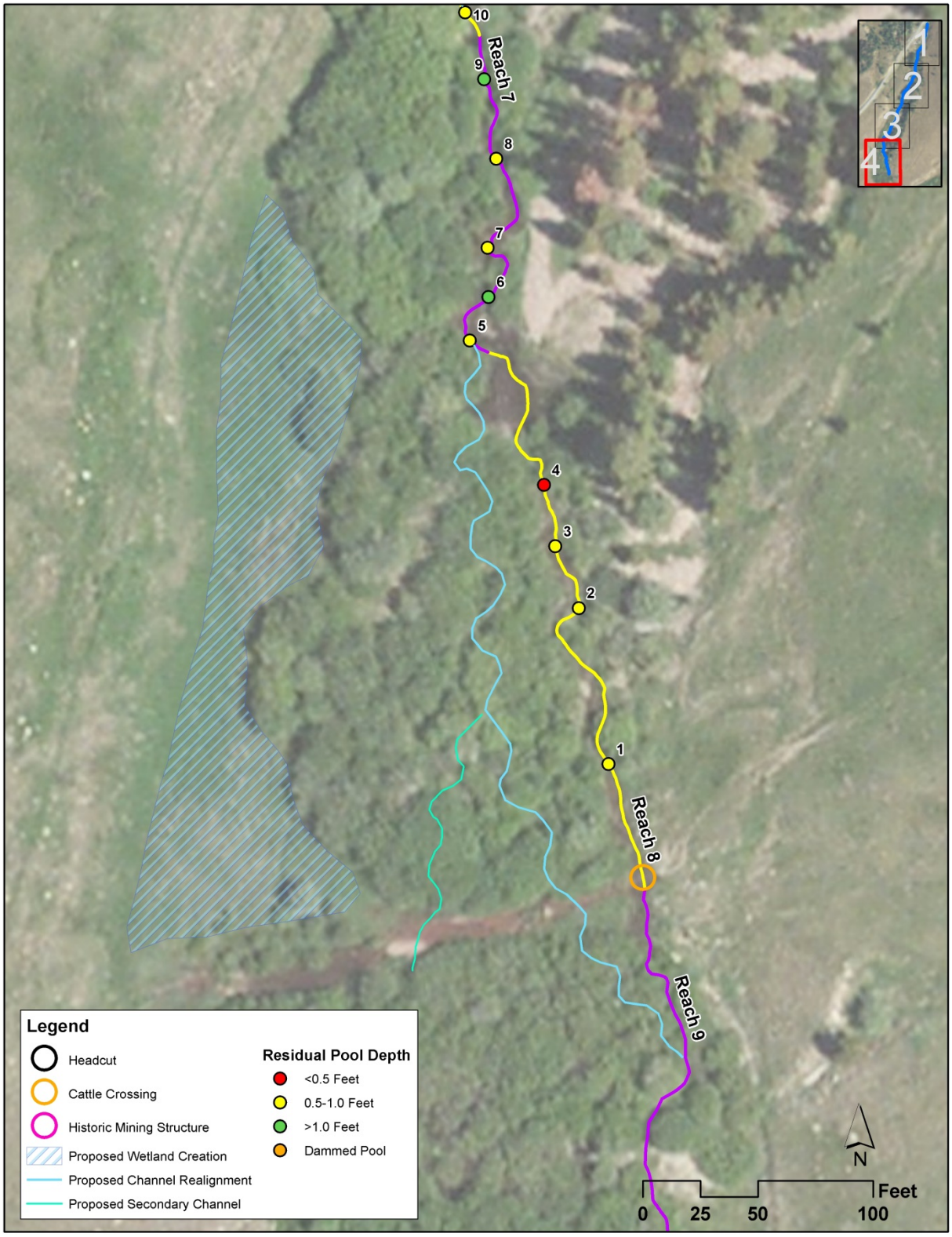


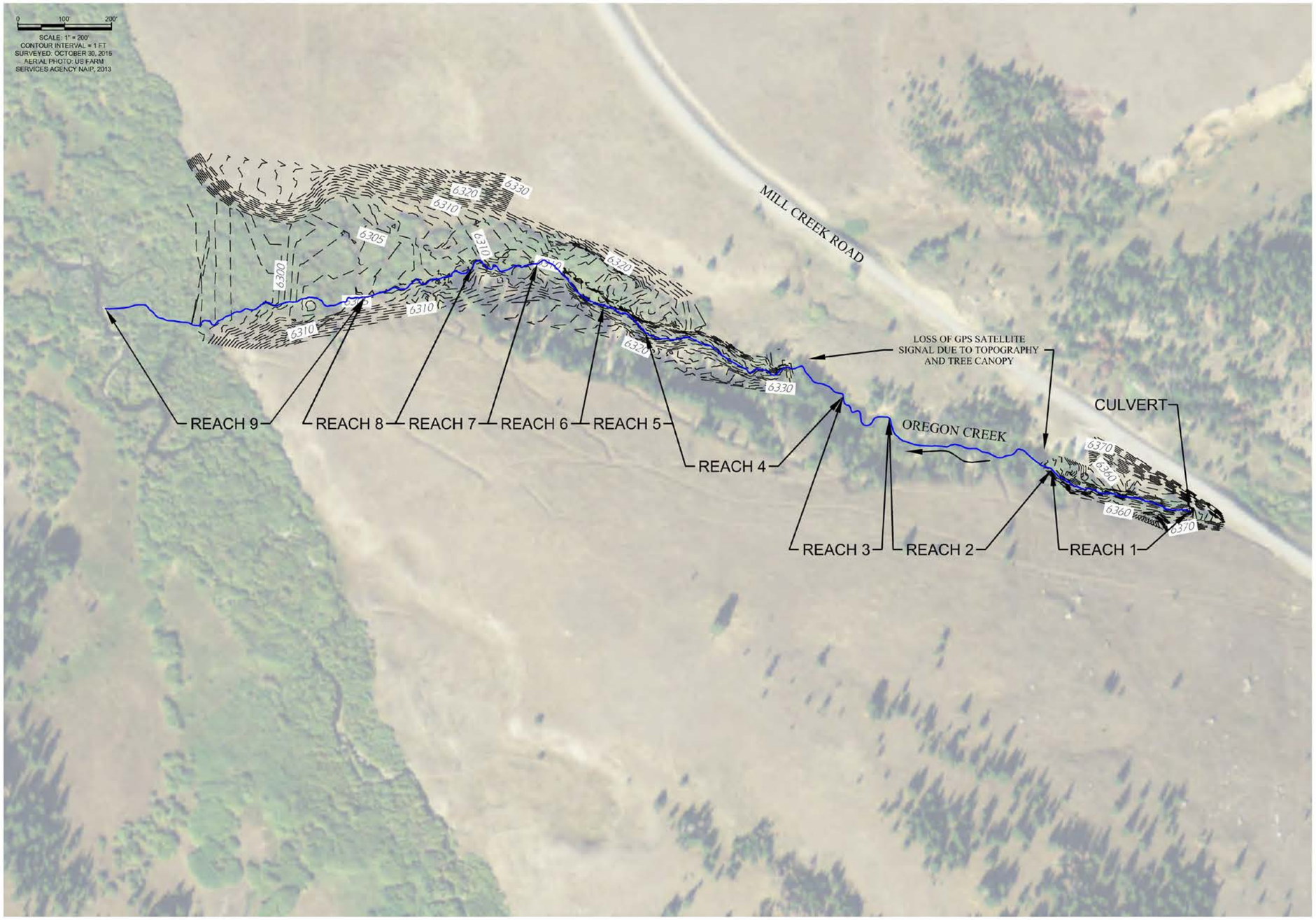
Figure 3-16. Reaches 8 and 9 Restoration Activities

Table 3-1. Proposed Restoration Activities for Oregon Creek by Reach

Reach	Length (Feet)	Pools	Description	Restoration Treatments		Constraints
				Preferred Alternative	Other Alternatives	
Reach 1	329	41-49	entrenched channel conditions, steep riffles, streambank erosion, cattle crossing, moderate willow density along channel margin	channel realignment, floodplain reconnection, improved cattle crossing	no action, log "step" structures	large boulders, grazing access gate, perched culverts upstream
Reach 2	407	33-40	over-widened channel, low banks, good willows, narrow valley, placer tails along river left	willow plantings, sedge mats, log "step" structures	no action	narrow valley, placer tails, large boulders, beetle killed pines
Reach 3	153	30-32	headcutting, good willows, narrow valley, placer tails along river left	channel realignment, wetland creation	no action, log "step" structures, beaver mimicry	narrow valley, placer tails, large boulders
Reach 4	500	17-29	large placer tails along river left, streambank erosion on river right where channel comes out of forested, moderate willow density	streambank bioengineering, log "step" structures, willow plantings, sedge mats	no action, tailings removeal along pool 25 and pool 18	extensive placer tails on river left
Reach 5	116	14-16	straight and entrenched channel with elevated floodplain on river right and, nearly continuous riffle with low quality pools	floodplain reconnection along river right	no action, log "step" structures	elevated floodplain on river right, extensive placer tails on river left
Reach 6	187	10-13	straight and entrenched channel with elevated floodplain on river right and, nearly continuous riffle with low quality pools, good willows and expanded floodplain at downstream end	floodplain reconnection along river right	no action, log "step" structures, willow plantings, sedge mats	elevated floodplain on river right, extensive placer tails on river left, historic wooden mining structure
Reach 7	167	5-9	expanded floodplain access on river right, meandering channel, low banks with sedges, high quality pools with gravel in tail-outs, identified as an internal "reference" condition	willow plantings, sedge mats	no action, channel re-alignment	placer tails on river left
Reach 8	271	1-4	expanded floodplain access on river right, low banks with sedges, placer tails dissipating, over-wide channel with fine sediment accumulations, channel splits at cattle crossing/stream ford, blown out beaver dams	channel realignment, reclaim stream ford, improved cattle crossing, wetland creation	no action, willow plantings, sedge mats	placer tails on river left, split flow, cattle access/stream ford
Reach 9	617	n/a	beaver ponds, multiple channels, willows and sedges	channel re-alignment and wetland creation extending down from Reach 8	no action	split flow, no definable main channel

Attachment C

Field Survey Topographic Data and Conceptual Designs



RESPEC
WATER & NATURAL RESOURCES
3610 VALLEY COMMONS DR
SUITE A
BOZEMAN, MT 59718
PHONE (406) 284-2525

REVISION

DESIGNED JD/MR/MJ
DRAWN JR
CHECKED JD/MJ
DATE 04/2016

STAMP

811
Know what's below.
Call before you dig.

BIG HOLE WATERSHED COMMITTEE
PO BOX 21
DIVIDE, MT 59727

PLACER MINE RECLAMATION
OREGON CREEK,
MOUNT HAGGIN WILDLIFE MANAGEMENT AREA

EXISTING CONDITIONS

SHEET NUMBER:
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SHEET 01

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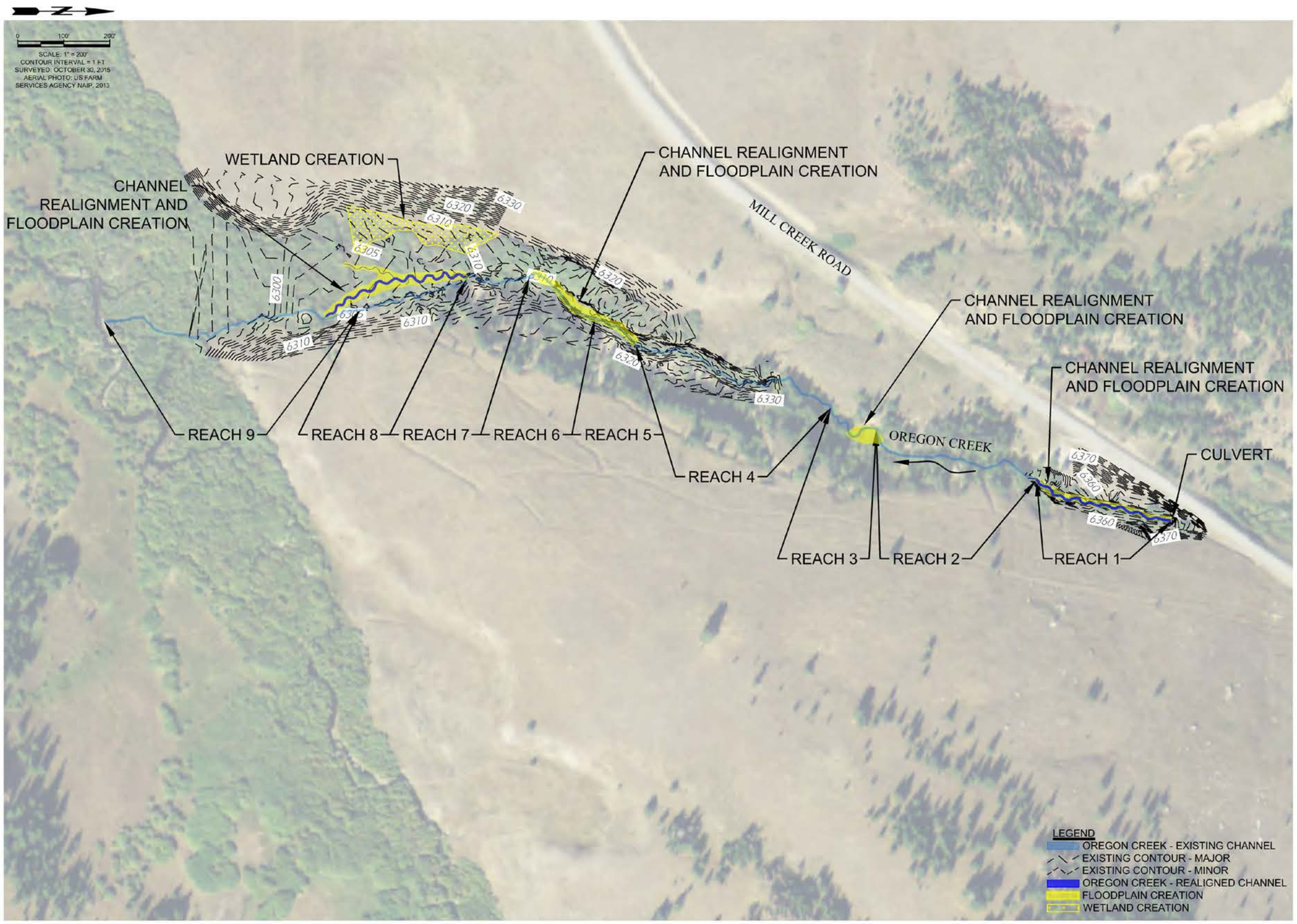

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RESPEC
WATER & NATURAL RESOURCES
3810 VALLEY COMMONS DR.
SUITE 1
BOZEMAN, MT 59718
PHONE (406) 284-2525

REVISION

DESIGNED	JD/MR/MJ
DRAWN	JR
CHECKED	JD/MJ
DATE	04/2016

STAMP

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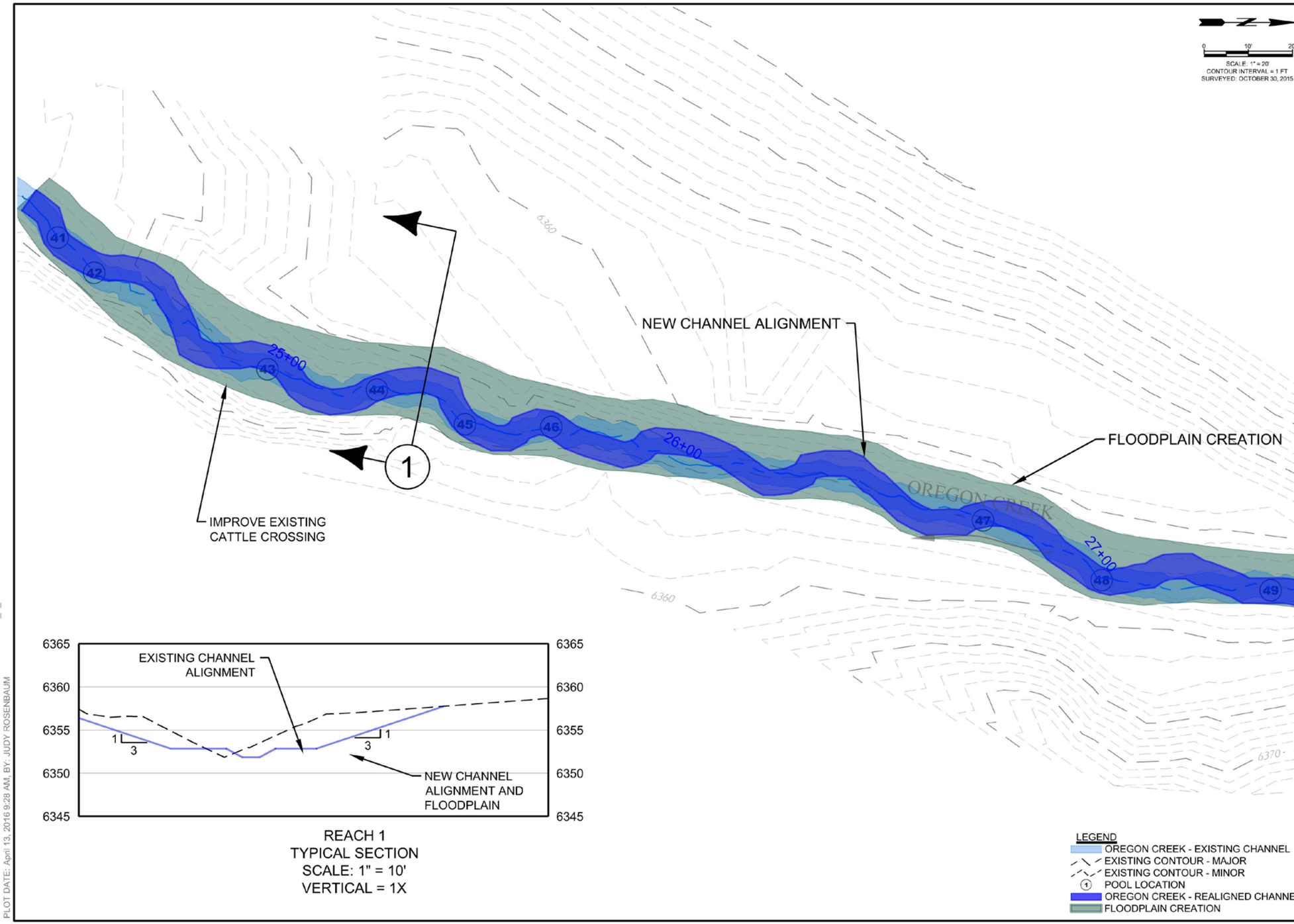
PO BOX 21
DIVIDE, MT 59727

PLACER MINE RECLAMATION
OREGON CREEK,
MOUNT HAGGIN WILDLIFE MANAGEMENT AREA

SITE PLAN

SHEET NUMBER:
02
SHEET 02



REACH 1
TYPICAL SECTION
SCALE: 1" = 10'
VERTICAL = 1X

RESPEC
WATER & NATURAL RESOURCES
3010 VALLEY COMMONS DR
SUITE 4
BOZEMAN, MT 59718
PHONE (406) 294-2925

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CHECKED JD/MR
DATE 04/2016

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DIVIDE, MT 59727

PLACER MINE
RECLAMATION
OREGON CREEK,
MOUNT HAGGIN
WILDLIFE
MANAGEMENT AREA

REACH 1
PLAN VIEW AND
TYPICAL SECTION

SHEET NUMBER:
03
SHEET 03

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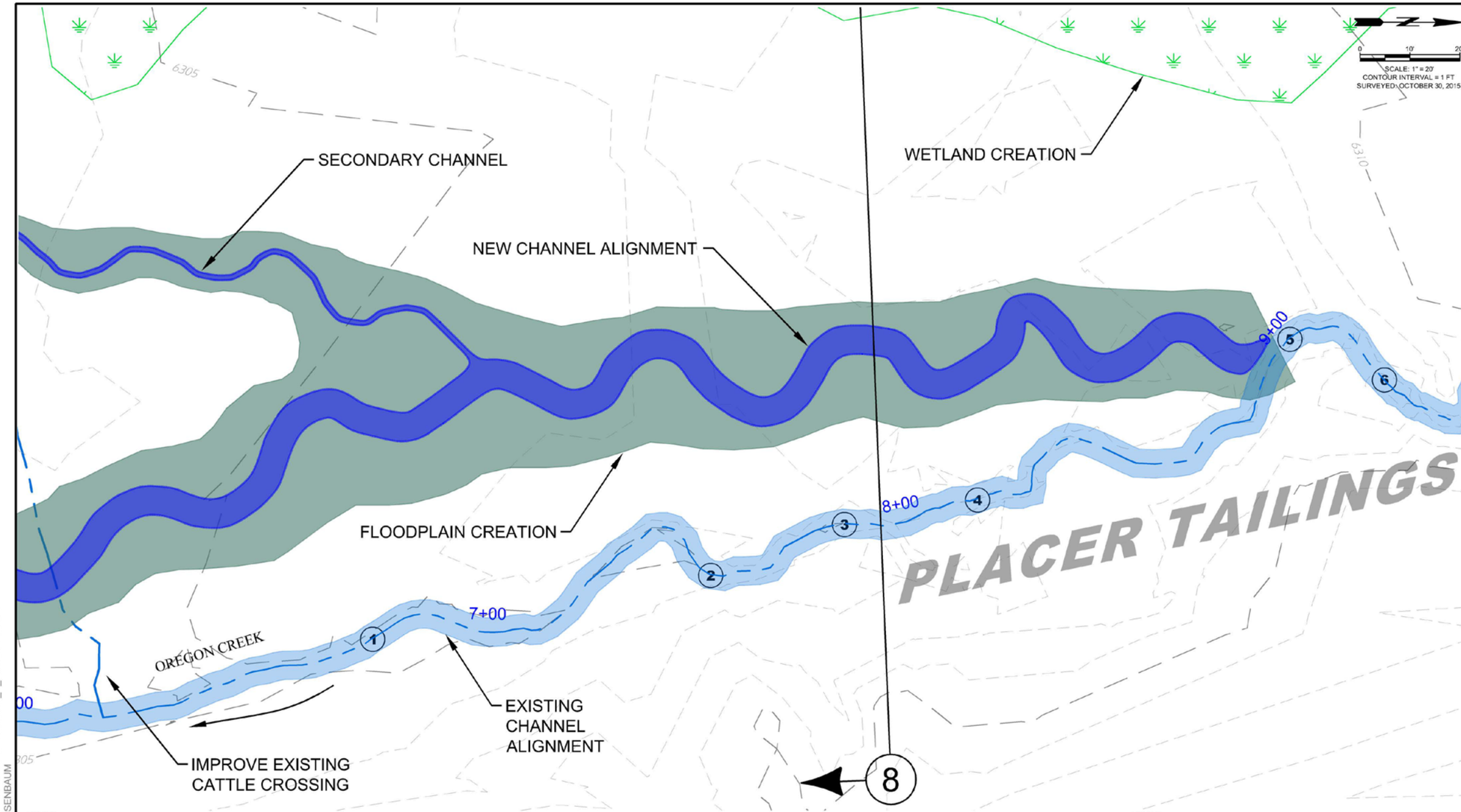

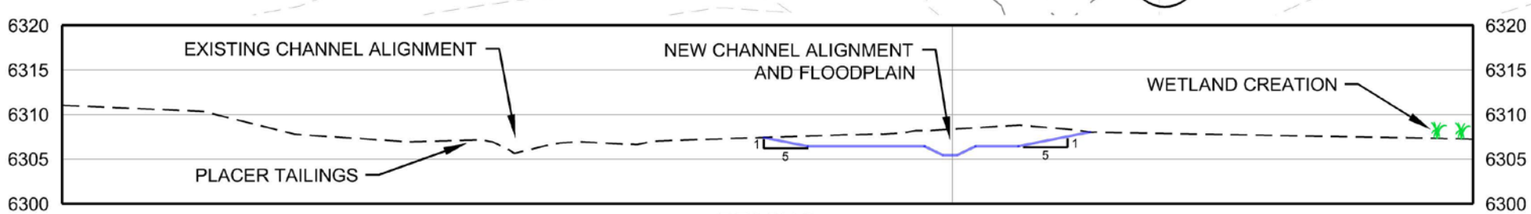

REACH 8
TYPICAL SECTION
SCALE: 1" = 15'
VERTICAL = 1X

LEGEND
- OREGON CREEK - EXISTING CHANNEL
- EXISTING CONTOUR - MAJOR
- EXISTING CONTOUR - MINOR
- POOL LOCATION
- OREGON CREEK - REALIGNED CHANNEL
- FLOODPLAIN CREATION
- WETLAND CREATION

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WATER & NATURAL RESOURCES
3010 VALLEY COMMONS DR.
SUITE A
BOZEMAN, MT 59718
PHONE (406) 294-2325

REVISION

DESIGNED JD/MR/MJ
DRAWN JR
CHECKED JD/MR
DATE 04/2016

STAMP

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DIVIDE, MT 59727

PLACER MINE RECLAMATION
OREGON CREEK, MOUNT HAGGIN WILDLIFE MANAGEMENT AREA

REACH 8
PLAN VIEW AND TYPICAL SECTION

SHEET NUMBER:
04
SHEET 04

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Attachment D

Field Survey Photos by Reach, October 2015

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103015_Oregon Creek_0406

103015_Oregon Creek_0411

103015_Oregon Creek_0425

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103015_Oregon Creek_0443

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3_Pool 47_103015_Oregon Creek_0439

4_Pool 46_103015_Oregon Creek_0424

5_Pool 45_103015_Oregon Creek_0417

6_Pool 44_103015_Oregon Creek_0414

7_Pool 43_103015_Oregon Creek_0413

8_Pool 42_103015_Oregon Creek_0389

9_ Pool 41_103015_Oregon Creek_0388

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103015_Oregon Creek_0353

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11_Pool 39_103015_Oregon Creek_0383

12_Pool 38_103015_Oregon Creek_0374

13_Pool 37_103015_Oregon Creek_0371

14_Pool 36_103015_Oregon Creek_0370

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16_Pool 34_103015_Oregon Creek_0355

17_Pool 33_103015_Oregon Creek_0343

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DSCN2486

DSCN2500

DSCN2515

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Reach 2_Oregon Pano 24

Reach 4_Oregon Pano 21

Reach 4_Oregon Pano 22

Reach 4_Oregon Pano 27

Reach 4_Oregon Pano 30

Reach 6_Oregon Pano 15

Reach 6_Oregon Pano 17

Reach 8 and 9_Oregon Pano 34

Reach 8_Oregon Pano 8

Reach 9_Oregon Pano 1