



# AGENDA

## IDAHO WATER RESOURCE BOARD

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### Board Meeting No. 6-19

July 9, 2019 at 12:00 p.m.

Idaho Water Center  
Conference Rooms C & D  
322 E Front Street  
BOISE

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**Brad Little**  
Governor

**Roger W. Chase**  
Chairman  
Pocatello  
District 4

**Jeff Raybould**  
Vice-Chairman  
St. Anthony  
At Large

**Vince Alberdi**  
Secretary  
Kimberly  
At Large

**Peter Van Der Meulen**  
Hailey  
At Large

**Albert Barker**  
Boise  
District 2

**John "Bert" Stevenson**  
Rupert  
District 3

**Dale Van Stone**  
Hope  
District 1

**Jo Ann Cole-Hansen**  
Lewiston  
At Large

1. Roll Call
2. Executive Session – Board will meet pursuant to Idaho Code §74-206(1) subsection (f), for the purpose of communicating with legal counsel regarding legal ramifications of and legal options for pending litigation, or controversies not yet being litigated but imminently likely to be litigated. Topic: Lemhi Water Right Applications. Executive Session is closed to the public.

*Following adjournment of Executive Session – meeting reopens to the public.*

3. Non-Action Items for Discussion
4. Adjourn

### Finance Committee Meeting No. 2-19

July 9, 2019

**Committee Meeting will begin upon adjournment of Board Meeting 6-19**

Idaho Water Center  
Conference Rooms C & D  
322 E Front Street  
BOISE

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1. Introductions and Attendance
2. Flood Mitigation Grant Recommendations\*
3. Other Items for Discussion
4. Adjourn

Committee Members: Vince Alberdi (Chair), Al Barker, Roger Chase, & Dale Van Stone

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Some Board Members may participate via Teleconference

\* Action Item: A vote regarding this item may be made this meeting. Identifying an item as an action item on the agenda does not require a vote to be taken on the item.

Americans with Disabilities

The meeting will be held in facilities that meet the accessibility requirements of the Americans with Disabilities Act. If you require special accommodations to attend, participate in, or understand the meeting, please make advance arrangements by contacting Department staff by email [nikki.regent@idwr.idaho.gov](mailto:nikki.regent@idwr.idaho.gov) or by phone at (208) 287-4800.

# Memorandum

To: Idaho Water Resource Board  
From: Neeley Miller & Rick Collingwood, Planning & Projects Bureau  
Date: July 8, 2019  
Re: Flood Management Grant Applications and Ranking



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**Action: Funding Recommendation for Consideration by the IWRB at July meeting**

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## **FY 2019 Flood Management Grant Program**

On April 8, 2019 the Governor signed HB 285 transferring \$21M legislative appropriation to the IWRB's Water Management Account for the Anderson Reservoir Enlargement and/or MHAFB Water Supply Project (\$20 M), the FY 2019 Flood Management Grant Program (\$800K) and for the Mid-Snake Water Quality Monitoring and Modeling effort (\$200K).

On April 18, 2019 the IWRB adopted by resolution the 2019 Flood Management Grant Criteria establishing an application deadline of June 21, 2019. The IWRB plans to award funds at the July Board meeting.

Several of the 2018 Flood Management Grant projects were completed under budget. These 2018 remaining funds total \$70,000. Therefore, the Board may award up to \$870,000 for 2019 Flood Management Grant projects (\$800,000 from 2019 appropriation + leftover 2018 funds for flood projects completed under budget).

Staff received a total of twelve (12) applications. The applications and sponsor's grant documents were evaluated, scored, and ranked according to criteria adopted by Board. See the attached summaries and ranking sheet.

### **Attachment(s):**

2019 Flood Management Grant Application Summaries  
Application Ranking Sheet

# **FLOOD MANAGEMENT GRANT PROGRAM**

## **PROJECT SUMMARIES & RANKING**

### **1. CITY OF BOISE – Crane Creek Flood Mitigation Project**

City of Boise (City) is requesting a \$6,371 flood management grant for the \$21,236 Crane Creek Flood Mitigation project. The remaining matching funding of \$14,865 will be provided by the City of Boise. The goal of the project is to construct an eco-block spillway structure, perform bank repairs to the Crane Creek embankment, and installation of a pedestrian bridge to reconnect the existing nature pathway at a low section of Crane Creek. The project is located on City of Boise Parks property west of the Esther Simplot Pond and east of privately owned land in Boise, Ada County, Idaho. Crane Creek is a natural stream that conveys water to the Boise River. High flows regularly breach the steam bank at this low point of Crane Creek. The embankment breach causes significant sediment loading in Crane Creek, the Boise River, and Esther Simplot Pond. The proposed spillway and embankment repairs will prevent ongoing repairs and maintenance, and provide a permanent solution to stop the regular breaching of the embankment.

### **2. BLAINE COUNTY – Big Wood Hospital Bridge Flood Mitigation Project**

Blaine County is requesting a \$50,000 flood management grant for the \$432,454 Big Wood Hospital Flood Mitigation project. A major portion of the remaining matching funding of \$382,454 will be provided by Blaine County and Trout Unlimited. The goal of the project is to mitigate land loss and channel migration which has occurred during past flooding events, and reduce the risk of stream channel erosion in the Big Wood River. The loss of land and river channel realignment are threatening public infrastructure, namely the Highway 75 Bridge, Wood River Trail railroad truss bridge, and St. Luke's Wood River Medical Center. These objectives will be achieved by river channel realignment and instream treatments to improve river function and water quality. In line with information from previous studies, including the Big Wood River Geomorphic Assessment Report, the County's consultant has completed a design that is aligned with the natural geomorphology of the Big Wood River at this location.

### **3. FLOOD CONTROL DISTRICT NO.10 – Boise River Management Tool Project**

Flood Control District No.10 is requesting a \$160,000 flood management grant for the \$527,000 Flood Control District No.10 Boise River Management Tool (BRMT) project. A major portion of the remaining matching funding of \$367,000 will be provided by Flood Control District No.10, Lower Boise Watershed Council, City of Boise, City of Caldwell, and the Eagle Sewer District. At the time of application submittal, twenty (20) stakeholders and/or regulatory jurisdictions were referenced as supporting the project. The goal of the project is to develop the BRMT to provide the foundation to evaluate natural and man-made alterations to the Boise River channel, flood risk determination, provide a tool for coordinating emergency response to flood events, evaluate and guide development within the Boise River floodplain, and identify, design, and prioritize cost-effective flood management projects. The BRMT will be created by mapping river subsurface topography through bathymetric LiDAR, and developing a 2-D hydraulic model that will characterize

and predict hydrodynamics affecting the river channel and floodplain. The proposed 2-D modeling project would encompass the Boise River from Diversion Dam to the confluence with the Snake River. The project is comprised of three (3) “Areas of Interest” (AOI). AOI-1 – FCD 10, from Veterans Parkway to Caldwell at the confluence with Indian Creek. AOI-2 – Boise, from Diversion Dam to Veterans Parkway, and AOI-3 – Lower Boise, from the confluence with Indian Creek to the Snake River. Flood Control District No.10’s funding request is for 2-D model development of all three (3) AOI’s, or the entire length of the Boise River from Diversion Dam to the Snake River. However, Flood Control District No.10’s highest priority is the section of the Boise River identified as AOI -1 - FCD 10, which is located within Flood Control District No.10’s service boundary.

**4. BLAINE COUNTY – Broadford Road Fisherman’ Access Project**

Blaine County is requesting a \$100,000 flood management grant for the \$263,498 Broadford Road Fisherman’s Access project. The remaining matching funding of \$163,498 will be provided by Blaine County (\$100,000 cash and \$10,000 in-kind services), Flood Control District No.9 (\$50,000), and a private land owner (\$3,498 in-kind with rocks and plants). The spring flooding of 2017 resulted in channel migration, severe bank erosion, and loss of critical habitat at many locations throughout the Big Wood River and tributaries. The project goal is to repair and restore an area commonly referred to as the Fisherman’s Access area near Broadford Road that was significantly damaged during the 2017 flooding of the Big Wood River. Blaine County implemented critical measures in May, 2017, to slow down further erosion and potential damage to the Broadford Bridge and Broadford Road. In line with information from previous studies, including the Big Wood River Geomorphic Assessment Report, the County’s consultant completed the Big Wood River Restoration Project, Broadford Road Bridge Area, in February, 2018. This design report created a project that would restore the Big Wood River from the Star Bridge to the Broadford Bridge.

**5. CITY OF HAILEY – Della View Subdivision Flood Mitigation Project**

The City of Hailey (City) is requesting a \$50,000 flood management grant for the \$104,134 Della View Flood Mitigation project. The remaining matching funding of \$54,134 will be provided by the City of Hailey, of which \$4,113 will be in-kind services. The goals of the project are to construct a drainage ditch extension on the east side of War Eagle Drive. The drainage ditch extension, along with road crossing culverts, will convey annual low-water flooding across War Eagle Drive to the existing War Eagle drainage ditch and culverts for discharge back to the Big Wood River. These improvements will assist to mitigate flood impacts to private and public properties.

**6. BOARD OF CONTROLS IRRIGATION – Diversion 45 Flood Mitigation Project**

Board of Controls Irrigation, which includes the Wood River Valley Irrigation District 45 and Triangle Irrigation District, is requesting a \$59,050 flood management grant for the \$136,457 Diversion 45



Flood Mitigation project. Flood District No.9, Diversion 45, and Trout Unlimited will provide the remaining matching funding of \$77,407, of which Diversion 45 will provide \$5,000 of in-kind services, and Trout Unlimited will provide \$2,407 in in-kind services. The goal of the project is to alleviate flood damage and risk of flooding of approximately 500-feet of streambank upstream of the Diversion 45 headgate structure. Currently, the streambank is stabilized by wooden planks, which were installed in the 1960's. As the wooden planks continue to degrade, streambank erosion continues to occur, requiring annual maintenance to keep flows directed at the headgate and prevent additional erosion to the streambank. City facilities, including the Howard Preserve, and a public trail are located adjacent to the eroding streambank, which creates a public safety issue in this stretch along the Big Wood River.

**7. CLEARWATER SOIL & WATER CONSERVATION DISTRICT – Gold Creek Culvert Replacement Project**

Clearwater Soil & Water Conservation District (CSWCD) is requesting a \$72,727.39 flood management grant for the \$160,896.09 Gold Creek Culvert Replacement project. The remaining matching funding of \$88,168.70 will be provided by PotlatchDeltic, of which \$5000 will be in-kind services. The goal of the project is to reduce the risk of flood damage to a key secondary road that is heavily used for recreation and industrial access, and protect water quality and fisheries in Gold Creek. The removal of the undersized culverts and roadway embankment, which acts as a dam during high flows, will provide stream channel capacity to pass the 50-year runoff event flows, and prevent debris from collecting in the creek. The project will likely prevent potentially tons of sediment entering Dworshak Reservoir.

**8. IDAHO SOIL & WATER CONSERVATION DISTRICT – Deer Creek Flood Mitigation Project**

Idaho Soil & Water Conservation District (ISWCD) is requesting a \$159,436 flood management grant for the \$330,524 Deer Creek Flood Mitigation project. The remaining matching funding of \$171,088 will be provided by the contractor, Deer Creek Highway Department, and ISWCD. ISWCD's portion of the matching funds, \$11,088, is for planning, engineering, and construction inspection. The goal of the project is to repair road damage on Deer Creek Road caused by a 2019 spring flood event, and replace and re-position four culverts along Deer Creek Road to re-establish anadromous fish passage in Deer Creek.

**9. CLEARWATER SOIL & WATER CONSERVATION DISTRICT – Shanghai Road Culvert Replacement Project**

Clearwater Soil & Water Conservation District (CSWCD) is requesting a \$190,492.37 flood management grant for the \$392,561.10 Shanghai Road Culvert Replacement project. The remaining matching funding of \$202,068.73 will be provided by PotlatchDeltic, of which \$18,369.73 will be in-kind services. The goal of the project is to replace undersized and failing culverts within the Canal Creek and Shanghai Creek watersheds to reduce the risk of flood damage to a key secondary road used for industrial and recreation use, and improve water quality in Canal Creek and Shanghai Creek. Canal Creek is the primary source of drinking water for the community

of Pierce, Idaho.

**10. IDAHO SOIL & WATER CONSERVATION DISTRICT – Lower Three Mile Creek Project**

The Idaho Soil & Water Conservation District (ISWCD) is requesting a \$21,619.50 flood management grant for the \$43,273.50 Lower Three Mile Creek project. The ISWCD will provide the matching funding of \$21,654.00. In April, 2019, Lower Three Mile Creek experienced high flood flows. The streambanks at this portion of Lower Three Mile Creek were breached due to severe erosion and material deposition. These high flows severely damaged a stream channel berm, and flooded private property adjacent to the berm. The goal of the project is to implement streambank channel and berm repairs, and rerouting of Lower Three Mile Creek to its original alignment.

**11. CASSIA COUNTY – Elba Bridge Replacement Project**

Cassia County is requesting a \$43,875 flood management grant for the \$87,750 Elba Bridge Replacement project. The remaining matching funding of \$43,875 will be provided by Cassia County and Raft River Flood District No.15. The goal of the project is to replace the Elba Bridge and perform stream channel repair. The bridge replacement is to replace a 50-year old deteriorating bridge that is experiencing structural damage due to erosion and sediment problems and age. Project description does not reference the need for bridge replacement and stream channel repairs due to flood damage.

**12. PORTNEUF SOIL AND WATER CONSERVATION DISTRICT**

The Portneuf Soil and Water Conservation District (PSWCD) is requesting a \$200,000 flood management grant for the \$485,000.00 Marsh Creek project. The remaining matching funding of \$285,000 will be provided by NRCS (\$260,000) and the USFWS (\$25,000). Land use practices have resulted in excessive sedimentation in Marsh Creek, contributing to flooding of the stream. Likewise, historic wetlands are not available for surface water flooding due to the construction of numerous small levees. The goal of the project is to make flood damage repairs to Marsh Creek from Downey to the confluence of Marsh Creek with the Portneuf River. The flood damage repairs include reconnection to historic wetlands, streambank stabilization, and reducing the flow velocity of runoff into Marsh Creek. The project is scheduled to be completed in 2022. The \$200,000 flood management grant request from the IWRB will be used for land and easement purchases. The location of proposed stream channel improvements and repairs have not been identified, and the project is currently at a conceptual phase.

## 2019 - Flood Management Grant Applications & Ranking

Ranking	Entity	Funding Request
1	City of Boise - Crane Creek	\$6,371.00
2	Blaine County - Big Wood Hospital Bridge	\$50,000.00
3	Flood Control District No.10	\$160,000.00
4	Blaine County - Broadford Road Fishermans Access	\$100,000.00
5	City of Hailey - Della View Subdivision	\$50,000.00
6	Board of Controls Irrigation - Diversion 45	\$59,050.00
7	Clearwater Soil & Water Cons. Dist. - Gold Creek	\$72,727.39
8	Idaho Soil & Water Cons. Dist. - Deer Creek	\$159,436.00
9	Clearwater Soil & Water Cons. Dist. - Shanghai Creek	\$190,492.37
10	Idaho Soil & Water Cons. Dist. - Lower Three Mile Creek	\$21,619.50
11	Cassia County - Elba Bridge	\$43,875.00
12	Portneuf Soil & Water Cons. Dist. - Marsh Creek	\$200,000.00
		\$1,113,571.26

## Flood Management Grant Application Ranking Sheet - Criteria Evaluation Points & Final Rankings

Entity	Funds Requested	Total Project Costs	Final Evaluation Score (135 Pts)	Final Rankings	Awarded Funding
City of Boise - Crane Creek	\$6,371.00	\$21,236.00	131	1	\$0.00
Blaine County - Big Wood Hospital Bridge	\$50,000.00	\$432,454.00	124	2	\$0.00
Flood Control District 10	\$160,000.00	\$527,000.00	119	3	\$0.00
Blaine County - Broadford Road Fishermans Access	\$100,000.00	\$263,498.00	118	4	\$0.00
City of Hailey - Della View Subdivision	\$50,000.00	\$104,134.00	107	5	\$0.00
Board of Controls Irrigation - Diversion 45	\$59,050.00	\$136,457.00	107	6	\$0.00
Clearwater Soil & Water Cons. Dist. - Gold Creek	\$72,727.39	\$160,896.09	103	7	\$0.00
Idaho Soil & Water Cons. Dist. - Deer Creek	\$159,436.00	\$171,088.00	100	8	\$0.00
Clearwater Soil & Water Cons. Dist. - Shanghai Creek	\$190,492.37	\$392,561.10	97	9	\$0.00
Idaho Soil & Water Cons. Dist. - Lower Three Mile Creek	\$21,619.50	\$43,273.50	88	10	\$0.00
Cassia County - Elba Bridge	\$43,875.00	\$87,750.00	83	11	\$0.00
Portneuf Soil & Water Cons. Dist. - Marsh Creek	\$200,000.00	\$485,000.00	72	12	\$0.00
<b>Total funds requested</b>	<b>\$1,113,571.26</b>				<b>\$0</b>

Total: \$0





JUN 20 2019



## IDAHO WATER RESOURCE BOARD

322 East Front Street, Statehouse Mail

Boise, Idaho 83720

Tel: (208) 287-4800

FAX: (208) 287-6700



## APPLICATION FOR FLOOD MANAGEMENT GRANT

Answer the following questions and provide the requested material as directed. All pertinent information must be provided. Additional information may be requested by the Idaho Water Resource Board (IWRB) depending on the scope of the project and amount of funding requested.

**Incomplete documents will be returned and no further action will be taken by IWRB staff. All paperwork must be submitted within twenty-eight (28) working days prior to the next IWRB meeting.**

Board meeting agendas can be found at: <https://idwr.idaho.gov/IWRB/meetings>

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**I. Overview:**

This form applies to the *IWRB Flood Management Grant Program*. The Flood Management Grant Program provides financial assistance, on a competitive statewide basis, to eligible entities interested in pursuing flood damaged stream channel repair, stream channel improvements, flood risk reduction, or flood prevention projects. Pursuing flood management improvement and repair projects can assist in maintaining flow capacities in major waterways, prevent bank and channel erosion, and reduce property damage during flood events.

The grant funding shall require a 50% funding match by the sponsor of the total project costs. In-kind services can account for up to 30% of the total project costs. Legal/Administrative in-kind services are limited to 5% of total project costs.

Funds will be distributed by sponsor submitting funding reimbursement requests, which shall include:

1. Cover letter formally requesting a funding reimbursement, description of project activities, dates of project activities, and contractor or supplier invoices. Funds shall be distributed within 15-days of receipt of reimbursement request.

Upon completion of the project, sponsor and/or consultant, shall submit a notice of completion to the IWRB, and that the improvements and/or repairs were constructed in substantial conformance with the approved plans and specifications.

**Prepare and attach a "Grant Document" to this application.**

The Grant Application Document requirements are outlined in the IWRB Flood Management Grant Program Guidelines. The guidelines can be found at:

<http://idwr.idaho.gov/IWRB/Programs/Financial>

You can also obtain a copy by contacting IWRB staff.

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## **II. General Information:**

### **A. Type of organization: (Check box)**

- ☐ Flood Control District  
☒ Municipality  
☐ County  
☐ Other

City of Boise

Organization name

Melissa Jannusch Associate Engineer

Name and title of Contact Person

150 N Capitol Blvd

PO Box/Street Address

208-608-7168

Contact telephone number

Boise, Ada, ID, 83702

City, County, State, Zip Code

mjannusch@cityofboise.org

e-mail address

82-60000165

Taxpayer ID#

Project location/ legal description 3206 W Pleasanton Ave Boise, ID 83702

LEGAL1:PAR #5655 OF W2 SEC 04; LEGAL2 E2 SEC 05 3N 2E & SE4; LEGAL3:SEC 32 4N 2E; LEGAL4  
PARCEL F R/S 5819; LEGAL5: #325650-B #233700-S

**B. Is your organization registered with the Idaho Secretary of State's office? Yes ☒ No ☐**

### **C. Purpose and project description for this grant application.**

- ☐ Stream Channel Repair  
☐ Stream Channel Improvement  
☐ Flood Risk Reduction  
☒ Flood Prevention  
☐ Other \_\_\_\_\_

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## **III. WATER PROJECT/ACTIVITY:**

### **A. Water Source and Name: Crane Creek**

- ☒ Surface ☐ Reservoir  
☐ Other \_\_\_\_\_



**B. Describe the Flood Management Project/Activity and the primary purpose of this grant application?**

The project proposes repair of a breach caused by the flooding of Crane Creek adjacent to Ester Simplot Pond in Boise, Idaho. A spillway, bank repairs, and pedestrian bridge are proposed to prevent Crane Creek from flooding the nature pathway, stop sediment entering the pond and creek, and will provide safe public trail access over the spillway.

**C. Does this project/activity address multiple objectives? If so explain.**

During high flows Crane Creek's bank is breached sending sediment into Crane creek. The project aims to reduce flooding and improve water quality by permanently repairing the bank to prevent regular breaches of the bank thereby reducing sediment, improving water quality, and preventing flooding.

**D. Will this flood management project/activity be implemented in a single year, or phased over multiple years?**

☒ 1-year      ☐ Multiple-years (Phased)

**E. Project start and completion dates:**

Estimated October 18th- December 20th. See grant funding proposal request for full estimated implementation schedule.

**F. Project detailed cost estimate, including all labor and materials:**

IWRB Grant Funding requested: \$6,371, Financing Sources: City Match 70% = \$14,865

Total = \$21,236, Please see grant funding proposal request for detailed budget with labor and materials

**G. Has your organization performed stream channel or stream bank repair and/or improvement projects in the past?**

Yes

**H. Provide the required regulatory approval and permit documents for this project.**

Permits may include: City of Boise permits (grading, floodplain etc.) and Army Corps 404 permits

#### **IV. FINANCIAL INFORMATION:**

**A. Does your organization have a regular assessment for a reserve or special needs fund?**

Yes ☒ No ☐

**B. Does your organization have prior experience in working with the Idaho Water Resource Board?**

Yes ☒ No ☐

**C. What other sources of funding have been explored to fund the project? (e.g. U.S. Army Corps of Engineers, NRCS, FEMA, Banks, Local Government, etc.)**

## Local Govenment

**Amount of funds requested:** \$6,371

*By signing this document you verify that all information provided is correct and the document is filled out to the best of your ability.*

Authorized signature & date: Melissa Jamusch 6-18-2019



## PUBLIC WORKS DEPARTMENT

MAYOR: David H. Bieter | DIRECTOR: Stephan Burgos

June 18, 2019

Idaho Water Resource Board  
322 E Front Street, Statehouse Mail  
Boise, Idaho 83720

Re: Application for Flood Management Grant  
Crane Creek Spillway

The City of Boise is seeking a grant Award of \$6,371 for the repair of a breach caused by the flooding of Crane Creek adjacent to Ester Simplot Pond in Boise, Idaho. The City proposes a 70% match (\$14,865) for the project. The spillway and bank repairs will prevent Crane Creek from flooding the nature pathway, sending sediment into the Esther Simplot Pond and Crane Creek, and will provide safe public trail access via a pedestrian bridge across the spillway. Please find enclosed the grant funding proposal and preliminary design plans for your consideration.

Sincerely,

Melissa Jannusch



CITYOFBOISE.ORG

Melissa Jannusch, EIT  
Associate Civil Engineer  
Public Works  
Office: (208)608-7168  
mjannusch@cityofboise.org

*Making Boise the most livable city in the country.*

# Grant Funding Proposal Request

## Project Background Information

### Purpose

Crane Creek is a natural stream that transports water from Crane Gulch to the Boise River. The proposed project is to repair a low section of Crane Creek that is regularly flooded during high flows breaching the bank and leading to significant erosion of the bank and pathway. The breach occurs along a section of Crane Creek with Esther Simplot Pond and a nature trail to the west and private residential development to the east. The area of creek is within Esther Simplot Park and is owned by the City of Boise Parks and Recreation Department.

The proposed solution includes:

- Installation of an ultra-block spillway
- A pedestrian bridge and trail repair
- Erosion protection for the bank and channel bottom
- Revegetation of the bank and disturbed areas



Figure 1: Crane Creek Breach May 2019

The bank repair and spillway will prevent flooding of Crane Creek and reduce the amount of erosion entering Esther Simplot Pond, Crane Creek and eventually the Boise River. Creating a pedestrian bridge will enhance public safety by providing a safe crossing of the breach.

The section of Crane Creek proposed for repair is located within Ada County, specifically Boise, ID on City of Boise Parks property. The subject area is within the FEMA (AO?????) floodplain zone. To the west of the project site is a nature path and Esther Simplot Pond and to the east is privately-owned residential land. The creek converges with the Boise River approximately 4,000 feet down stream.



Figure 2: Vicinity and Locality Map

The City of Boise is the qualified entity responsible for the project. The City of Boise was incorporated as a city 156 years ago in 1863. Funding for the project will be from the Public Works DIS/Drainage 2020 budget. The City owns a large variety of existing operations including flood control ponds, flumes, water renewal plants, agricultural operations, city parks, city facilities (fire stations, police, stations, etc.), and others. This project would align with the types of project the City regularly undertakes and maintains (see previous projects and studies below).

The Public Works Department will design and manage the project. Design is approximated at 50 hours. Project management is approximated at 120 hours. Staff members from parks and finance and administration will be involved at various stages. This project will not use volunteers. Work will be performed by contractors or City Staff from Utilities and Maintenance department and is estimated to be completed during a 1.5-month period with approximately 15 working days.



## Previous Projects and Studies

- The White-Water Park phases 1 and 2 are near to the proposed project site. Extensive hydrological, geotechnical, and engineering studies were conducted, reviewed, and approved for these projects. These studies can be referenced if additional general information is needed for the project area.
- A similar spillway was constructed a part of the Hyatt Wetland project. The spillway was constructed from ultra-blocks and is used as a reference for the proposed project design.



- Several pedestrian bridges have been constructed for Parks projects and are used as a general reference for the design of the pedestrian pathway bridge. The specifications for the proposed bridge will be similar to the bridges used in the White-Water Park wetland areas.
- Multiple river bank repairs have been completed by the City in 2018 and 2019 and are used as a reference for bank repair, grading, and revegetation of the bank.

## Project Description

The proposed project is to repair a low section of Crane Creek that is regularly breached during high flows. The breach occurs along a section of Crane Creek with Esther Simplot Pond and a nature trail to the west and private residential development to the east. The area of creek is within Ester Simplot Park and is owned by the City of Boise Parks and Recreation Department.

The goal of the proposed project is to improve the water quality, improve flood control, and increase public safety. The spillway will improve water quality by reducing sediment loading in Crane Creek, the Boise River, and Esther Simplot Pond. Currently the bank is breached during high flows sending sediment from the bank/pathway into pond, Crane Creek, and ultimately the Boise River. Sediment is a pollutant of concern as it can reduce breeding habitat for fish, raise water temperatures, and impair recreation. The spillway and bank repair will provide a permanent solution to the breaches stopping the cycle of flooding, breaching, and repairing. The project also proposes a bridge for pedestrian access across the spillway, so the public can safely use the pathway.

The project will be monitored to ensure the spillway does not cause additional breaches upstream of the spillway. The spillway elevation is based on the lowest elevation in the vicinity. If water is overtopping upstream, the elevation of the spillway can be adjusted to solve the problem. The project will be a success if the bank is no longer breached and the pathway is not flooded.

The conceptual design plans can be found starting on page 7 of the grant funding proposal request.

## Cost estimate

Based on previously completed projects and engineering estimates.

Table 1: Cost Estimate

Item	Item	Cost
<b>Ecology Blocks</b>	~60 per block	\$ 780.00
<b>Bridge (Materials)</b>		\$ 900.00
<b>Rip rap, fabric, revegetation, and grading</b>	~\$500/linear foot	\$10,000.00
<b>Labor</b>	~\$20/hour 120 hours 3 people	\$ 7,200.00
<b>Permitting</b>		\$ 425.00
<b>10% Contingency</b>		\$ 1,931
<b>Total</b>		<b>\$ 21,236</b>



## Financial Feasibility Analysis

IWRB Grant Funding requested: \$6,371

Financing Sources: City Match 70% = \$14,865

The project is feasible based on Public Works DIS/Drainage 2020 Budget

## Implementation Schedule

*Table 2: Proposed Schedule*

June 21	Grant application due
August 14	Final design drawings complete. Submitted for agency approval.
July 31	Potential notice of award
August 21	Bid package complete
August 28	Submit for advertisement
September 12	Pre-bid conference at ESP
September 18	Last day for questions
September 24	Bid opening
October 8	Council approval
October 15	Project preconstruction meeting
October 18	Notice to proceed (NTP) (No later than November 1 2019)
November 18	Monthly progress report to IWRB
December 13	Substantial completion
December 18	Monthly progress report to IWRB
December 20	Final Completion
January 18	Substantial conformance certification to IWRB

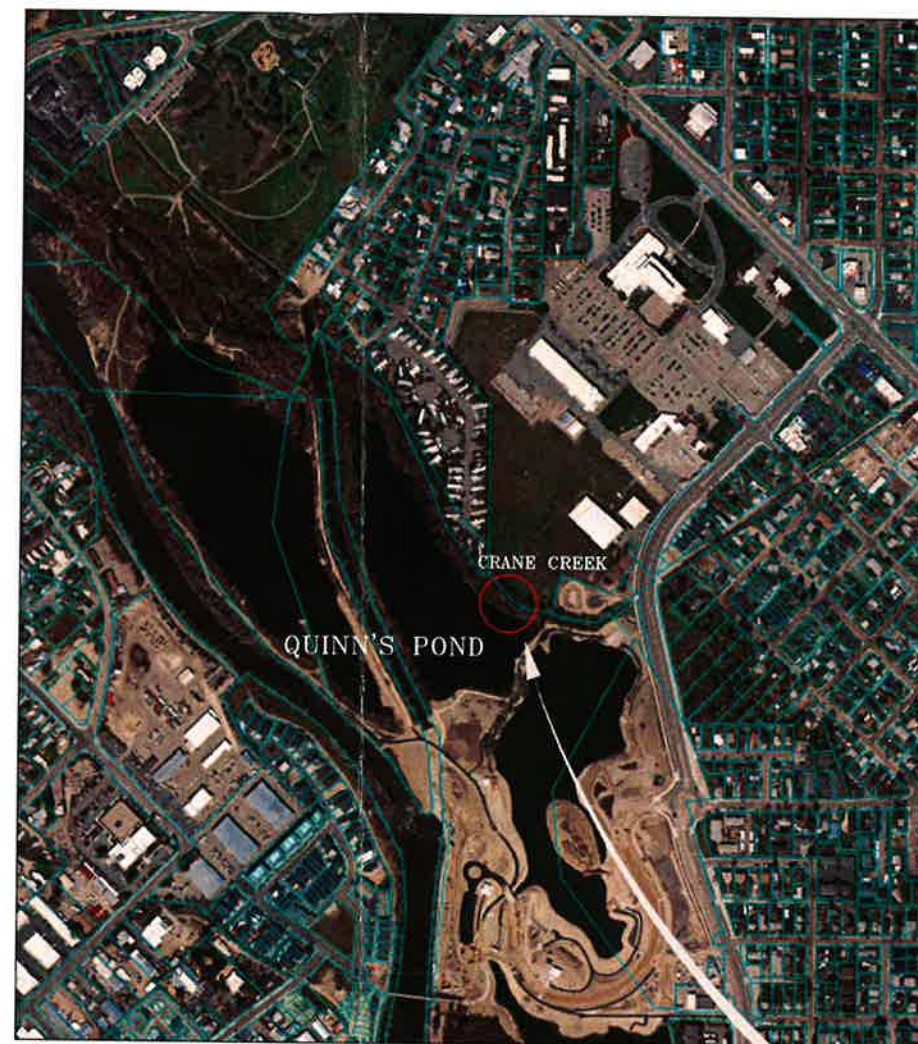




1. ALL ELEVATIONS ARE BASED ON NAVD 88 DATUM.

The map displays a street network in the Emerald area. Key streets shown include Chinden Blvd, State Road, Hill Road, 36th, Harrison, 27th, 13th, 9th, 5th, 1st, Franklin, Curtis, Latah, Federal, Way, Amity, W Gowen Road, Pleasant Valley Road, Victory Road, Overland Road, Eagle Road, Cloverdale Road, Five Mile Road, Milwaukie Road, Ustick Road, and Meridian Road. A red star is located at the intersection of 27th and Harrison, with a line pointing to it from the text 'PROJECT LOCATION' on the right. A north arrow is positioned in the upper right corner.


STREET OR SURVEY CENTER LINE  
 EXISTING SANITARY SEWER, MANHOLE  
 PROPOSED SANITARY SEWER, MANHOLE  
 BURIED TELEPHONE LINE, MANHOLE, RISER  
 WATER LINE, METER, VALVE  
 GAS LINE, VALVE  
 UNITED CABLE TELEVISION LINE  
 BURIED POWER LINE, TRANSFORMER  
 RIGHT-OF-WAY LINE  
 PROPERTY LINE  
 FENCE LINE, GATE  
 CONCRETE SIDEWALK, CURB  
 EDGE PAVEMENT  
 GRAVEL  
 OPEN DITCH  
 ASPHALT DRIVEWAY  
 CONCRETE DRIVEWAY  
 GRAVEL DRIVEWAY  
 FIRE HYDRANT, MAIL BOX, SIGN  
 BENCH MARK, BRASS CAP  
 MONUMENT — CONTROL POINT  
 MONUMENT — FOUND  
 MONUMENT OF RECORD — NOT FOUND  
 TELEPHONE POLE, LIGHT POLE  
 POWER POLE, GUY WIRE  
 EXISTING STORM DRAIN, MANHOLE, DROP INLET  
 EXISTING IRRIGATION DRAIN, IRRIGATION BOX  
 EXISTING BUILDING, PROPOSED BUILDING  
 TREES, SHRUBS  
 HEDGE  
 LENGTH OF SERVICE  
 STATION OF SERVICE LINE  
 ELEVATION AT PROPERTY LINE  
 SPRINKLER



## LOCALITY MAP

1. TITLE SHEET
2. NOTES
3. SITE MAP
4. PRELIMINARY PLANS
5. DETAILS

PRELIMINARY

						DESIGNED:MMJ	DATE: MARCH 2019	 <b>PUBLIC WORKS DEPARTMENT</b> 150 N. CAPITOL BLVD. BOISE, IDAHO 83702 (208) 384-3800	TITLE SHEET	CRANE CREEK SPILLWAY	SHEET 1 OF 5 PWE 888
						DRAWN: MMJ	SECTION , T. N., R. E.				
						CHECKED: JCT	FILE NO.: CRANE CREEK WALKWAY				
DATE	NO.	REVISION	DATE	NO.	REVISION						

All work shall conform to all city and other governing agencies regulations. Contractor shall coordinate with Project Manager on all necessary permits, inspections and approvals required to perform work including but not limited to: Erosion and Sediment Control, Floodplain Applications, Grading and Drainage Permit, etc.

The contractor is responsible for coordinating a construction staging and access area with BPR and Public Works. Contractor must keep all roadways and access points clear of project debris by sweeping or cleaning as necessary.

The Contractor shall schedule all work under this contract to be a sustained and concerted effort to complete the project within the allotted time. A project construction schedule specific to the line item tasks shall be completed by the Contractor prior to beginning work on the project. The aforementioned construction schedule must be presented to and approved by the Boise Public Works Departments Coordinator prior to construction start up.

The Contractor shall be responsible for pedestrian and vehicular safety and control within and about the work site. Special care shall be taken to ensure temporary warning signage is placed in both directions of path and/or street travel. The Contractor shall obtain all permits and bonds required by and/all pertinent agencies and shall provide all necessary warning devices, barricades, signage and ground personnel needed to give safety, protection and warning to persons within the area.

The contractor is responsible for damages to any and all facilities and appurtenances, plant material, and other improvements and must repair and/or replace any or all items damaged in a timely and acceptable manner at no cost to the Owner.

It is the Contractor's responsibility to make provision and pay for water and power necessary for work under this contract and to clean-up any spills or debris or residues created by their work.


The limits of construction as coordinated with Public Works shall be delineated on the site by temporary safety fence suitable for denying access to the construction area. Such fencing shall be considered incidental to the contract and shall be barricaded and/or fenced to deny access whenever the Contractor is away and cannot provide security for the facility. Barricades are to remain in place until final inspection has been made by the Project Coordinator. Contractor responsible to maintain fencing and barricades in good working, safe condition.

		% of Mix	Lbs/acre
Sandberg Bluegrass	<i>Poa secunda</i>	15.0%	2.55
Blue Bunch	<i>Pseudoroegneria spicata</i>	40.0%	6.8
Squirreltail	<i>Elymus elymoides</i>	20.0%	3.4
Needle & thread	<i>Hesperostipa comata</i>	15.0%	2.55
Sand dropseed	<i>Sporobolus cryptandrus</i>	8.0%	1.36
Shaggy fleabane	<i>Erigeron pumilus</i>	1.0%	0.17
Western Yarrow	<i>Achillea millefolium</i>	1.0%	0.17
		100.0%	17

Application rate shall be 17bbls/acre

		% of Mix	Lbs/acre
Sandberg Bluegrass	<i>Poa secunda</i>	15.0%	2.55
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		100.0%	17

Application rate shall be 17bbls/acre

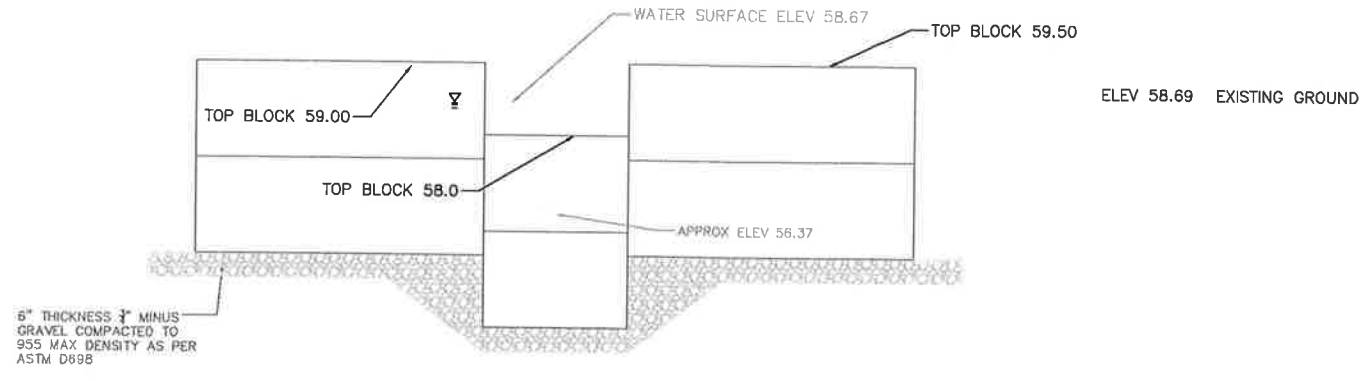
						DESIGNED: MMJ	DATE: MARCH 2019	 PUBLIC WORKS DEPARTMENT 150 N. CAPITOL BLVD. BOISE, IDAHO 83702 (208) 384-3900	NOTES	CRANE CREEK SPILLWAY	SHEET 2 OF 5 PWE 888
						DRAWN: MMJ	SECTION: T, N, R, E.				
DATE	NO.	REVISION	DATE	NO.	REVISION	CHECKED: JCT	FILE NO.: CRANE CREEK HALLWAY				



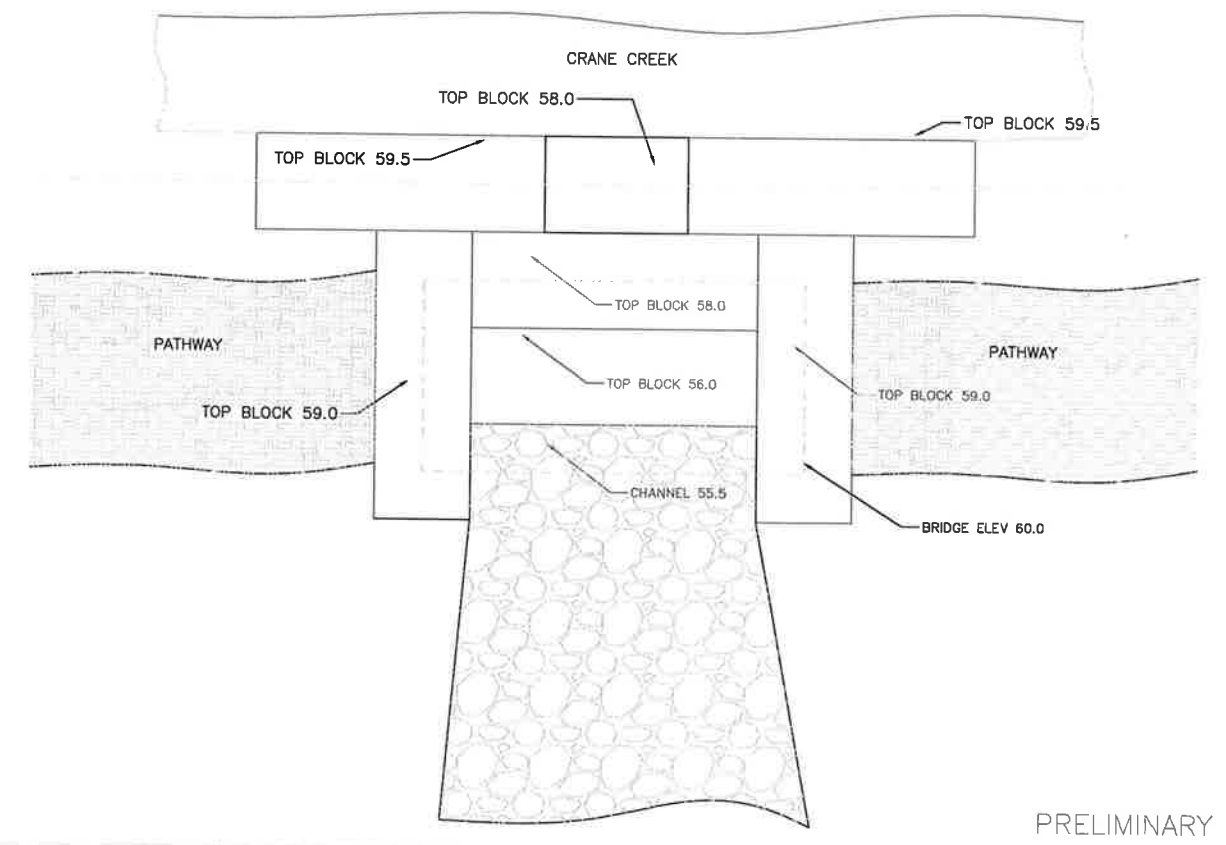
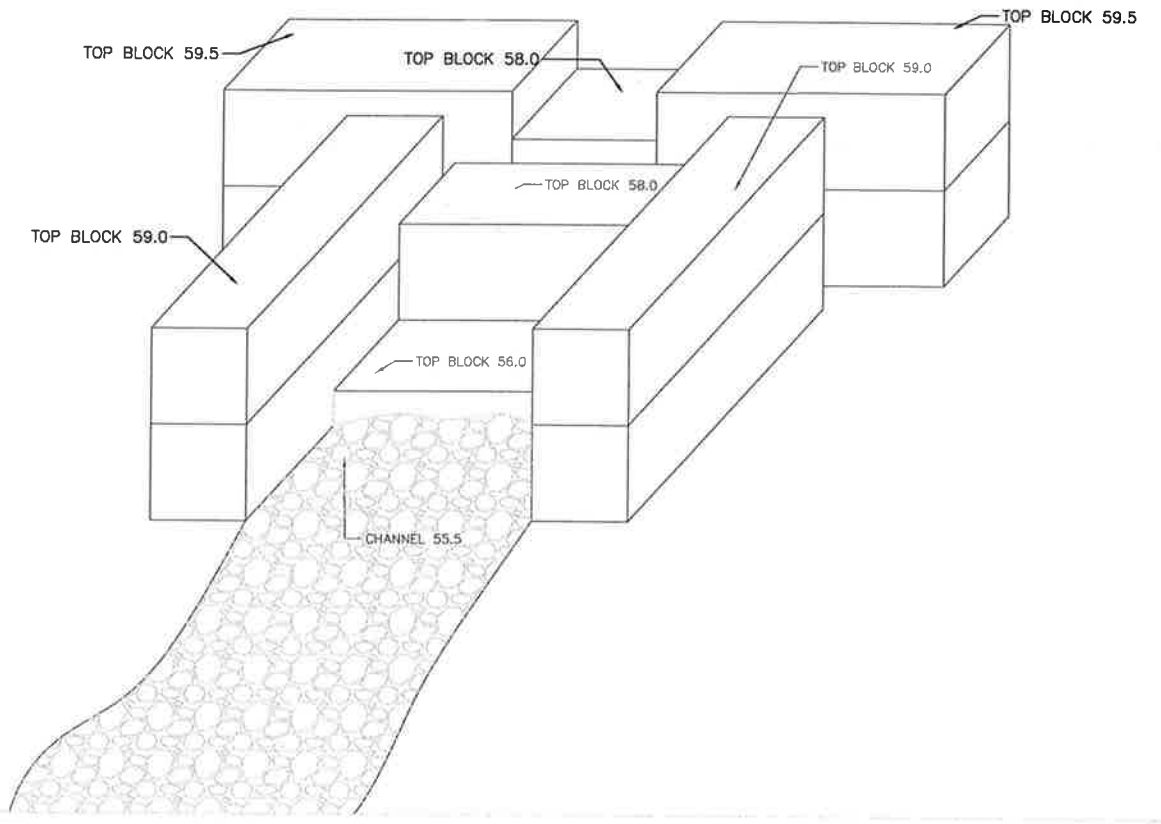
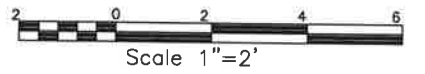


CRANE CREEK SPILLWAY

WEST ELEV 59.76



Cut (excavation for ultra-blocks)	322 ft <sup>3</sup>
Fill (Pathway and 3/4 base)	335 ft <sup>3</sup>
Total	13 ft <sup>3</sup>

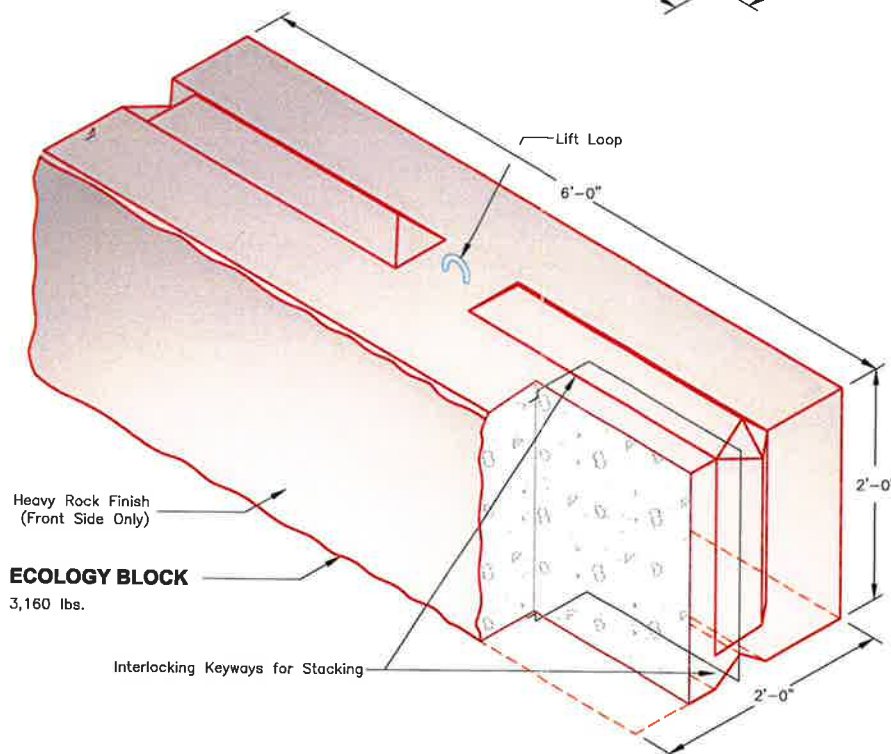


PRELIMINARY

(2) - Pinning Holes  
w/(2) -  $\frac{1}{2}$ " x 18" Rebars

**BUMPER CURB-PARKING STOP**  
**6'-0" LONG**  
290 lbs.

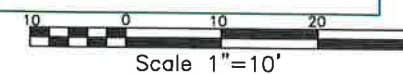
**BUMPER CURB-PARKING STOP**  
**6'-0" LONG**  
290 lbs.



File Name: 020-CRBBLK
Issue Date: 2016
<b>oldcastleprecast.com/wilsonville</b>

## BUMPER CURBS ECOLOGY BLOCK

## 6.0



DATE	NO.	REVISION	DATE	NO.	REVISION

DESIGNED:MMJ	DATE: MARCH 2019
DRAWN:MMJ	SECTION , T. N., R. E.
CHECKED: JCT	FILE NO.: CRANE CRICK 1141010



**PUBLIC WORKS DEPARTMENT**  
150 N. CAPITOL BLVD.  
BOISE, IDAHO 83702  
(208) 384-3900

## DETAILS

CRANE CREEK SPILLWAY

SHEET 5 OF 5  
PWE 888





## THE BOARD OF BLAINE COUNTY COMMISSIONERS

206 FIRST AVENUE SOUTH, SUITE 300

HAILEY, IDAHO 83333

PHONE: (208) 788-5500 FAX: (208) 788-5569

[www.blainecounty.org](http://www.blainecounty.org) [bcc@co.blaine.id.us](mailto:bcc@co.blaine.id.us)

Jacob Greenberg, Chairman \* Angenie McCleary, Vice-Chairman \* Dick Fosbury, Commissioner

June 18, 2019

Idaho Department of Water Resources  
Attn: Mr. Neeley Miller  
PO Box 83720  
Boise, ID 83720

Re: Idaho Water Resource Board Grant – Big Wood Hospital Bridge Flood Mitigation Project


Dear Mr. Neeley and Selection Committee,


Blaine County is pleased to submit its grant application as part of the Idaho Water Resource Board grant opportunity. Blaine County is seeking \$50,000 to partially fund the Big Wood Hospital Bridge Flood Mitigation Project. The total cost of the project is estimated at \$432,454, and the County is working with Trout Unlimited to secure the remaining \$382,454 needed to complete this project.

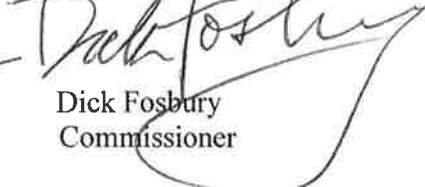
The spring flooding of 2017 resulted in channel migration, severe bank erosion, and loss of critical habitat at many locations throughout the Big Wood River and its tributaries. The Big Wood Hospital Bridge Flood Mitigation Project will alleviate flood damage and future risk of flooding to public infrastructure and private property at the Highway 75 traffic bridge near the St. Luke's Wood River Medical Center, the "Hospital Bridge." The Hospital Bridge and adjacent railroad truss/Wood River Trail bridge are threatened by annual flooding events and migration of the river channel southward. With partners, Blaine County proposes to implement treatments that will realign the channel with the two bridges while enhancing river function and ecosystem health.

We have enclosed the Idaho Water Resource Board grant application and supporting documents for your review. We appreciate your time and consideration of our application and process. If you have any questions, please contact Chris Corwin by phone at 208-788-5508 or email at [ccorwin@co.blaine.id.us](mailto:ccorwin@co.blaine.id.us).

Sincerely,

  
Jacob Greenberg  
Chairman

  
Angenie McCleary  
Vice-Chair

  
Dick Fosbury  
Commissioner



**IDAHO WATER RESOURCE BOARD**

322 East Front Street, Statehouse Mail

Boise, Idaho 83720

Tel: (208) 287-4800

FAX: (208) 287-6700



**APPLICATION FOR FLOOD MANAGEMENT GRANT**

Answer the following questions and provide the requested material as directed. All pertinent information must be provided. Additional information may be requested by the Idaho Water Resource Board (IWRB) depending on the scope of the project and amount of funding requested.

**Incomplete documents will be returned and no further action will be taken by IWRB staff. All paperwork must be submitted within twenty-eight (28) working days prior to the next IWRB meeting.**

Board meeting agendas can be found at: <https://idwr.idaho.gov/IWRB/meetings>

---

**I. Overview:**

This form applies to the *IWRB Flood Management Grant Program*. The Flood Management Grant Program provides financial assistance, on a competitive statewide basis, to eligible entities interested in pursuing flood damaged stream channel repair, stream channel improvements, flood risk reduction, or flood prevention projects. Pursuing flood management improvement and repair projects can assist in maintaining flow capacities in major waterways, prevent bank and channel erosion, and reduce property damage during flood events.

The grant funding shall require a 50% funding match by the sponsor of the total project costs. In-kind services can account for up to 30% of the total project costs. Legal/Administrative in-kind services are limited to 5% of total project costs.

Funds will be distributed by sponsor submitting funding reimbursement requests, which shall include:

1. Cover letter formally requesting a funding reimbursement, description of project activities, dates of project activities, and contractor or supplier invoices. Funds shall be distributed within 15-days of receipt of reimbursement request.

Upon completion of the project, sponsor and/or consultant, shall submit a notice of completion to the IWRB, and that the improvements and/or repairs were constructed in substantial conformance with the approved plans and specifications.

**Prepare and attach a "Grant Document" to this application.**

The Grant Application Document requirements are outlined in the IWRB Flood Management Grant Program Guidelines. The guidelines can be found at:

<http://idwr.idaho.gov/IWRB/Programs/Financial>

You can also obtain a copy by contacting IWRB staff.

---

## **II. General Information:**

### **A. Type of organization: (Check box)**

- ☐ Flood Control District  
☐ Municipality  
☒ County  
☐ Other

Blaine County

Organization name

\_\_\_\_\_  
Name and title of Contact Person

\_\_\_\_\_  
PO Box/Street Address

\_\_\_\_\_  
Contact telephone number

\_\_\_\_\_  
City, County, State, Zip Code

\_\_\_\_\_  
e-mail address

\_\_\_\_\_  
Taxpayer ID#

Project location/ legal description Upstream of the Highway 75 traffic bridge 'Hospital Bridge,' south  
of Ketchum, encompassing parcel numbers RP003750000090, RP003750000100, RP003750000110,  
RP04N18030744E, RP04N18030728A, RP04N18030728D

B. Is your organization registered with the Idaho Secretary of State's office? Yes ☒ No ☐

### **C. Purpose and project description for this grant application.**

- ☒ Stream Channel Repair  
☒ Stream Channel Improvement  
☒ Flood Risk Reduction  
☒ Flood Prevention  
☐ Other \_\_\_\_\_

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## **III. WATER PROJECT/ACTIVITY:**

### **A. Water Source and Name: Big Wood River**

- ☒ Surface ☐ Reservoir  
☐ Other \_\_\_\_\_



**B. Describe the Flood Management Project/Activity and the primary purpose of this grant application?**

The Hospital Bridge Flood Mitigation Project will mitigate land loss and channel migration from past flooding events, while alleviating the risk of erosion from future floods. This will be accomplished through channel realignment and implementing treatments aligned with river channel geomorphology.

**C. Does this project/activity address multiple objectives? If so explain.**

This project addresses threats to public infrastructure, erosion of private property, and degraded aquatic habitat and river channel conditions. The instream treatments are designed to improve river function and water quality while addressing ongoing issues caused by flooding and erosion.

**D. Will this flood management project/activity be implemented in a single year, or phased over multiple years?**

☒ 1-year      ☐ Multiple-years (Phased)

**E. Project start and completion dates:**

October 1, 2019 - March 30, 2020

**F. Project detailed cost estimate, including all labor and materials:**

The total project cost estimate is \$432,454, which includes design and permitting costs, project management, construction administration, equipment, and material costs.

**G. Has your organization performed stream channel or stream bank repair and/or improvement projects in the past?**

Blaine County and partner Trout Unlimited have experience performing stream channel improvement projects on the Big Wood River, two of which were funded in 2018 by the IWRB Flood Management grant funding.

**H. Provide the required regulatory approval and permit documents for this project.**

Permits will be required from the Army Corps of Engineers, Idaho Dept. of Water Resources, and Blaine County.

---

**IV. FINANCIAL INFORMATION:**

A. Does your organization have a regular assessment for a reserve or special needs fund?

Yes ☐ No ☐

B. Does your organization have prior experience in working with the Idaho Water Resource Board?

Yes ☒ No ☐

C. What other sources of funding have been explored to fund the project? (e.g. U.S. Army Corps of Engineers, NRCS, FEMA, Banks, Local Government, etc.)

Project funding has been secured from private donations, the National Fish and Wildlife Foundation, and an internal Trout Unlimited Grant. Pending grant applications include: Idaho Fish and Wildlife Foundation, Idaho Dept. of Fish and Game, Blaine County Land, Water, and Wildlife Program, and another internal Trout Unlimited grant.

---

Amount of funds requested: \$50,000

*By signing this document you verify that all information provided is correct and the document is filled out to the best of your ability.*

Authorized signature: \_\_\_\_\_

*Jacob Greenberg*  
Jacob Greenberg, Chairman

Date 6.18.19

ATTEST

*JoLynn Drage*  
JoLynn Drage  
Blaine County Clerk



## **2.1 Project Background Information**

### **2.1.1 Purpose**

The Big Wood Hospital Bridge Flood Mitigation Project will alleviate flood damage and future risk of flooding to public infrastructure and private property at the Highway 75 traffic bridge near the St. Luke's Wood River Medical Center, the "Hospital Bridge." The Hospital Bridge and adjacent railroad truss/Wood River Trail bridge are threatened by annual flooding events and migration of the river channel southward. With partners, Blaine County proposes to implement treatments that will realign the channel with the two bridges while enhancing river function and ecosystem health. We request \$50,000 of the total project cost from the Idaho Water Resources Board.

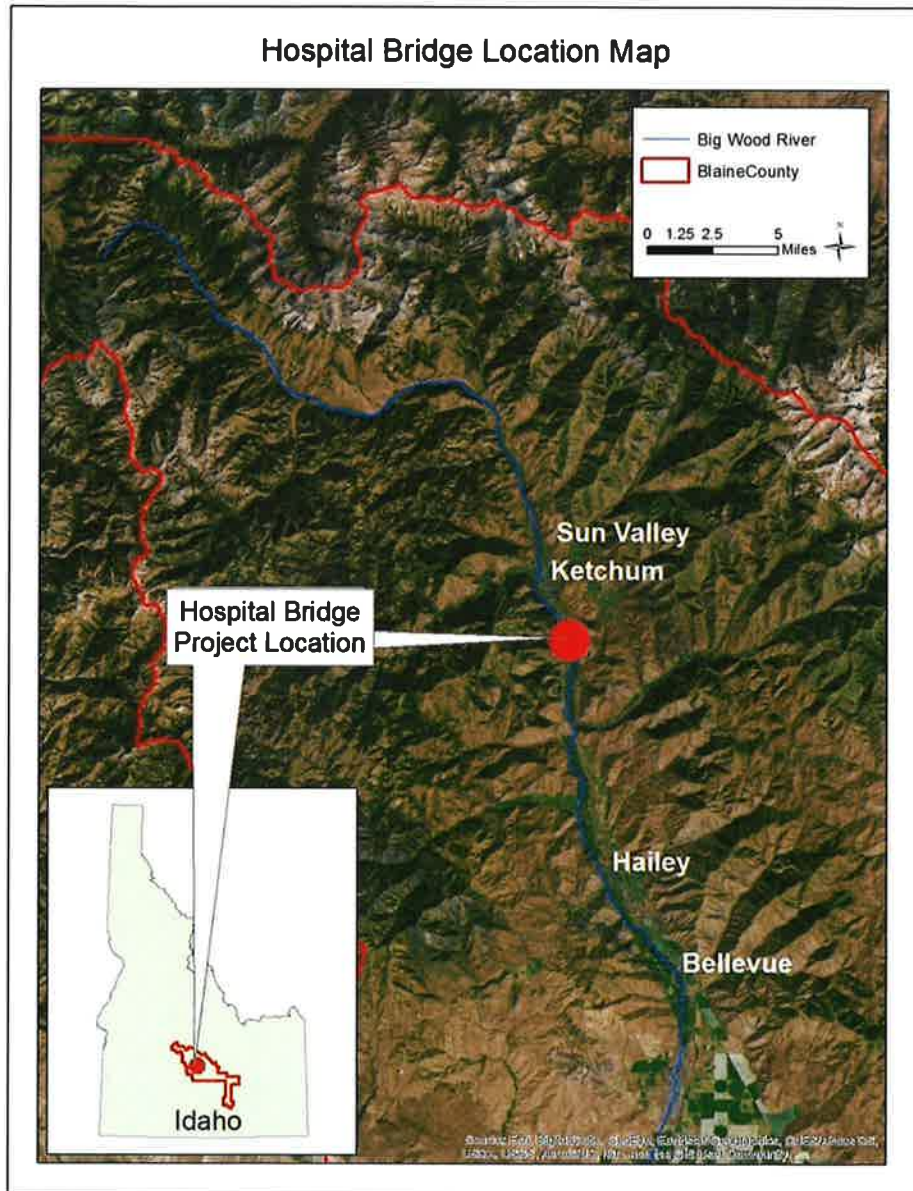
The two bridges at risk are critical to the local transportation system and the community. The Hospital Bridge was constructed approximately 100 years ago and was reconstructed in 2016 and 2017. Adjacent to the traffic bridge is a single span railroad truss bridge originally constructed in 1894 and placed on the National Register of Historic Places in 1997. This railroad truss bridge is within the most utilized part of the Wood River Trail System. Each year during spring runoff, high flow velocities threaten bridge abutments. The reach is highly unstable and has migrated more than 100 ft. in recent years, causing erosion and riparian land loss. During the 2017 flood, flow velocities caused significant erosion directly upstream of Highway 75, and now the channel is directed southward, and then northward before flowing under the bridge. If no action is taken, the river will continue to erode bridge land and bridge abutments and migrate south. If the Big Wood watershed experiences another extreme weather year, the river may top the western bank and flow directly towards Highway 75 and the Wood River Medical Center.

A recent *Geomorphic Assessment of the Big Wood River* identified this reach as one of the most impaired within the 40-mile study. Although this reach has experienced little encroachment, development and constrictions both upstream and downstream have created dramatic alterations to the river channel. Sediment transport analyses indicate that this reach has excess capacity to transport sediment but insufficient capacity to transport bedload, causing excess deposition of mid-channel and lateral gravel bar enlargement. These features promote channel migration and excessive bank erosion and contributes 396 tons of sediment into the Big Wood River annually. Project design elements are aligned with the natural geomorphology of this reach and will reduce sedimentation, improving water quality and floodplain habitat. Realigning the river according to its geomorphology and implementing treatments such as floodplain benches will enable the river to respond to annual precipitation events and changes in hydrology. The project is also designed to transport sediment loads calculated for this reach by incorporating pools and structures that will direct flow and suspended sediment downstream.

If the river continues to migrate, high flow velocities will threaten bridge abutments, private land, the St. Luke's Wood River Medical Center, low-income housing, and Highway 75. During the 2017 flood, coffer dams and sandbags were used to prevent flooding at St. Luke's and water surrounded both bridges and inundated adjacent land. If flooding had continued, the main flow velocity may have topped the existing streambank and threatened Highway 75. This reach of river is one of the highest priorities in Blaine County's Hazard Mitigation Plan.

### 2.1.2 Project Area Description

- a. The project site is approximately 1,250 ft. of the Big Wood River in Blaine County, one mile south of Ketchum, and upstream of the Highway 75 'Hospital Bridge.'
- b. Maps







- c. Land use surrounding the project site is residential, industrial, and includes public infrastructure.

### 2.1.3 Previous Projects and Studies

Biota Research and Consulting, Inc. 2016. Geomorphic Assessment Report, Big Wood River, Blaine County. Prepared for Trout Unlimited. online <https://woodriverlandtrust.org/bigwoodassessmentupdate/>

Pentzer, C. 2006. Big Wood River Watershed Total Maximum Daily Load (TMDL) Implementation Plan for Agriculture. Idaho Dept. of Environmental Quality. online <https://www.deq.idaho.gov/media/1117170/big-wood-river-ag-imp-plan-0214.pdf>

Rapp, C. F. 2006. Geomorphic Assessment of the Big Wood River. Prepared for Wood River Land Trust.

online [http://www.co.blaine.id.us/vertical/sites/%7BBB2A7BCF-1E38-4DB2-AE8E-3A22829A1987%7D/uploads/Rapp\\_Geomorphic\\_Assessment\\_2006.pdf](http://www.co.blaine.id.us/vertical/sites/%7BBB2A7BCF-1E38-4DB2-AE8E-3A22829A1987%7D/uploads/Rapp_Geomorphic_Assessment_2006.pdf)

## **2.2 Project Sponsor**

Blaine County is a county government in the state of Idaho. In 1895, Blaine County was created by the Idaho State legislature by combining Alturas and Logan Counties. It was a large county consisting of five other present-day counties, Lincoln, Gooding, Minidoka, Jerome and Camas. Blaine County's current boundaries were established on February 8, 1917 as described in Idaho Code 31-109. Blaine County was formed under The Idaho Constitution – Article XVIII and Idaho Statutes Title 31 contains Idaho Code pertaining to counties.

Blaine County's revenue source is from assessments. Blaine County is a local government that provides public services to the citizens of Blaine County, Idaho. Blaine County has a three person county commissioner's board and a county administrator. Blaine County has approximately 20 different departments and 166 employees. The departments include: Administrative Services, Assessors Office, Commissioners Office, Coroner, County Services, County, Emergency Communications, DMV, Elections, Facilities, GIS, Information Technology, Land Use and Building Services, Probation, Prosecuting Attorneys, Clerk/Recorders, Recycling, Road & Bridge, Sheriff, Treasurer and Weed Department. Blaine County has an official County Code that was last updated by ordinance 2018-03, passed February 13, 2018. In the county code under Chapter 7 is the county commissioner bylaws. Given the size of Blaine County workforce and with their knowledge and experience, Blaine County has the organizational capacity to undertake and complete the project described in this application. Blaine County's project lead, Chris Corwin, has worked on an Idaho Water Resource Board Grant from 2018. He has maintained proper documentation and worked seamlessly with program manager, Rick Collingwood. He has also been a grant manager for several FEMA grants within the past 18 months, including the Emergency Management Program Grant, State Homeland Security Grant Program and the Hazard Mitigation Grant Program. Chris will work with other county staff including the County Engineer and Floodplain Manager to ensure the work being complete meets both engineering standards and floodplain regulations. The amount of time that will need to be dedicated to this project is difficult to determine at this time but Chris has the flexibility in his job responsibilities to be able to dedicate the required time to complete the project timely, efficiently and properly.

Trout Unlimited is a primary project partner and has experience in Idaho and nationwide completing restoration, flood mitigation, and irrigation projects. For more than a half century, Trout Unlimited—a grassroots sportsmen's conservation organization—has worked to improve trout and salmon habitat across the United States. Today, Trout Unlimited is the premier 501c(3) coldwater conservation organization in the United States, with more than 300,000 members in more than 30 states. Trout Unlimited is also an acknowledged leader in collaborating with the agricultural producers in the West to find creative solutions that benefit both fisheries and producers' bottom lines. Trout Unlimited partners with farmers, ranchers and irrigation companies on pragmatic, voluntary, and market-driven solutions that benefit agricultural operations as well as fish and wildlife habitat. In Idaho, Trout Unlimited has successfully completed numerous projects in the Yankee Fork, Pahsimeroi, Lemhi, Blackfoot, and Upper

Snake, and Wood River basins. In 2018, Trout Unlimited and Flood Control Dist. No. 9 received Idaho Water Resources Board grant funding for the Bypass Canal and Bannon Ditch Flood Mitigation Project.

Big Wood River Project Manager, Keri York, will be the primary staff implementing this project, as a partner with Blaine County. Blaine County will administer this grant and provide support as needed. As the Big Wood River Project Manager, Ms. York coordinates and manages restoration and water conservation projects in the Big and Little Wood River basins. She successfully implemented the Bypass Canal and Bannon Ditch Flood Mitigation Project and post-fire stream restoration in the Little Wood drainage in 2018. Ms. York administers the Wood River Water Collaborative, was an initial staff member on the Hailey Greenway Master Plan, and was involved in the Hulen Meadows restoration and recreation planning efforts. As a project partner, she also helped direct the Wood River Geomorphic Assessment. She completed numerous conservation easement and land management projects with private landowners and agricultural producers for 10 years in her previous position at Wood River Land Trust. Ms. York's staff time as project manager is included in the overall project budget and will be provided by Trout Unlimited.

Other affected stakeholders have been contacted by Trout Unlimited. Those include private landowners, St. Luke's Wood River Medical Center, the Idaho Transportation Department, Blaine County Recreation District, and Flood Control District No. 9. Letters of support are provided by landowners, Flood Control District No. 9, Trout Unlimited, Idaho Dept. of Fish and Game, the Blaine County Recreation District, and Wood River Land Trust. We appreciate the Board's consideration of these support letters with a different project title, 'Bridge to Bridge Restoration Project.' A Right-of-Way Encroachment permit has been received from the Idaho Transportation Department.

## **2.4 Project Description**

### **2.4.1 Project Description**

#### **a. Project Description**

Blaine County proposes to implement instream treatments and Best Management Practices to mitigate damage caused by the 2017 flood and reduce future damage from high flows. Channel alignment will be re-established by restoring historic river channel morphology and flow direction. By using information from previous studies, including the Big Wood River Geomorphic Assessment Report, Biota Research and Consulting has completed a design that is aligned with the natural geomorphology of the Big Wood River in this location.

The main channel of the Big Wood River will be realigned with the Hospital Bridge and railroad truss bridge while re-establishing floodplain and side channels. In previous decades, channel form and function have not been maintained in this reach, causing excessive erosion and channel migration. Realigning the main channel will entail excavation and the creation of floodplain benches to absorb high flows, promote bank stability, and floodplain sediment deposition. Appropriate grade control will be applied to the main channel along with a riffle/pool sequence to effectively transport sediment.

Meander bend and channel margin structures will be installed along streambanks and floodplain benches to reduce erosion and create aquatic and riparian habitat. These structures use root wads, tree clumps, woody shrubs, or logs to stabilize banks, and transplanted woody clumps will increase bank roughness. Using wood to accomplish bank stabilization increases hydraulic roughness of the channel and reduces near-bank flow velocity and erosion. Transplanted willow clumps and willow stingers will be installed to establish a root matrix and growth of young plants. These woody structures are keyed in and provide stability to streambanks. Root wads will extend into the stream channel and provide cover and fish habitat. Willows and brush trenches will be implemented into floodplain benches for long-term stability and vegetative root growth.

Streambank vegetation has additional benefits of filtering nutrients from runoff and reducing instream temperatures. Stormwater and runoff from agricultural fields flows through riparian vegetation and infiltrates into groundwater or flows directly into surface water. Roots and stabilized soil capture Phosphorus and other nutrients, improving water quality. Woody trees and shrubs planted along streambanks cools instream temperatures, which can be elevated to levels of concern for trout species during late summer months.

Three side channels will be enhanced through this project. Side channels can convey high flows and flood waters, dissipating energy and reducing erosion along streambanks of the main channel. Side channels are also important fish habitat, particularly for juveniles, in other parts of the year. The inlet to the western side channel and one of the eastern side channels will be excavated to increase flow. Apex and porous log jams will be constructed to maintain a split flow path, with most of the flow remaining in the main channel. Logjams will use available woody debris to stabilize the upstream end of the gravel bar or floodplain benches while maintaining divergent flow paths.

The western streambank directly upstream of the railroad truss bridge receives the majority of flow velocity and will be stabilized using rock toe. This treatment is used in conjunction with floodplain bench and meander bend structure treatments to maintain the channel location. Rock is placed along the streambank and planted with vegetation bundles. Over time, mature vegetation bundles, along with floodplain brush trenches, provide additional root growth and stability while increasing habitat complexity.

Success will be measured by the reduction in land loss and channel erosion in this reach. Success will also be measured by the reduction in ongoing concern of flood damage to the Hospital Bridge and railroad truss / Wood River Trail bridge. By designing instream treatments according to the river's geomorphology, the proposed solution will be long-term and will address flood mitigation as well as environmental issues. The incorporation of multiple channels and floodplain benches will disperse velocity and lessen high flow impacts on public infrastructure and streambanks. Sedimentation and other water quality indicators will continue to be monitored by the Department of Environmental Quality through their BURP program.



During construction, the project will be monitored onsite daily by project partner, Trout Unlimited, and a contracted engineer or geomorphologist to ensure design specifications are followed. Prior to the project, photopoints will be established to provide qualitative information documenting changes to structures, vegetation, and specific features over time. Baseline photographs and drone imagery will identify existing conditions, and photographs will be taken after construction and thereafter annually to monitor the project. Photographs and annual site visits by Trout Unlimited will determine if any project maintenance is required. The Department of Environmental Quality will continue its water quality monitoring on the Big Wood River and provide information in its TMDL documents regarding reductions in sediment load and other parameters.

This project is aimed at mitigating impacts of the 2017 flood and alleviating future risk of flooding. The benefits include re-establishment of a functional river form to maintain a realigned channel; improved streambank stability and riparian habitat; and reduction in sedimentation to the river. If this project does not occur, the river will exist in its current state and high flows and flooding will continue to erode bridge abutments and private land and contribute sediment load to the system. Through collaboration between the Blaine County, Trout Unlimited, and other stakeholders, this project will be a leading effort in the basin and southcentral Idaho. Local contractors and consultants will be hired for engineering, construction, and sourcing materials wherever possible. Adult and student volunteers will help with vegetation plantings, cutting and bundling willows, and seeding disturbed areas. This will be coordinated through Trout Unlimited's Hemingway Chapter, with over 200 members that volunteer for projects. Students will be engaged through Trout Unlimited's Trout-in-the-Classroom program, and we expect at least two student groups to participate.

b. Map



c. Conceptual Plan/Cross Section

Please see attached Final Design Plan and Cross Sections.

d. Conceptual Design and Repair Features

The final design and plan uses repair features that will mitigate impacts of the 2017 flood, alleviate future flooding, and enhance riparian and aquatic habitat. Floodplain benches, wood structures, and rock toe will be installed to reactivate the floodplain, protect the streambank, and realign the Big Wood River with the Hospital Bridge. Side channels will be enhanced and maintained to convey high flows and mitigate flooding. An instream riffle/pool sequence will be created to transport sediment and enhance instream habitat.

e. Right-of-Way / Easement

Trout Unlimited is in the process of securing access agreements with the five private landowners. A Right-of-Way Encroachment permit has been secured with the Idaho Transportation Department.

2.4.2 Cost Estimate

Construction costs are based on a bid from Biota Research and Consulting (see attached Biota Cost Estimate). Additional project costs are included in the total budget below.

**Detailed Hospital Bridge Project Budget**

<b>Architectural and Engineering Fees</b>	<b>\$15,635</b>
- Final Design Development	\$7,425
- Engineering Analysis & Certification	\$4,160
- Drafting, Construction Drawings	\$4,050
<b>Administrative and Legal Expenses</b>	<b>\$85,311</b>

**Permitting**

- USACE & IDWR Permit (joint app)	\$3,300
- Blaine Co Stream Alteration Permit	\$5,500
- Blaine Co. Floodplain Development Permit (if required)	
--- CLOMR (pre-const, FEMA permit)	\$12,000
--- Field Surveys for No-Rise Analysis or CLOMR	\$4,000
--- LOMR (post-const FEMA permitting)	\$10,000
- Stormwater Prevention Permit	\$3,000

**Project Management**

- Project Manager (TU)	\$21,050
- Project Administration (TU)	\$700
- Legal Counsel (TU)	\$1,715
- Project Support (TU)	\$1,770
- Travel	\$1,000
- Monitoring	\$6,000

**Volunteer and In-Kind Partner Support**

- IDFG, BCRD, St. Luke's Project Planning Support	\$2,500
- Adult and Student Volunteer Planting & Seeding	\$9,876
- Landowner Private Funding and Access	\$2,900

**Restoration Site Work and Construction** **\$267,036****Construction Contract**

- Construction Administration	\$36,839
- Equipment Mobilization & Demobilization	\$5,000
- Contingency	\$36,000

**Site Work - Land Restoration and Stabilization**

- Pool and Riffle Construction	\$25,962
- Floodplain Bench Construction	\$26,368
- Sediment Storage Area Construction	\$7,365
- Side Channel Excavation - Construction	\$972

**Construction Materials and Supplies**

- Toe Rock - Material	\$55,440
- Channel Margin Structures - Material	\$17,500
- Meander Bend Structures - Material	\$21,000
- Apex Jam Structures - Material	\$3,500
- Porous Matrix Jam Structure - Material	\$9,000
- Ballast Boulders	\$3,000
- Willow Bundles for River Bank Treatment	\$8,750
- Brush Trenches for Floodplain Bench Treatment	\$2,840
- Site Seeding and Clean-up	\$2,500
- Interpretive Signage	\$5,000

**Sub Total** **\$367,982**

- TU Indirect	\$64,472
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<b>Grand Total</b>	<b>\$432,454</b>
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#### 2.4.3 Implementation Schedule

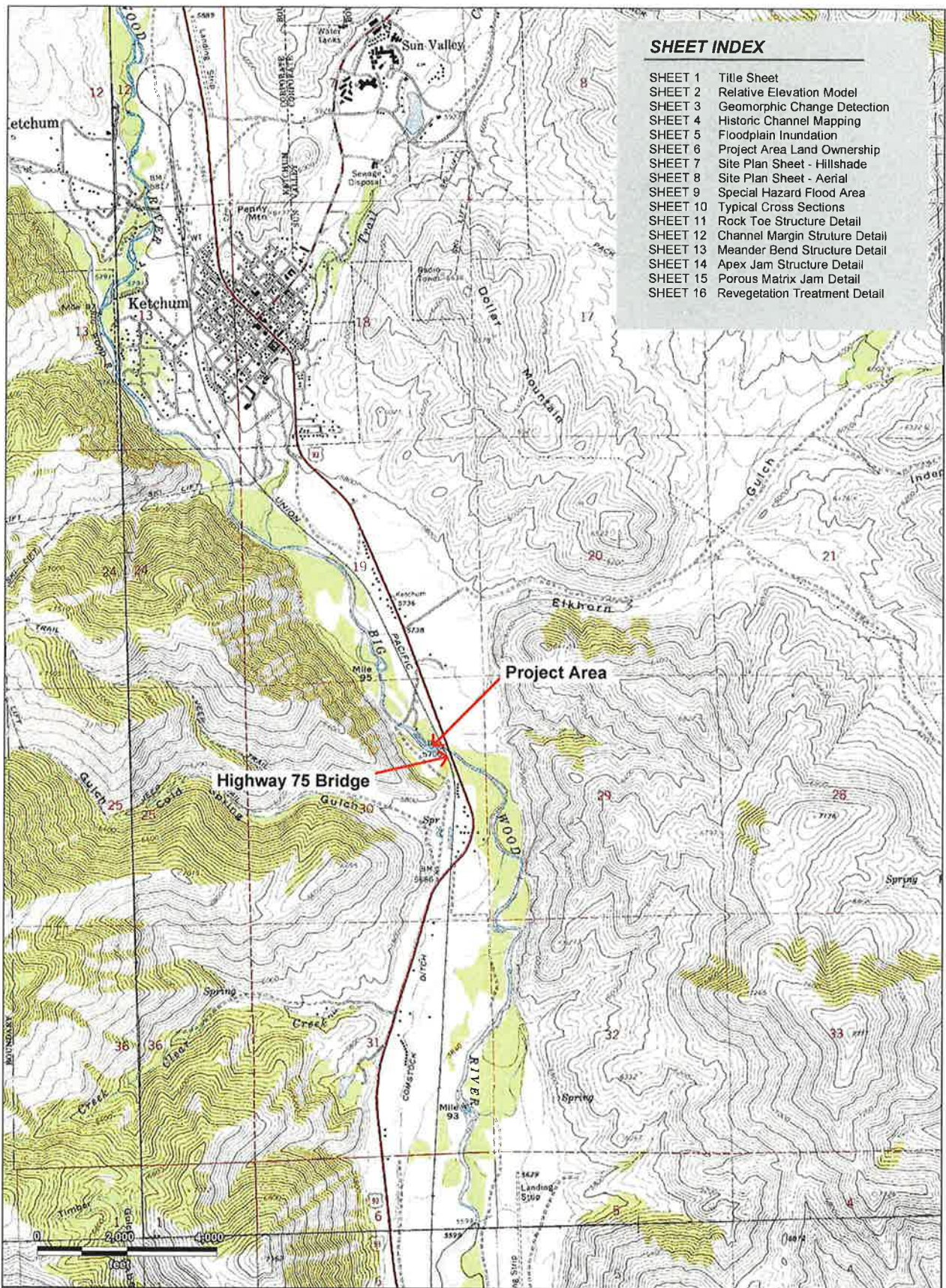
<b>Task</b>	<b>Start Date</b>	<b>End Date</b>
Final Design	June 1, 2019	July 1, 2019
Finalize Access Agreements	June 1, 2019	July 1, 2019
Permitting and Regulatory Review	July 1, 2019	October 15, 2019 or sooner
Secure Remainder Funding	December 15, 2018	August 15, 2019
Pre-Construction Monitoring	October 15, 2019	November 1, 2019
Construction	November 1, 2019	January 1, 2020
Post-Construction Monitoring	January 1, 2020	Annually thereafter

#### 2.5 Financial Feasibility Analysis

The total cost for this project is estimated at \$432,454. The request to Idaho Water Resources Board is \$50,000 (12%). Match funding has been secured through private fundraising, the National Fish and Wildlife Foundation, private landowners, and a Trout Unlimited Coldwater Conservation Fund internal grant. Pending sources are the Blaine County Land, Water, and Wildlife Program, the Idaho Fish and Wildlife Foundation, the Idaho Department of Fish and Game Commission Challenge Grant, and another internal Trout Unlimited Embrace-A-Stream grant. Please see attached letter from Trout Unlimited committing to securing match funding of \$382,454.

<b>Funding Source</b>	<b>Amount</b>	<b>Status</b>
Idaho Water Resources Board	\$50,000	Pending
Trout Unlimited Private Fundraising	\$66,000	Secured
Trout Unlimited Internal Coldwater Conservation Fund Grant	\$25,000	Secured
National Fish and Wildlife Foundation Grant to Trout Unlimited	\$29,326	Secured
Private Landowner Material Donation and Volunteers	\$17,616	Secured
Blaine County Land, Water, and Wildlife Program	\$215,476	Pending
Idaho Fish and Wildlife Foundation	\$10,000	Pending
Idaho Dept. of Fish and Game	\$5,000	Pending
Trout Unlimited Internal Embrace-A-Stream Grant	\$10,000	Pending
Additional Trout Unlimited Private Fundraising	\$37,036	Pending
<b>Total</b>	<b>\$432,454</b>	

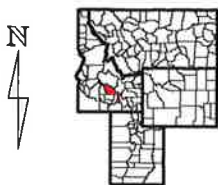




### SHEET INDEX

SHEET 1	Title Sheet
SHEET 2	Relative Elevation Model
SHEET 3	Geomorphic Change Detection
SHEET 4	Historic Channel Mapping
SHEET 5	Floodplain Inundation
SHEET 6	Project Area Land Ownership
SHEET 7	Site Plan Sheet - Hillshade
SHEET 8	Site Plan Sheet - Aerial
SHEET 9	Special Hazard Flood Area
SHEET 10	Typical Cross Sections
SHEET 11	Rock Toe Structure Detail
SHEET 12	Channel Margin Structure Detail
SHEET 13	Meander Bend Structure Detail
SHEET 14	Apex Jam Structure Detail
SHEET 15	Porous Matrix Jam Detail
SHEET 16	Revegetation Treatment Detail

**Project Locator Map**



Blaine County, Idaho

### Big Wood River Restoration, Bridge to Bridge Project Blaine County, Idaho

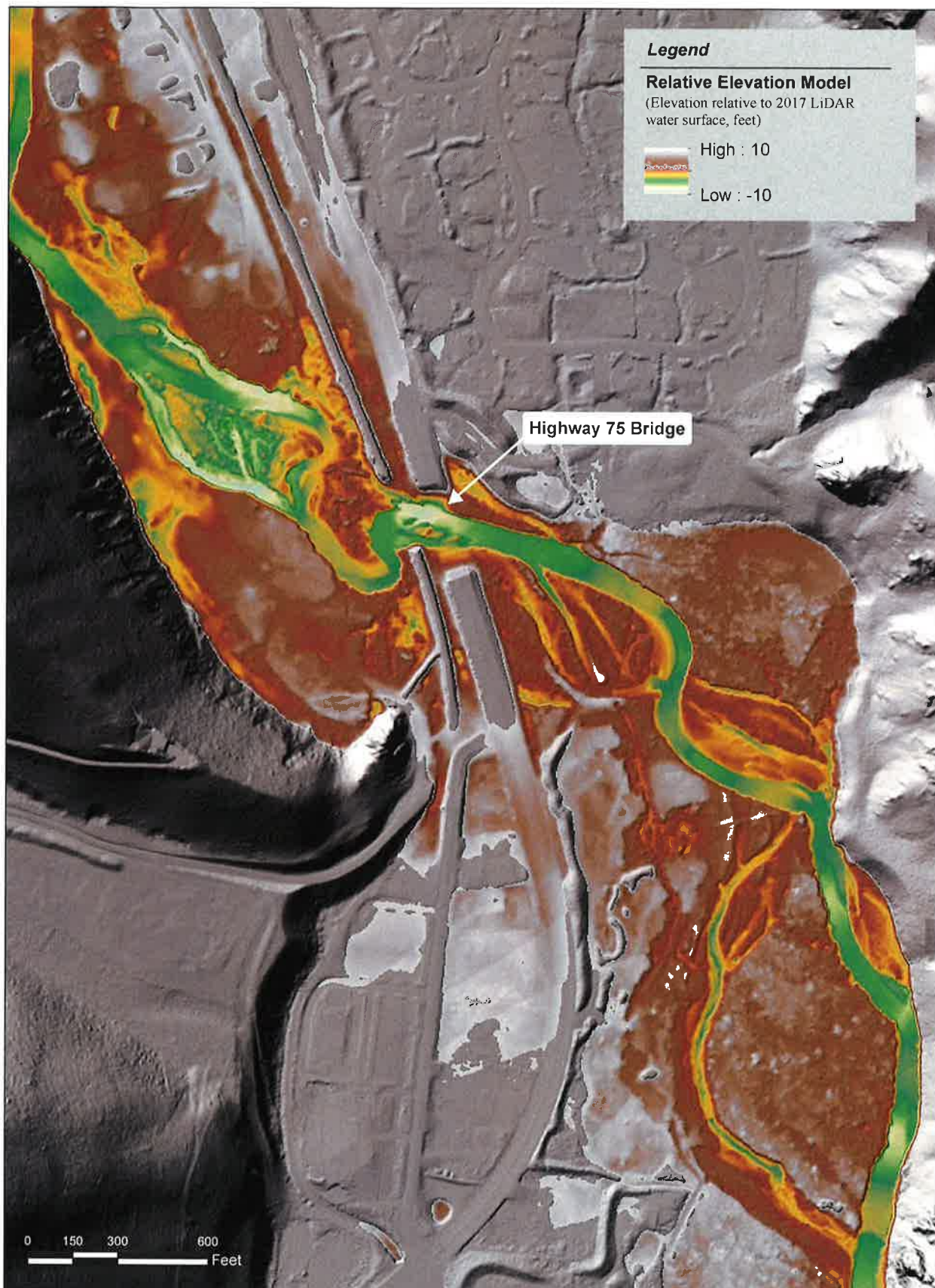
#### SHEET 1

Scale: 1 inch = 2,000 feet  
Township 04N Range 18E Sections 30  
USGS Sun Valley Quadrangle



PO Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83002





Date: 02/27/2019  
Description: Existing Conditions  
Scale 1 inch = 300 feet  
2017 LiDAR Hillshade

**SHEET 2**

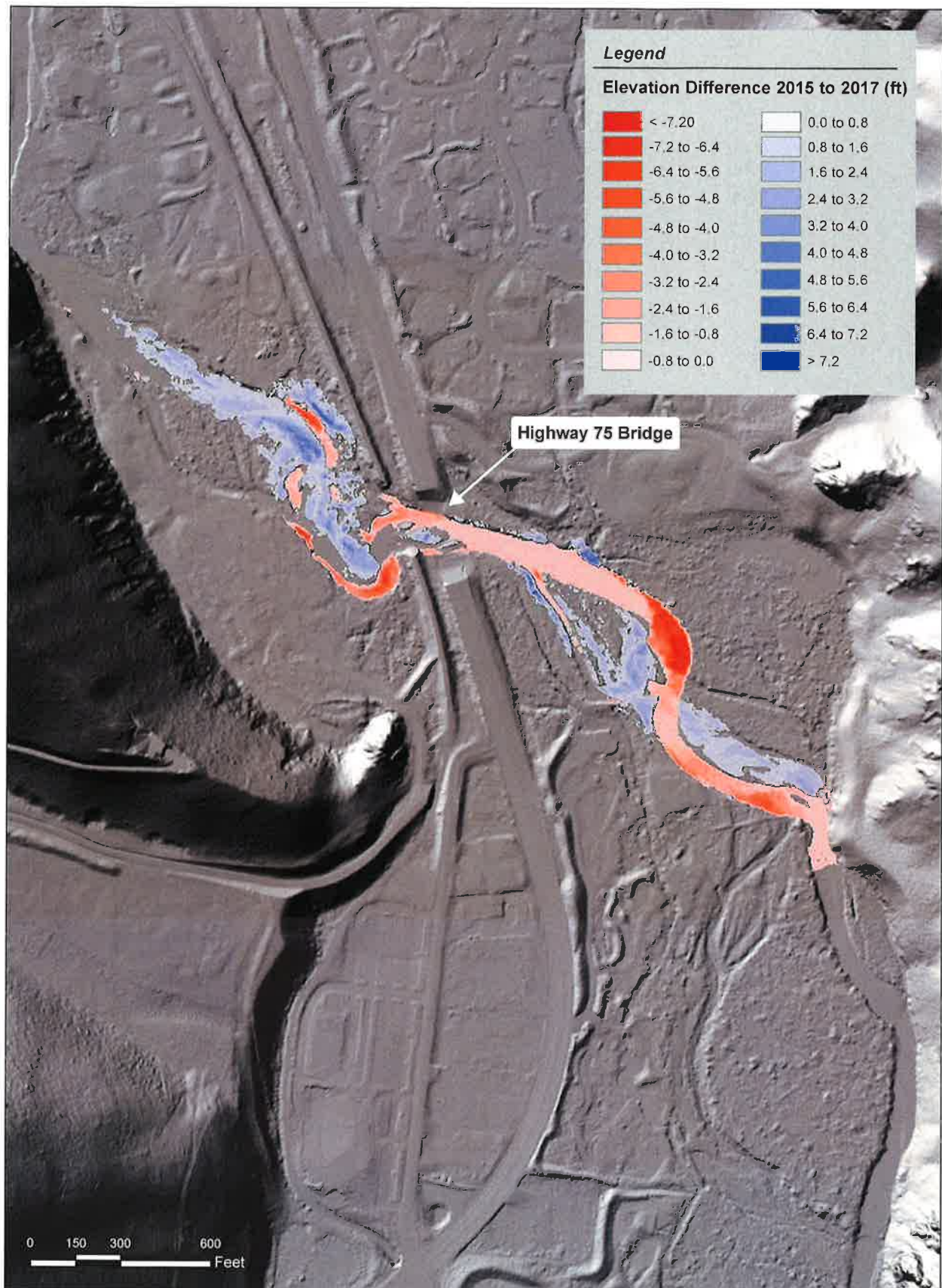
## RELATIVE ELEVATION MODEL

Big Wood River Restoration,  
Bridge to Bridge Project  
Blaine County, Idaho



PO Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83002





Date: 02/27/2019  
 Description: Existing Conditions  
 Scale 1 inch = 300 feet  
 2017 LiDAR Hillshade

**SHEET 3**

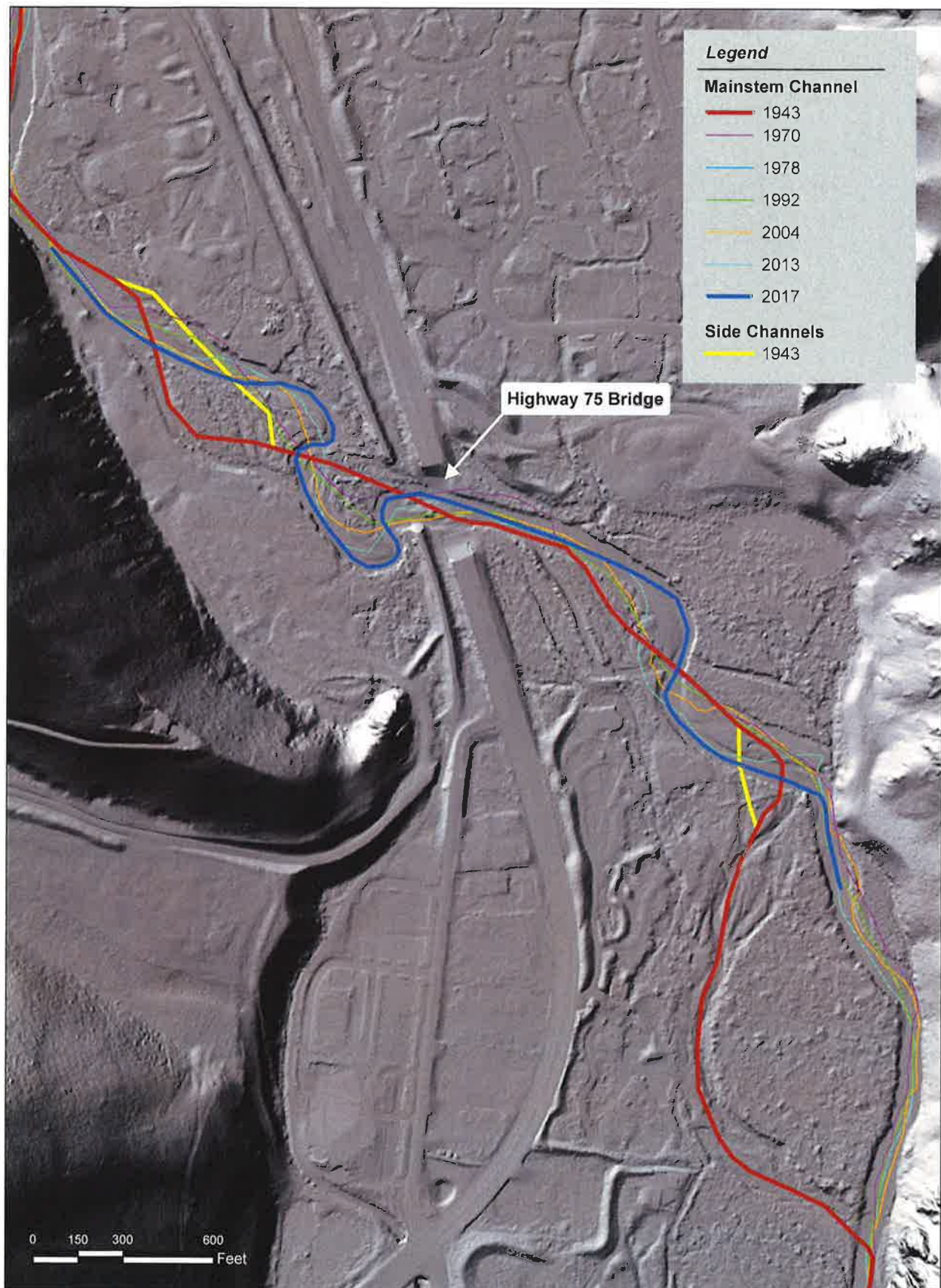
## GEOMORPHIC CHANGE DETECTION

Big Wood River Restoration,  
 Bridge to Bridge Project  
 Blaine County, Idaho



PO Box 6578, 140 E Broadway, Suite 23, Jackson, WY 83002





Date: 02/27/2019  
 Description: Existing Conditions  
 Scale 1 inch = 300 feet  
 2017 LIDAR Hillshade

**SHEET 4**

## HISTORIC CHANNEL MAPPING

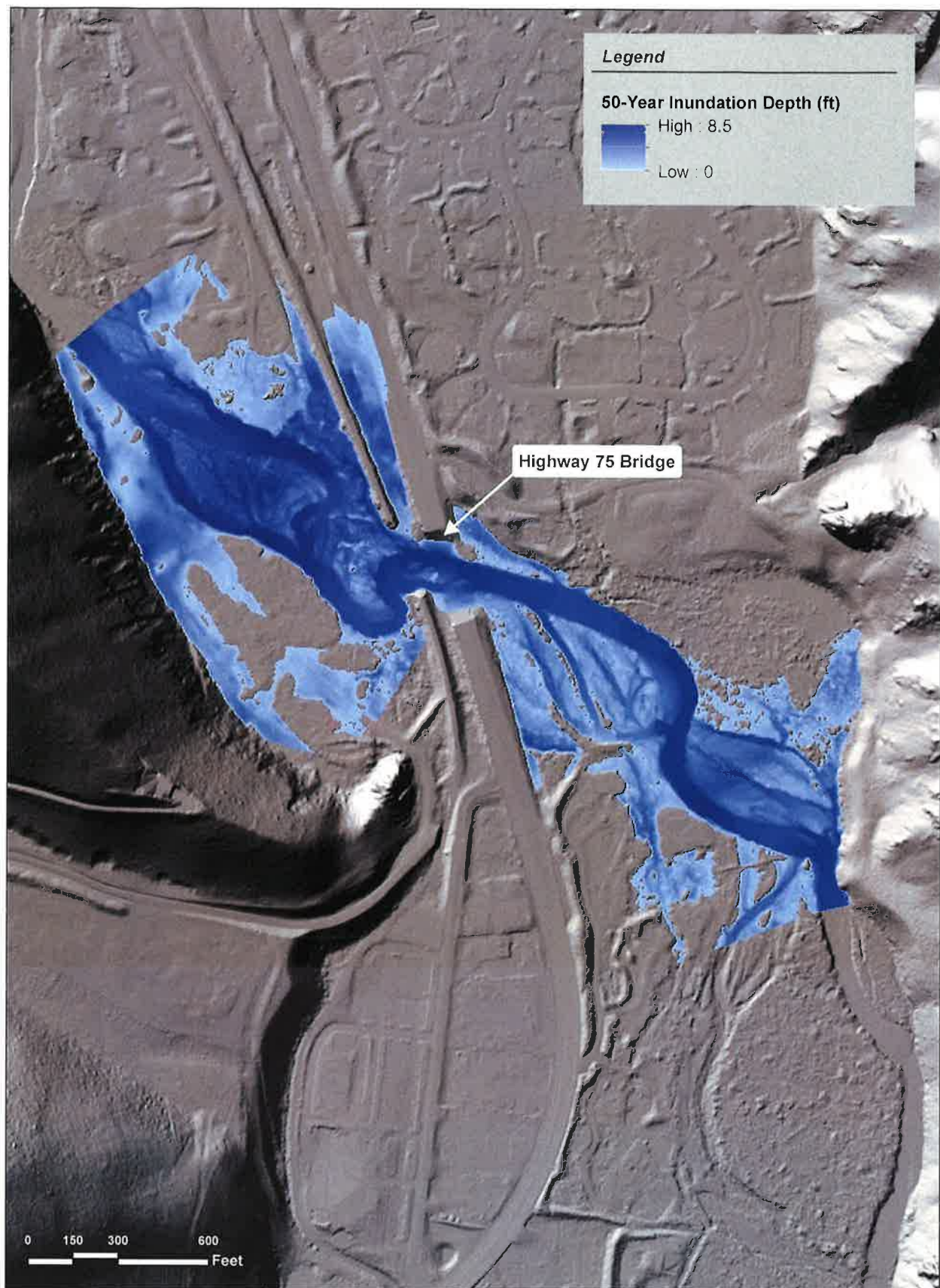
Big Wood River Restoration,  
 Bridge to Bridge Project

Blaine County, Idaho



PO Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83002





Date: 02/27/2019  
 Description: Existing Conditions  
 Scale 1 inch = 300 feet  
 2017 LiDAR Hillshade

Drawing:

**SHEET 5**

## FLOODPLAIN INUNDATION

Big Wood River Restoration,  
 Bridge to Bridge Project  
 Blaine County, Idaho



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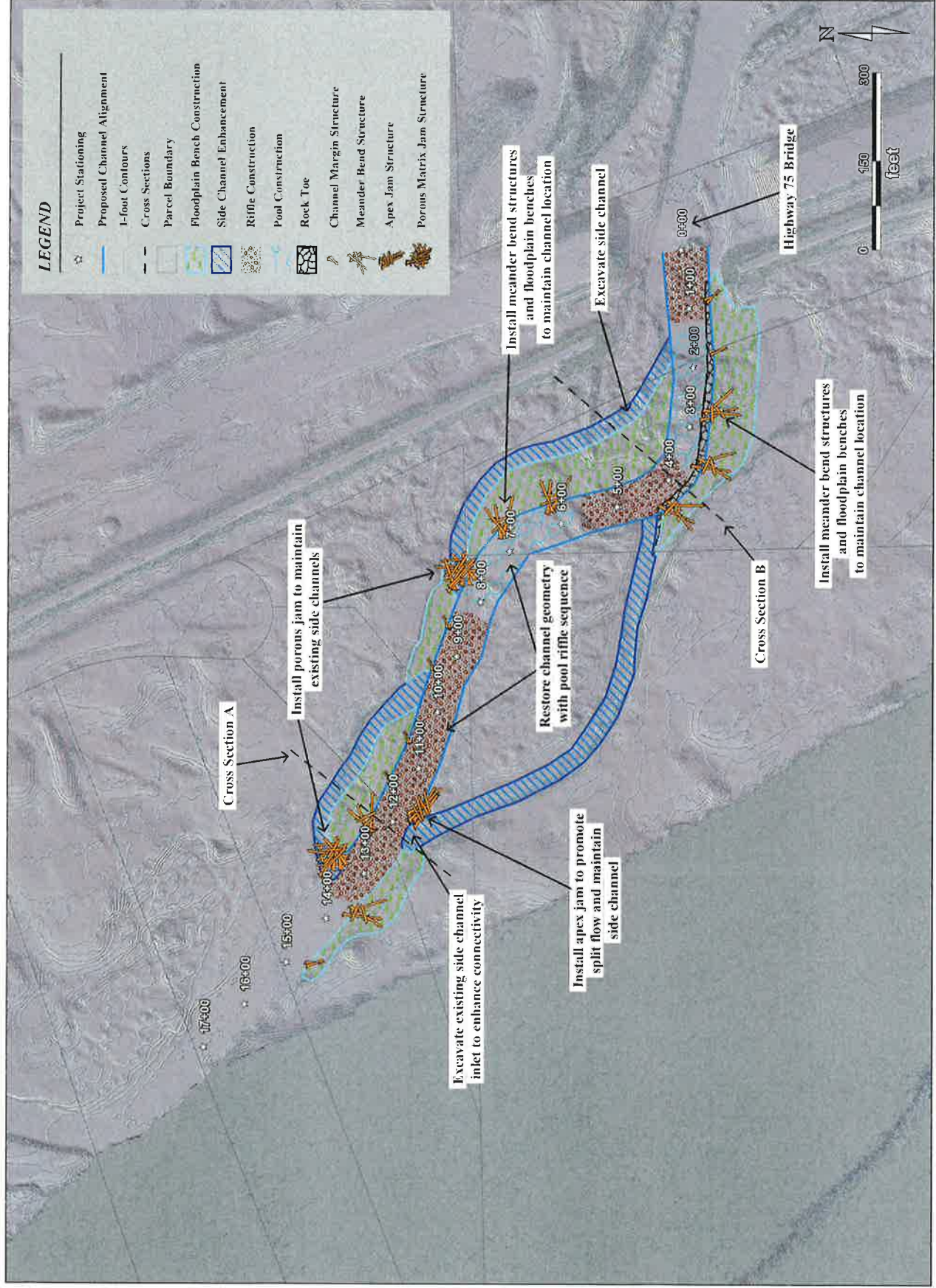
PROJECT AREA LAND OWNERSHIP  
Big Wood River Restoration,  
Blaine County, Idaho

Date 02/27/2019  
Description: Design Drawings  
Scale 1 inch = 300 feet  
June 2, 2017 Aerial Imagery

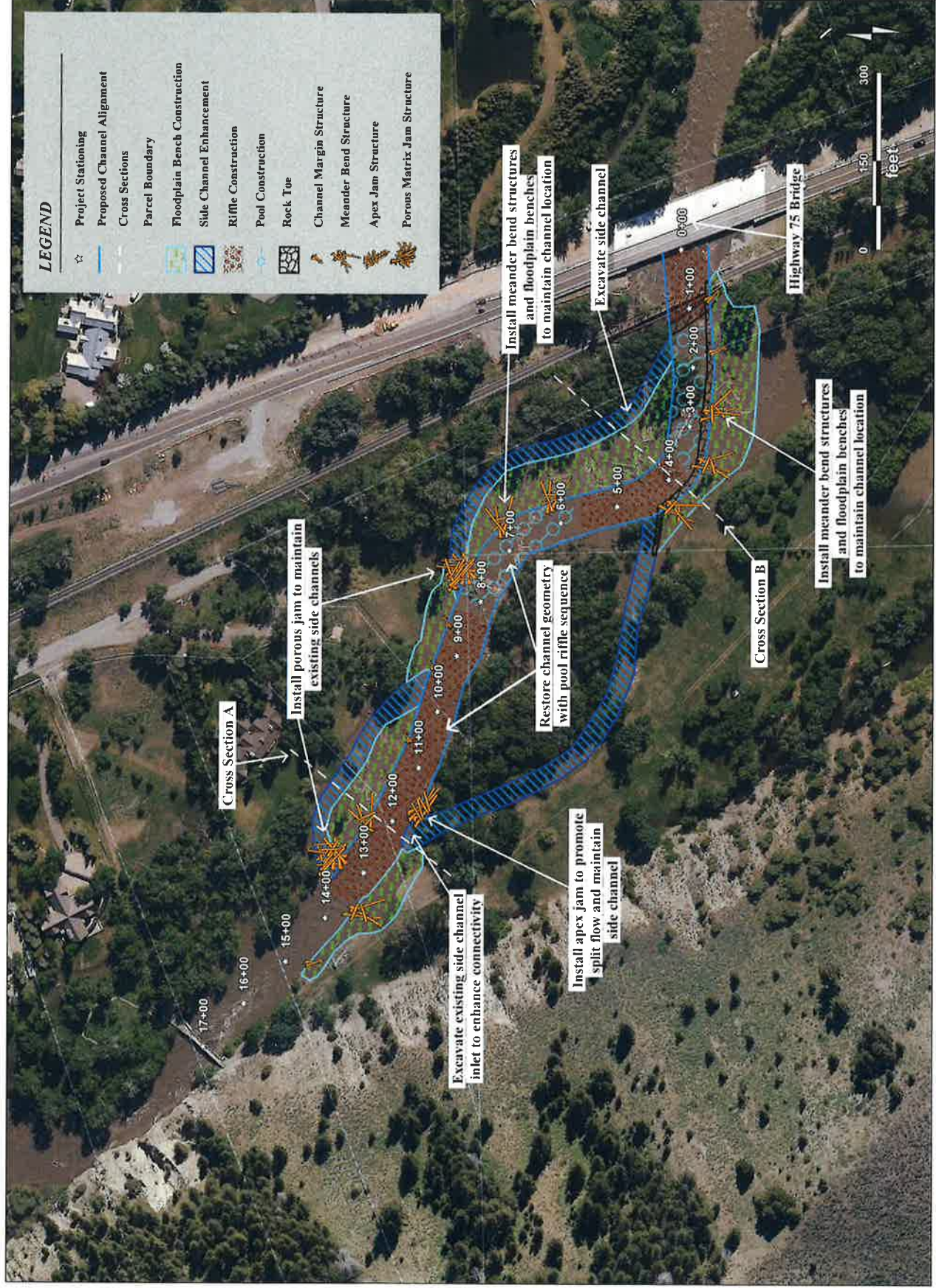
Drawing:  
**SHEET 6**







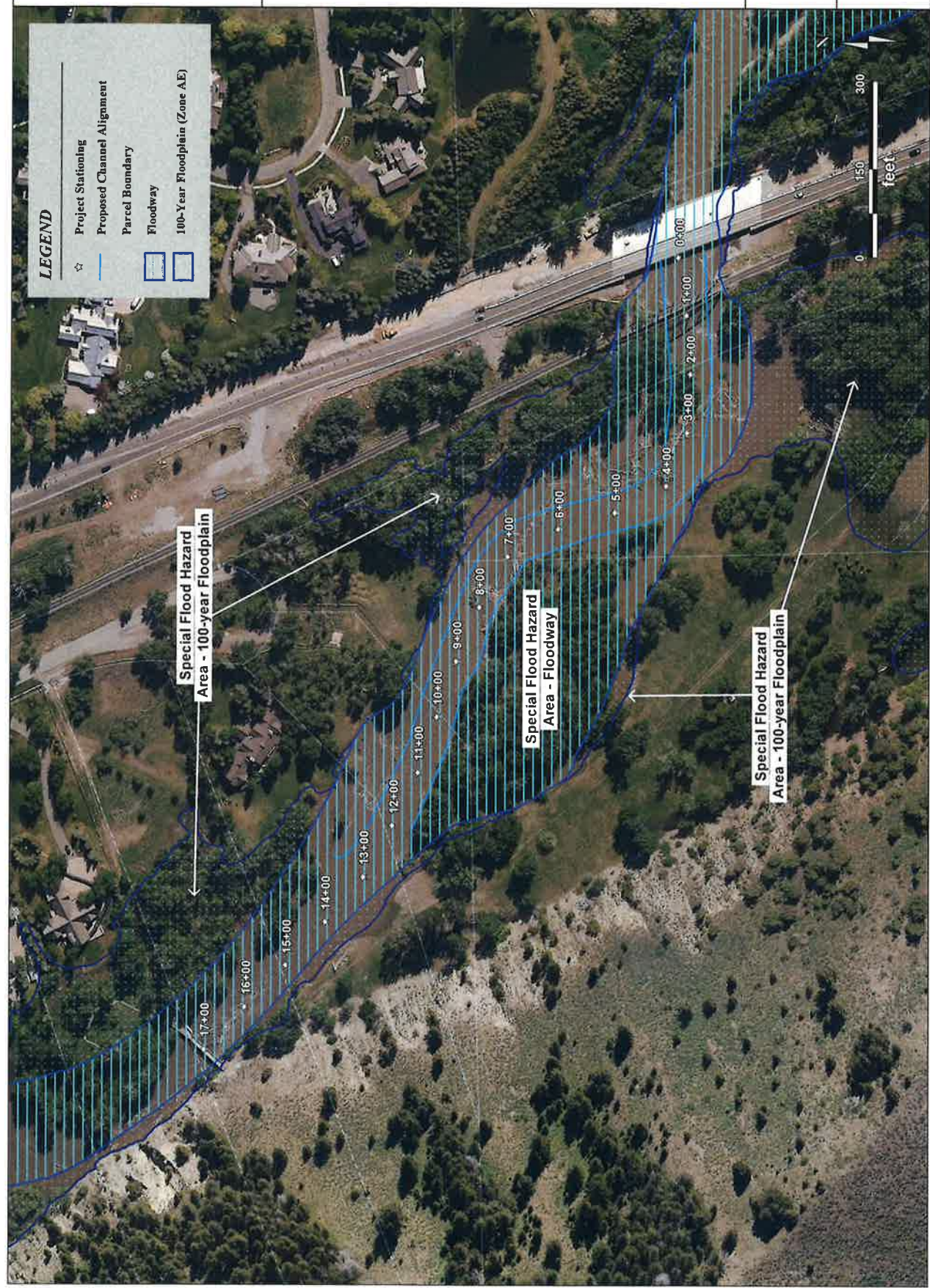




**LEGEND**

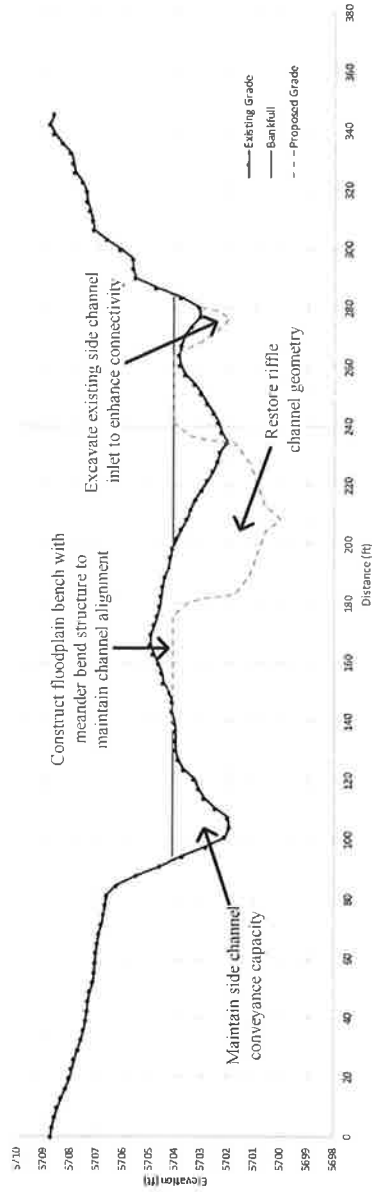
☆	Project Stationing
—	Proposed Channel Alignment
—	Cross Sections
—	Parcel Boundary
	Floodplain Bench Construction
	Side Channel Enhancement
	Riffle Construction
	Pool Construction
	Rock Toe
	Channel Margin Structure
	Meander Bend Structure
	Apex Jam Structure
	Porous Matrix Jam Structure



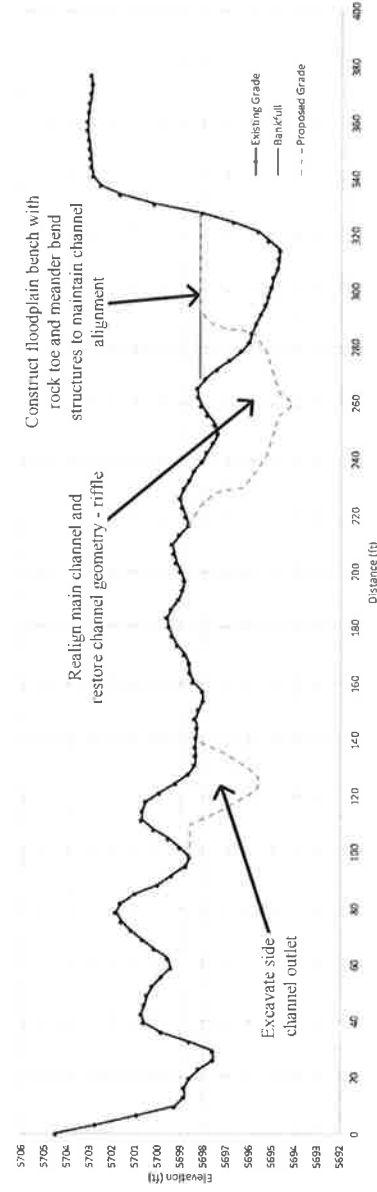


# TREATMENT TYPICAL CROSS SECTIONS

Cross Section A



Cross Section B



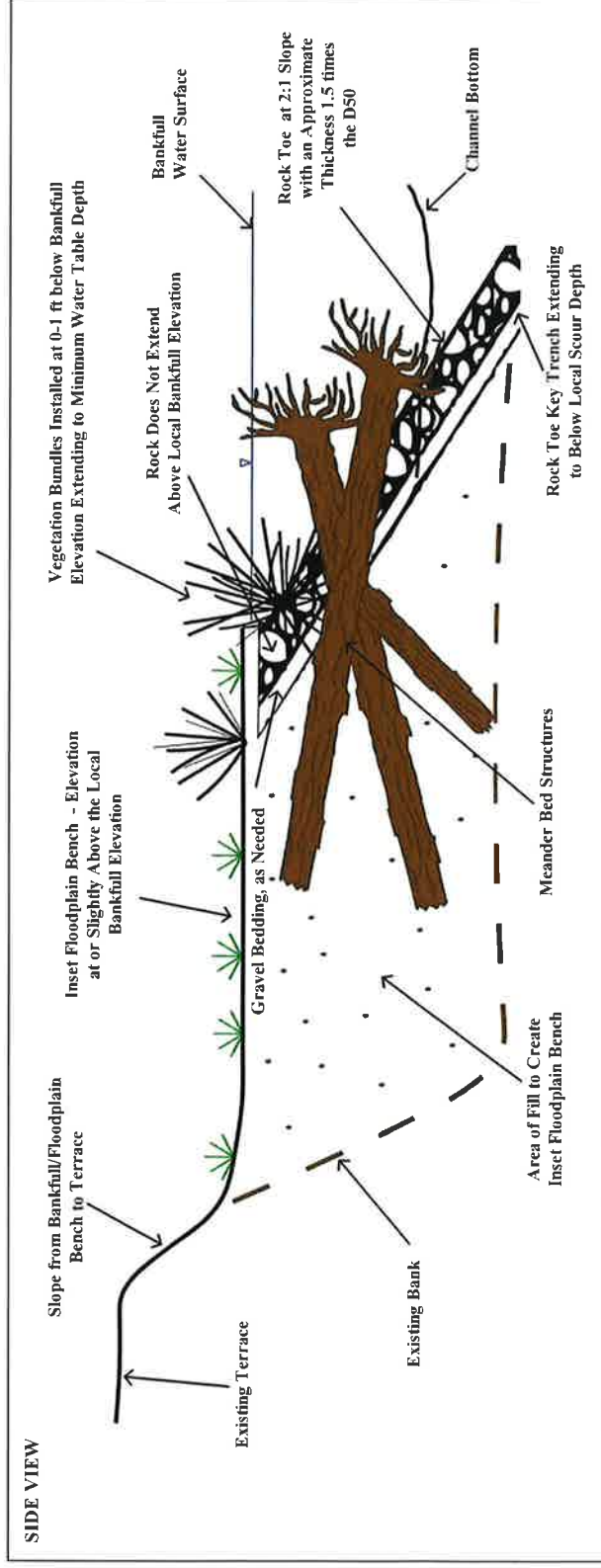
Design Channel Geometry

Bankfull Width (ft)	Mean Depth (ft)	Maximum Depth (ft)	Width/Depth Ratio	Slope (%)	Bankfull Area (sq ft)	Wetted Perimeter (ft)	Hydraulic Radius (ft)
6.5	2.6	4.1	2.5	0.67%	170	67	2.6

Design Criteria		Bridge Criteria	
Parameter		Mean Value	Min Value
Meander Width (ft)	314	183	655
Riffle Length (ft)	210	164	521
Riffle Drains (ft)	4.2	3.6	4.4
Inner Bank Width (ft)	30	26	35
Riffle Slope (ft)	0.018	0.010	0.021
Pool Length (ft)	164	131	210
Pool Width (ft)	51	46	72
Pool Drains (ft)	4.2	4.0	4.1
Pool Slope (ft)	0.0020	0.0013	0.0014
Pool Foot Spacing (ft)	317	147	500
Linear Weir Length (ft)	900	655	1179
Stream Meander Length (ft)	1251	1016	1900
Radius of Curvature (ft)	275	203	406



## ROCK TOE STRUCTURE DESIGN DETAILS



### Work Description

This work includes the creation of an inset bankfull floodplain bench and installation of a rock toe with meander bend structures and bioengineering techniques as shown on the typical design drawing. The intent of this structure is to provide bank stabilization to protect the inset floodplain bench while increasing habitat complexity, and providing fish cover.

### Construction Notes

Grade the inset floodplain bench to the local bankfull elevation specified in the construction stakeout points. Construct inset floodplain using native alluvium for fill. Compact fill material with an excavator bucket or similar force in a series of consecutive lifts. Place coarse native materials on the river side of the inset floodplain bench to increase bank stability.

Place dormant hardwood vegetation bundles at an 8 ft spacing along the banks of the inset floodplain bench using the installation procedure described on the revegetation detail sheet.

Construct a rock toe on the river side of the of the inset floodplain bench for bank protection. The revetment rock should have a median (D50) size of 24 inches and a maximum (D100) size of 36 inches with an appropriate gradation and approximate thickness of 50 inches. The rock toe should extend from just below the floodplain bench elevation to the local scour depth at 2:1 feet below the channel bed elevation. The installed rock toe should have a horizontal to vertical slope of 2:1.

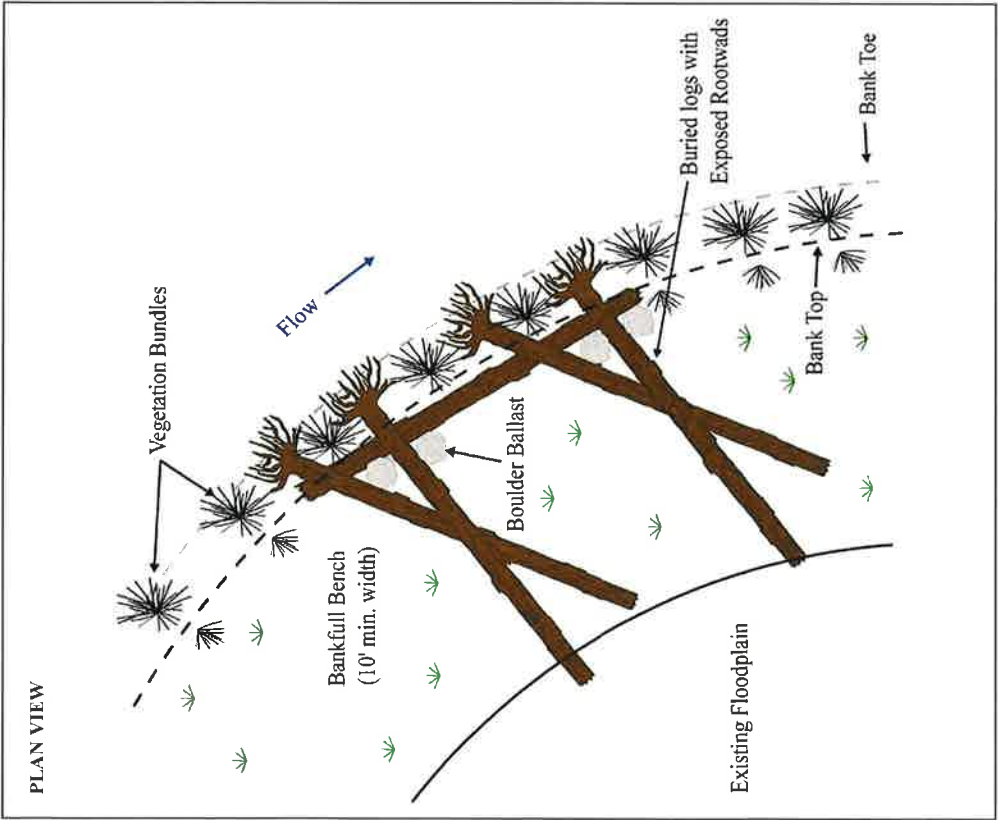
Install meander bend structures at designated locations following the construction notes included on the Meander Bend Structure design detail sheet.

## STRUCTURE TREATMENT DETAIL

Big Wood River Restoration,  
Blaine County, Idaho



CHANNEL MARGIN STRUCTURE DESIGN DETAILS



**Work Description**

This work includes the creation of an inset bankfull floodplain bench and installation of wood channel margin structures with bioengineering techniques as shown on the typical design drawing. The intent of this structure is to provide bank stabilization to provide temporary protection for the inset floodplain bench, increase habitat complexity, and provide fish cover.

**Construction Notes**

Grade the inset floodplain bench to the local bankfull elevation specified in the construction stakeout points. Construct inset floodplain using native alluvium for fill. Compact fill material with an excavator bucket or similar force in a series of consecutive lifts. Place coarse native materials on the river side of the inset floodplain bench to increase bank stability.

Place dormant hardwood vegetation bundles at an 8 ft spacing along the banks of the inset floodplain bench using the installation procedure described on the revegetation detail sheet. Revegetate floodplain bench with native herbaceous and woody vegetation and reclaim these areas with broadcast seeding with a native transitional seed mix.

Place channel margin structures as shown on the typical design drawing. Backfill the buried portion of the structure with a minimum depth of 1 ft and compact native fill material with an excavator bucket or similar force in a series of consecutive lifts. Place logs with root wads exposed within the bankfull channel along the channel banks. The orientation of logs should generally follow the typical design drawing for optimal function and stability but may require field adjustments to address site specific conditions during implementation. Place boulders for ballast downstream of structure logs. Place slash and small wood irregularly along the bank and root wads to provide structure and cover. The channel margin structure material quantity sizing is as follows:

- Logs with root wads greater than 18 in diameter and 30 ft length (4 each);
- Broken logs greater than 12 in diameter and 30 ft length (1 each);
- Ballast boulders greater than 24 in diameter (4 each).

STRUCTURE TREATMENT DETAIL

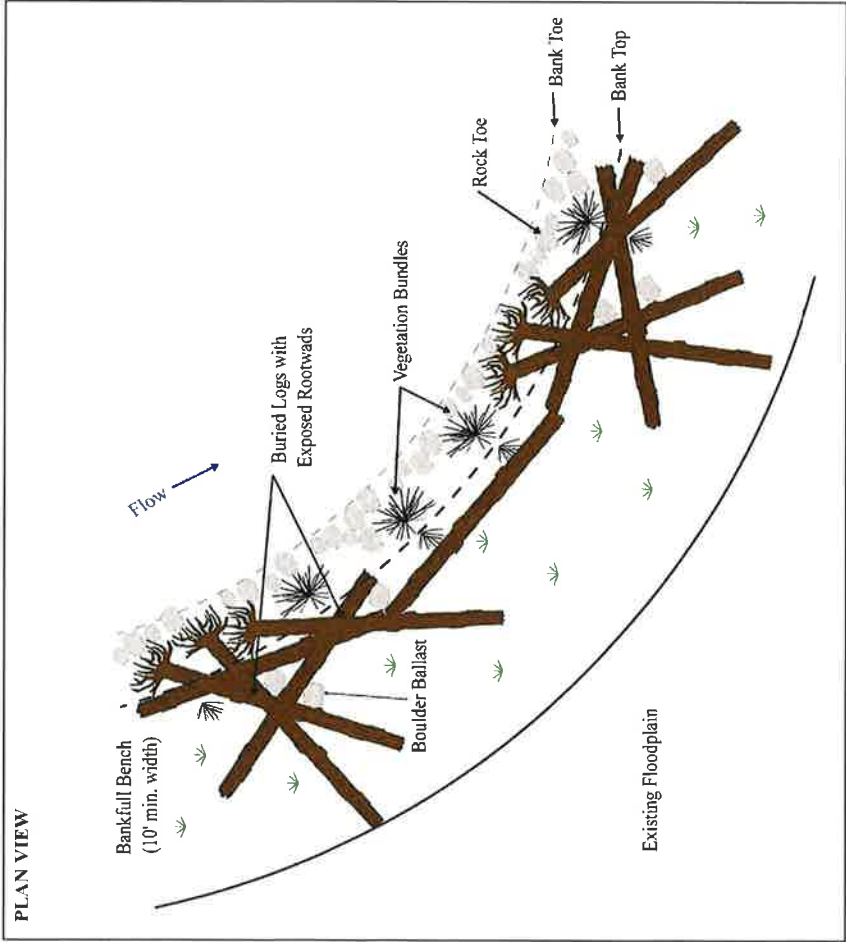
Big Wood River Restoration,  
Blaine County, Idaho

Date: 02/27/2019  
Description: Treatment Details  
Scale: N/A

Drawing:

SHEET 12

MEANDER BEND TREATMENT DESIGN DETAILS



**Work Description**

This work includes the creation of an inset floodplain bench and installation of wood meander bend structures with bioengineering techniques as shown on the typical design drawing. The intent of this structure is to provide bank stabilization, increase habitat complexity, and provide fish cover.

**Construction Notes**

Grade the inset floodplain bench to the local bankfull elevation specified in the construction stakeout points. Construct inset floodplain using native alluvium for fill. Compact fill material with an excavator bucket or similar force in a series of consecutive lifts. Place coarse native materials on the river side of the inset floodplain bench to increase bank stability. A rock toe comprised of native alluvium or imported boulders may be needed under high erosion potential conditions.

Place dormant hardwood vegetation bundles at an 8 ft spacing along the banks of the inset floodplain bench using the installation procedure described on the revegetation detail sheet. Revegetate floodplain bench with native herbaceous and woody vegetation and reclaim these areas with broadcast seeding with a native transitional seed mix.

Place channel margin structures as shown on the typical design drawing. Backfill the buried portion of the structure with a minimum depth of 1 ft and compact native fill material with an excavator bucket or similar force in a series of consecutive lifts. Place logs with root wads exposed within the bankfull channel along the channel banks. The orientation of logs should generally follow the typical design drawing for optimal function and stability but may require field adjustments to address site specific conditions during implementation. Place boulders for ballast downstream of structure logs. Place slash and small wood irregularly along the bank and root wads to provide structure and cover. The channel margin structure material quantity sizing is as follows:

- Logs with root wads greater than 18 in diameter and 30 ft length (6 each);
- Broken logs greater than 12 in diameter and 30 ft length (5 each);
- Ballast boulders greater than 24 in diameter (6 each);
- Rock toe boulders, as needed

STRUCTURE TREATMENT DETAIL

Big Wood River Restoration,  
Blaine County, Idaho



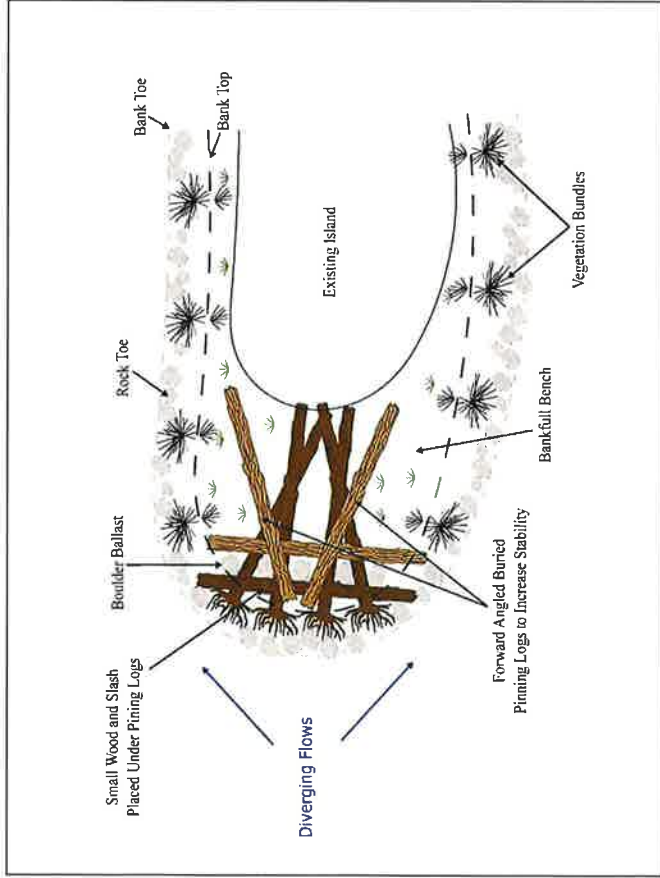
P.O. Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83002

Date: 02/27/2019  
Description: Treatment Details  
Scale: N/A

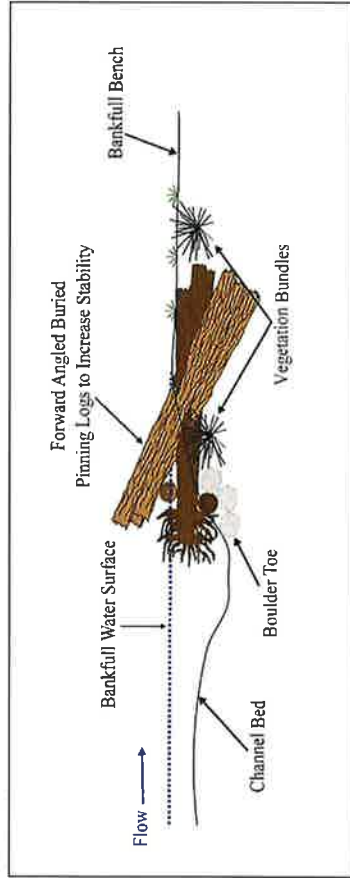
Drawing:  
**SHEET 13**

# APEX JAM STRUCTURE TREATMENT DETAILS

PLAN VIEW



SIDE VIEW



## Work Description

This work includes the creation of an inset floodplain bench and installation of a wood apex jam structure with bioengineering techniques as shown on the typical design drawing. The intent of this structure is to promote diverging flow paths, increase habitat complexity, and provide fish cover.

## Construction Notes

Place the apex jam structure logs as shown on the typical design drawing. Backfill the buried portion of the structure with a minimum depth of 1 ft and compact native fill material with an excavator bucket or similar force in a series of consecutive lifts. Place logs with root wads exposed and protruding into the bankfull channel. Place the buried portion of the pinning logs and rock toe material below the potential scour depth. The orientation of logs should generally follow the typical design drawing for optimal function and stability but may require field adjustments to maximize flow diversion during implementation. Place boulders for ballast downstream of structure logs. Place slash and small wood irregularly in front of the pinning logs and root wads to provide structure and cover. The apex jam structure material quantity sizing is as follows:

- Logs with root wads greater than 18 in diameter and 30 ft length (4 each);
- Broken logs greater than 12 in diameter and 30 ft length (2 each);
- Pinning logs greater than 12 in diameter and 20 ft length (2 each);
- Ballast boulders greater than 24 in diameter (5 each);
- Rock toe boulders, as needed.

Grade the floodplain bench to the local bankfull elevation specified in the construction stakeout points. Construct inset floodplain using native alluvium for fill. Compact fill material with an excavator bucket or similar force in a series of consecutive lifts. Place coarse native materials on the river side of the inset floodplain bench to increase bank stability. A rock toe comprised of native alluvium or imported boulders may be needed under high erosion potential conditions.

Place vegetation bundles at an 8 ft spacing along the banks of the inset floodplain bench. Revegetate the floodplain bench with native herbaceous and woody vegetation and reclaim these areas with broadcast seeding with a native transitional seed mix.

## STRUCTURE TREATMENT DETAIL

Big Wood River Restoration,  
Bridge to Bridge Project  
Blaine County, Idaho

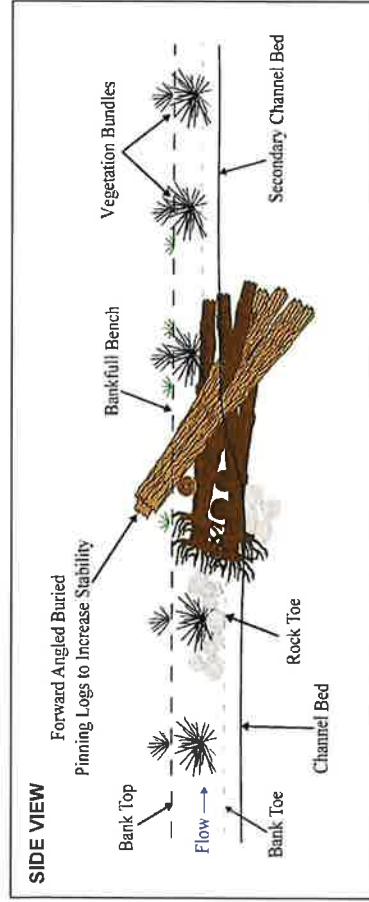
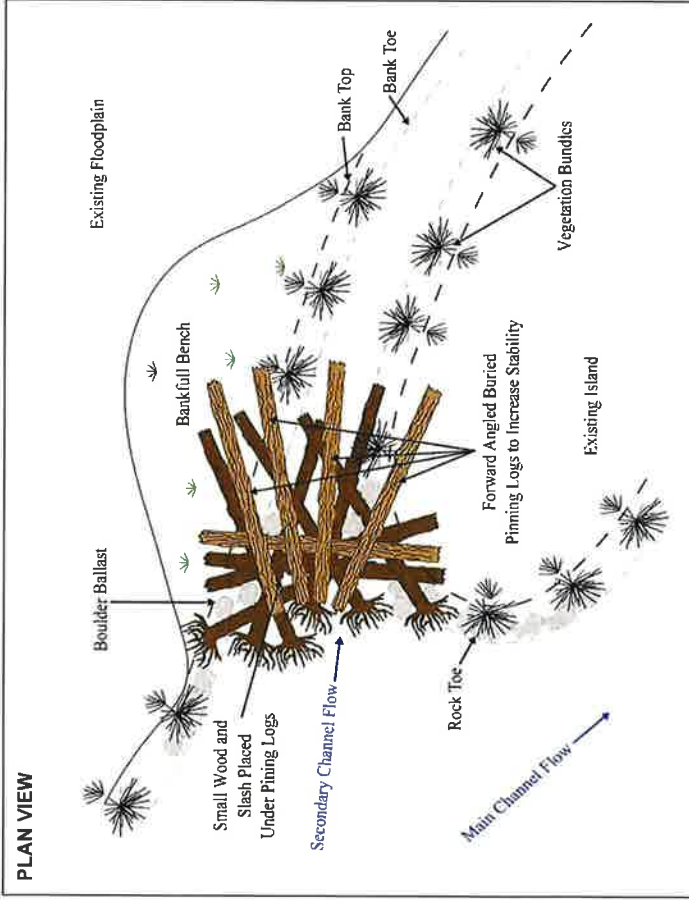


Date: 02/27/2019  
Description: Treatment Details  
Scale: N/A

Drawing:

SHEET 14

# POROUS MATRIX JAM STRUCTURE TREATMENT DETAILS



## Work Description

This work includes the creation of an inset floodplain bench and installation of a wood porous matrix jam structure with bioengineering techniques as shown on the typical design drawing. The intent of this structure is to promote through-flow into a secondary channel, while maintaining the main channel as the primary flow path. The structure is also designed to increase habitat complexity, and provide fish cover.

## Construction Notes

Place the porous matrix jam structure logs as shown on the typical design drawing. Backfill the portion of the structure buried in the side channel banks with a minimum depth of 1' ft and compact native fill material with an excavator bucket or similar force in a series of consecutive lifts. Place logs with root wads exposed into the bankfull channel. The orientation of logs should generally follow the typical design drawing for optimal function and stability but may require field adjustments to maximize through flow during implementation. Place boulders for ballast downstream of structure logs. Place slash and small wood irregularly along the bank and under pinning logs and root wads to provide structure and cover. The porous matrix jam structure material quantity sizing is as follows:

- Logs with root wads greater than 18 in diameter and 30 ft length (6 each);
- Broken logs greater than 12 in diameter and 30 ft length (3 each);
- Pinning logs greater than 12 in diameter and 20 ft length (4 each);
- Ballast boulders greater than 24 in diameter (6 each);
- Rock toe boulders, as needed.

Construct floodplain benches graded to the local bankfull elevation specified in the construction stakeout points. Construct inset floodplain using native alluvium for fill. Compact fill material with an excavator bucket or similar force in a series of consecutive lifts. Place coarse native materials on the river side of the inset floodplain bench to increase bank stability.

Place dormant hardwood cutting vegetation bundles at an 8 ft spacing along the banks of the inset floodplain bench. Revegetate the floodplain bench with native herbaceous and woody vegetation and reclaim these areas with broadcast seeding with a native transitional seed mix.

## STRUCTURE TREATMENT DETAIL

Big Wood River Restoration,  
Blaine County, Idaho



Date: 02/27/2019  
Description: Treatment Details  
Scale: N/A

Drawing:

SHEET 15

## REVEGETATION TREATMENT DESIGN DETAILS

### Work Description

Dormant hardwood cuttings will be utilized to facilitate bioengineering techniques including, vertical bundles, 45-degree bundles, and brush trenches. Cuttings will be harvested from healthy vigorous plants during the dormant season (i.e., between dormancy/leaf abscission in the fall and bud break in the spring). Care will be taken to avoid harvesting cuttings from donor plants that exhibit signs of damage by disease or insects. Cuttings will be comprised of willow, cottonwood, and dogwood stems that have a minimum bottom diameter of 1-inch, have a minimum length of 7 feet, and are relatively straight. Cuttings will be removed from the donor plant with a clean diagonal cut at the base of the stem using lopping shears, bypass pruners, or a sharp saw. The diagonal surface will differentiate the bottom (i.e., rooting end) from the top (i.e., above ground portion), and allow for easier installation. The terminal buds and a few upper branches will be left intact until installation. All other branches will be removed by clipping them as close to the stem as possible. Caution will be used to avoid damaging the stem while trimming the lateral branches. Cuttings will be bundled by type (i.e., willow, dogwood, cottonwood) and kept cool, moist, and shaded during transportation and on-site storage. The cuttings will be soaked in water for 7-14 days prior to installation. At least half of the length of the cutting should be in contact with water while soaking, and cuttings should be weighed down when soaked. The vertical bundle and 45-degree bundle treatments will utilize bundles of 3 willow and/or dogwood cuttings; therefore, it will be necessary to break down any larger bundles into bundles of 3 for these treatments. Vertical bundles and 45-degree bundles will be installed on 4-foot spacing throughout the treatment area, in an alternating fashion (i.e., one vertical bundle, then one 45-degree bundle, then another vertical bundle, and so on).

### Vertical Bundles

Bundles of dormant willow and/or dogwood cuttings will be installed vertically under the toe rock during construction. The preparation and installation procedure for vertical bundles will be as follows:

1. Bundle 3 willow and/or dogwood cuttings together in the same orientation (tops up and butts down). Bundles will be as uniform as possible, and the butts of the cuttings will be at the same level to ensure that no butts will be out of the water when installed. The bundles one foot from the top end and one foot from the butt end with pre-stretched cotton string, sisal rope, cord or non-galvanized tie wire (no jute or plastic twine will be utilized).
2. Install the bottom of the bundle into an excavated key trench that is at least 4 feet below bankfull elevation and 1-foot below the low-flow water table, and lay the bundle vertically up the bank. Ensure that the top of the bundle protrudes at least 1 foot above the constructed floodplain bench.
3. Bury bundle with unsorted alluvium and wash in by filling the excavator bucket with water.
4. Place toe rock on top of the buried bundle if called for in design specifications.
5. Install vertical bundles on 8-foot spacing, alternating with 45-degree bundles so there is one bundle every 4 feet.

### 45-Degree Bundles

Bundles of dormant willow and dogwood cuttings will be installed at a 45-degree angle to the bank so the top of the bundle hangs out over the water. The preparation and installation procedure for the 45-degree bundles will be as follows:

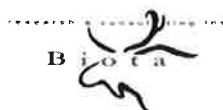
1. Bundle 3 willow and/or dogwood cuttings together in the same orientation (tops up and butts on the ground). Bundles will be as uniform as possible, and the butts of the cuttings will be at the same level to ensure that no butts will be out of the water when installed. The bundles one foot from the top end and one foot from the butt end with pre-stretched cotton string, sisal rope, cord or non-galvanized tie wire (no jute or plastic twine will be utilized).
2. Place toe rock (if called for in design specifications) in key trench and continue placing rock up the bank to 1 foot above existing water level elevation.
3. Place track hoe bucket immediately above land rock pointed down toward the base of the streambank at a 45-degree angle.
4. Push the bucket down at a 45-degree angle until the teeth reach an elevation that is at least 4 feet below bankfull elevation and 1-foot below the existing water level.
5. Stop pushing down and lift the bucket enough to create a small opening between the bucket and the substrate underneath it.
6. Push the bundle into the hole by hand until the butt end is seated on the bottom of the hole, and the bundle is lying on the rock rip rap. The butt end of the bundle must be 1 foot below the low-flow water table when installed.
7. Pull the bucket out of the hole dropping remaining soil/alluvium on the bundle.
8. Ensure that the top of the bundle protrudes at least 1 foot above the rock ensuring that a minimum of 3 or 4 axillary buds remain on the above-ground portion, and trim off any excess.
9. Continue laying rock up the bank until the design bankfull elevation is reached.
10. Install 45-degree bundles on

### Brush Trenches

Brush trenches will be constructed on the floodplain bench and oriented perpendicular to the flow. The preparation and construction procedure for the brush trenches will be as follows:

1. Trenches will be excavated to the design specification of 10 ft x 2 ft (bottom dimensions) and will be excavated to a depth of 6 feet.
2. Install 20 pre-soaked cuttings along with other live/dead branches into each trench, ensuring that the butts of the cuttings are on the bottom of the trench and into the low-flow water table.
3. Add a small amount of fill into the bottom of the trench while holding the cuttings to ensure they remain upright and will not fall over while backfilling.
4. Carefully backfill the trench with a 50/50 mix of topsoil and native alluvium. Alternate dumping buckets of topsoil/alluvium and buckets of water into the trench, or utilize a water pump to fully saturate the topsoil after the trench has been backfilled to alleviate air pockets and maximize soil-to-stem contact.
5. Ensure that the top of the live cuttings protrude at least 1 foot above the floodplain ensuring that a minimum of 3 or 4 axillary buds remain on the above-ground portion, and trim off any excess.
6. Trenches shall be arranged in a non-uniform pattern on the floodplain, with 1 trench constructed per 1,000 sf of floodplain area.

**Implementation Cost Estimate  
Bridge to Bridge Restoration Project  
Big Wood River, Blaine County, Idaho**



Wednesday, December 12, 2018

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL COST
<b>FINAL DESIGN</b>				
Design Advancement, Final Design Development	1	ea	\$7,425	\$7,425
Engineering Analysis and Certification	1	ea	\$4,160	\$4,160
Drafting, Construction Drawings	1	ea	\$4,050	\$4,050
<b>SUBTOTAL</b>				<b>\$15,635</b>
<b>PERMITTING*</b>				
Blaine County Stream Alteration Permit	1	ea	\$5,500	\$5,500
USACE and IDWR Permitting (Joint Application)	1	ea	\$3,300	\$3,300
Field Surveys for No-Rise Analysis	1	ea	\$4,000	\$4,000
<b>SUBTOTAL</b>				<b>\$12,800</b>
<b>MOBILIZATION</b>				
Equipment/Contractor Mobilization and Demobilization	1	ea	\$5,000	\$5,000
<b>SUBTOTAL</b>				<b>\$5,000</b>
<b>RIVER AND FLOODPLAIN RESTORATION</b>				
Floodplain Bench Construction (fill)	5,274	cy	\$5	\$26,368
Side Channel Excavation (cut)	162	cy	\$6	\$972
Pool and Riffle Construction (cut)	4,327	cy	\$6	\$25,962
Sediment Storage areas (cut)	1,473	cy	\$5	\$7,365
Rock Toe (fill)	924	cy	\$60	\$55,440
Channel Margin Structures (w/ harvested wood material)	7	ea	\$2,500	\$17,500
Meander Bend Structures (w/ harvested wood material)	7	ea	\$3,000	\$21,000
Apex Jam Structures (w/ harvested wood material)	1	ea	\$3,500	\$3,500
Porous Matrix Jam Structure (w/ harvested wood material)	2	ea	\$4,500	\$9,000
Ballast Boulders (2 to 3-ft diameter), delivered	2	load	\$1,500	\$3,000
Willow Bundles (river bank treatment)	350	ea	\$25	\$8,750
Brush Trenches (floodplain bench treatment)	71	ea	\$40	\$2,840
Site Seeding and Clean-up	1	ea	\$2,500	\$2,500
<b>SUBTOTAL</b>				<b>\$184,197</b>
<b>CONSTRUCTION ADMINISTRATION</b>				
Construction Staking, Supervision, Permit Compliance Reporting	1	ea	\$36,839	\$36,839
<b>SUBTOTAL</b>				<b>\$36,839</b>
<b>PROJECT COST</b>				<b>\$254,472</b>

**NOTICES:**

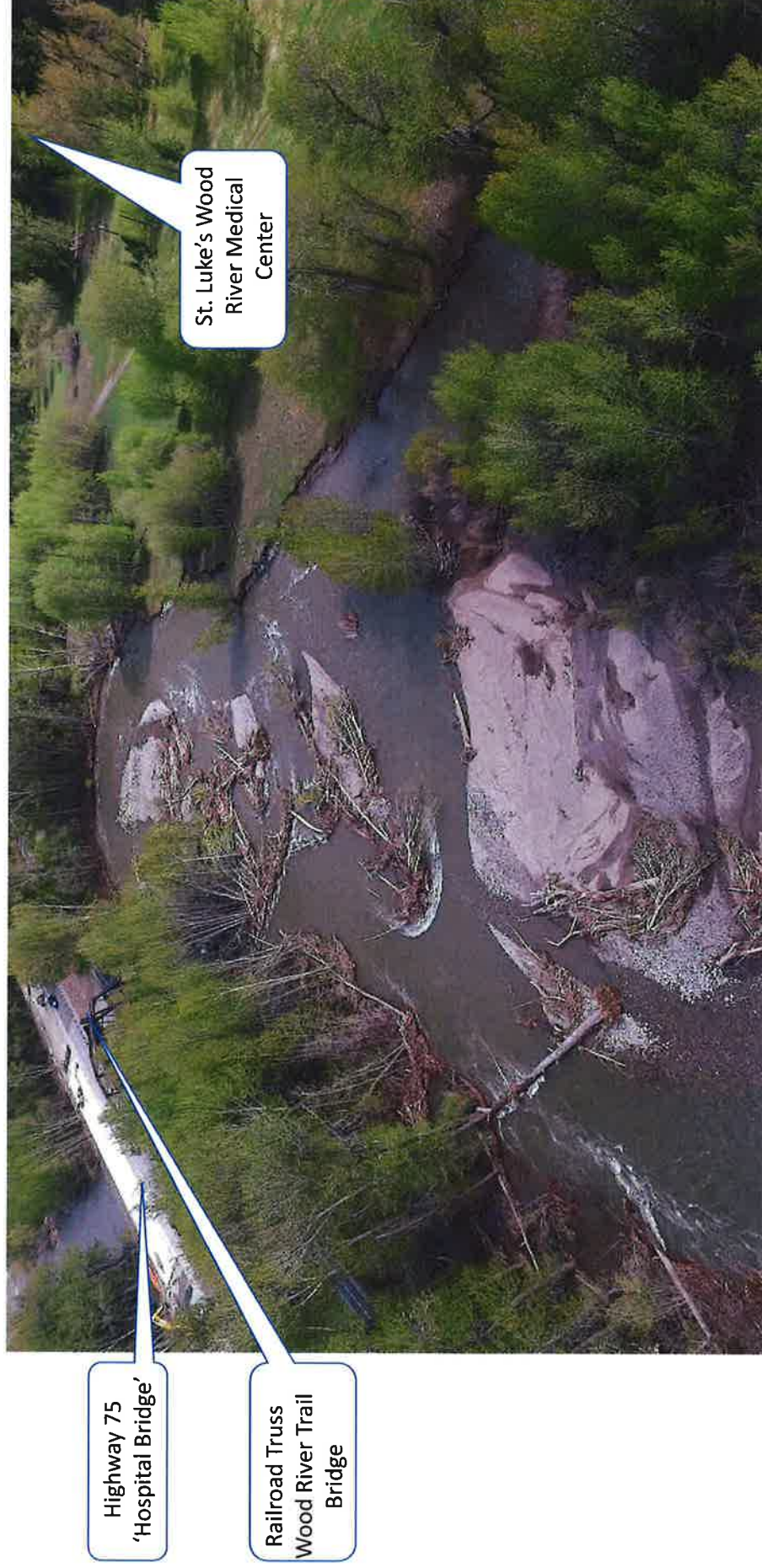
\* It may be possible to secure permits for this project through a standard No-Rise analysis (instead of the FEMA CLOMR process). This will only be evident as hydraulic modelling is completed. If the CLOMR process is required, permitting costs will increase.

\* Estimated costs do not include post-construction survey, engineering, application fees, and analysis to complete a CLOMR/LOMR, which may be required upon completion of project construction.

The information contained here was prepared in December 2018 and is based on information available at that time. Actual costs to complete project activities may vary depending on changing conditions, regulatory requirements, and the needs of the client.



Drone Footage of the Hospital Bridge Reach During the 2017 Flood



Highway 75  
'Hospital Bridge'

Railroad Truss  
Wood River Trail  
Bridge

St. Luke's Wood  
River Medical  
Center



## 2017 Flood Threatens Structures and Surrounding Land



High flows threaten  
bridge footings

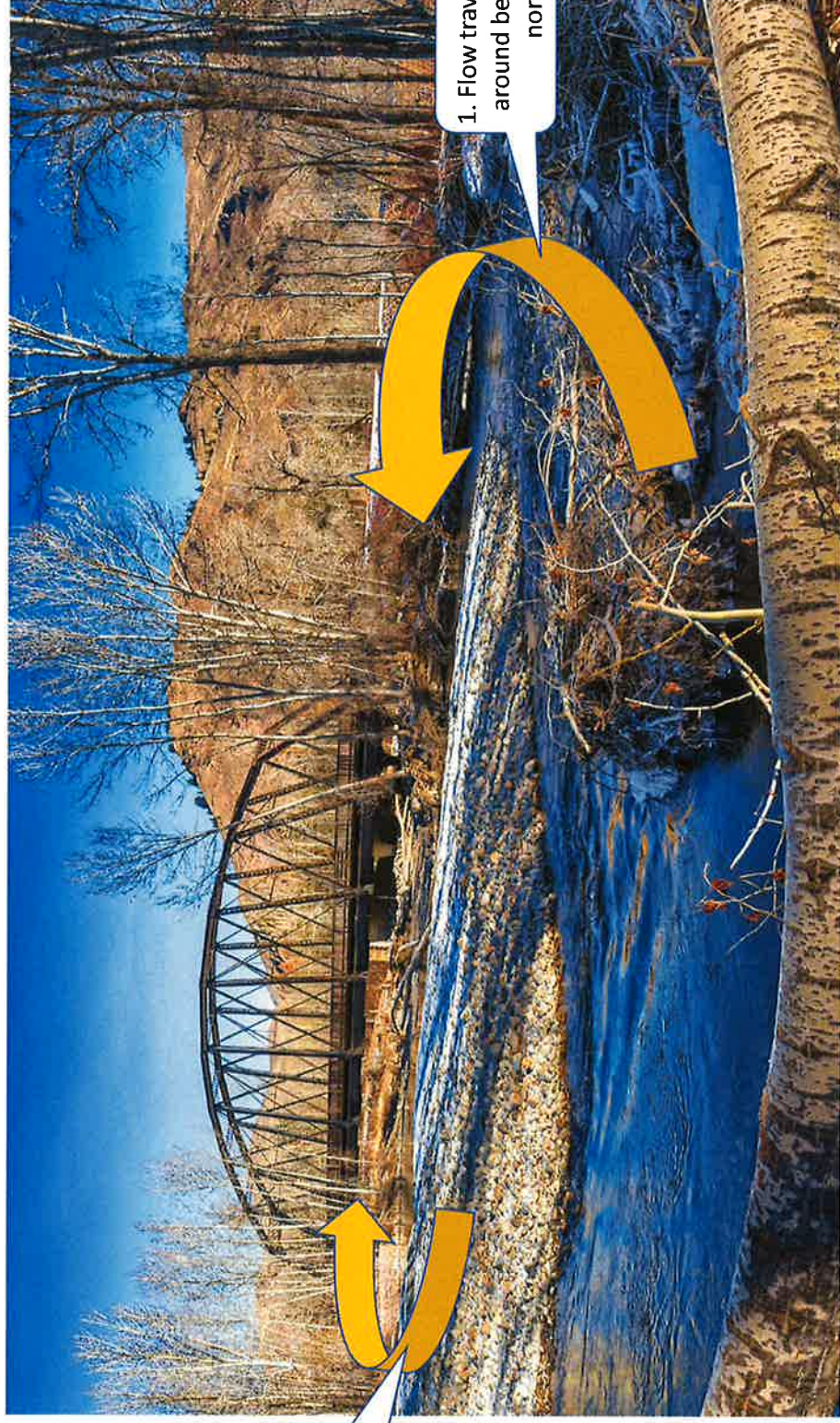
Railroad Truss Wood  
River Trail Bridge



Temporary barricade  
to protect St. Luke's  
Hospital



## Big Wood River Flow at the Hospital Bridge Reach



2. Flow travels around bend to the south again under bridges

1. Flow travels south, around bend, then north



## Erosion in the Hospital Bridge Reach



Erosion  
contributes 396  
tons of sediment  
annually to the  
Big Wood River  
in this reach



Three – four foot  
eroded river  
banks; lack of  
streambank  
vegetation



May 28, 2019

Blaine County  
206 S. First Ave.  
Hailey, ID 83333

Dear Blaine County:

Trout Unlimited supports the Blaine County Hospital Bridge Flood Mitigation Project and is committed to providing matching funds in the amount of \$382,454. Matching funds will be provided through private fundraising; national, state, and local grants; and internal Trout Unlimited grants.

The Hospital Bridge project proposes to mitigate flood damage and alleviate the risk of future flooding while implementing treatments aligned with the river's natural geomorphology. This reach of river is Trout Unlimited's highest priority for river restoration on the Big Wood River because of ongoing erosion, sedimentation, and disconnection from the floodplain. There are also willing landowners and project partners.

The proposed project is based on previous geomorphic studies and will improve the natural functionality of the Big Wood River while mitigating impacts of recent and future flood events. It will realign the river channel with the bridges while building floodplain and woody streambank treatments to maintain the channel in future high water events. If nothing is done, the river will continue to erode bridge abutments and private property and migrate southward.

This project is necessary to protect public infrastructure by re-establishing characteristics of a natural river channel.

Sincerely,

Keri York  
Big Wood River Project Manager



**Blaine County Sheriff's Office**

Sheriff Steve M. Harkins  
Chief Deputy Will Fruehling

1650 Aviation Drive  
Hailey, Idaho 83333

P: 208 788 5555  
F: 208 788 3592  
E: [sheriff@blainecounty.org](mailto:sheriff@blainecounty.org)  
W: [blainesherriff.com](http://blainesherriff.com)

11/28/2018

Keri York  
308 N. Main St.  
Hailey, ID 83333

Dear Ms. York:

I want to express my support for Trout Unlimited's proposed Big Wood River Bridge-to-Bridge Restoration project.

The project, located just north of the Highway 75 Bridge south of Ketchum, is designed to restore river and riparian habitat, improve water quality, and protect existing structures and recreational access points. The most downstream end of the project is adjacent to two bridges: a historic railroad bridge that now serves as a bike/pedestrian path and an emergency access across the river, and the Idaho Transportation Department Highway 75 Bridge.

Blaine County's All Hazards Mitigation Plan was updated after the 2017 spring flood to include this project, due to the severe change in the river's flow and its potential to damage critical infrastructure in Blaine County. This project will help protect the two bridges that serve as the primary access to Ketchum from the south.

Blaine County, through its Disaster Services department has a pending application in to the Idaho Office of Emergency Management and FEMA for this project because we believe it is important to complete this work. Not only will the project realign the river channel and create better fish habitat and recreational opportunities, it will also protect the Highway 75 Bridge, bike/pedestrian bridge, and St. Luke's Hospital from the threat of future flooding.

The completed project will restore stable stream channel morphology and riparian habitat, and provide further reaching benefits for Blaine County, including the recreation and economic impacts.

Sincerely,

Chris Corwin

Blaine County Disaster Services Coordinator  
1650 Aviation Dr.  
Hailey, ID 83333  
[ccorwin@co.blaine.id.us](mailto:ccorwin@co.blaine.id.us)  
208-788-5508



July 20 2017

Kira Finkler  
308 N. Main St.  
Hailey, ID 83333

Dear Ms. Finkler:

I want to express my support for Trout Unlimited's proposed Big Wood River Bridge-to-Bridge Restoration project.

The project, located just north of the Highway 75 Bridge south of Ketchum, is designed to restore river and riparian habitat, improve water quality, and protect existing structures and recreational access points. The most downstream end of the project is adjacent to two bridges: a historic railroad bridge that now serves as a bike and pedestrian path, and the Idaho Transportation Department Highway 75 Bridge.

Trout Unlimited is proposing to work with private property owners and interested parties to reduce erosion and sedimentation, restore floodplain function and fish habitat, and improve water quality. This project will also help protect the two bridges on the downstream end. The restoration plans will include channel realignment, construction of hardened riffles, pools, rock cross vanes, floodplains, and root-wad bank treatments.

The Blaine County Recreation District (BCRD) manages the bike and pedestrian path, the Wood River Trail, crossing the historic railroad bridge on the downstream end of this project. This stretch of the Big Wood River has enormous recreational value, both from bike path users and access for fishing, swimming, hiking, and birding. The 2012 Trail Count Study estimates more than one hundred thousand annual recreation visits to this area of the Wood River Trail.

The completed project will restore stable stream channel morphology and riparian habitat, and provide further reaching benefits for Blaine County, including the recreation and economic impacts on area fishing and tourism.

Sincerely,

A handwritten signature in dark ink, appearing to read "Jim Keating", is written above the typed name.

Jim Keating  
Executive Director, Blaine County Recreation District  
1050 Fox Acres Road  
Hailey, Idaho 83333



4/21/17

Trout Unlimited  
Kira Finkler  
308 N. Main St.  
Hailey, ID 83333

To Whom It May Concern:

I want to express my support for Trout Unlimited's proposed Big Wood River Bridge-to-Bridge Restoration project.



The project, located just north of the Highway 75 Bridge south of Ketchum, bisects our property and runs for a long stretch. We have had increasing problems with bank erosion, and have been considering options for stabilizing the banks.

We are excited to work with Trout Unlimited to implement a designed to improve river and riparian habitat, and improve water quality, as well as to protect our property.

Trout Unlimited is proposing to work with five private property owners, Idaho Fish & Game and others to stabilize riverbanks and protect properties, while improving water quality and aquatic and riparian habitat. This project should also be protective of two downstream bridges.

In support of this project, we are planning to provide large wood, recently harvested on one of our nearby properties, which can be used for root-wad bank stabilization.

Sincerely,

Robert and Kathryn Gardner

Box 1200  
Hailey, ID 83333

April 24, 2017

Ms. Kira Finkler  
Director, Idaho Water Project  
Trout Unlimited  
308 N. Main St.  
Hailey, ID 83333

Dear Kira:

I am writing in my capacity as the current President of the Hemingway Chapter of Trout Unlimited. I want to express the Chapter's very strong support for Trout Unlimited's proposed Big Wood River Bridge-to-Bridge Restoration project.

The project, located just north of the Highway 75 bridge south of Ketchum, is designed to improve river and riparian habitat, and improve water quality, as well as to protect private property.

Property owners in this section the Big Wood River (in Blaine County) experience significant streambank erosion. Some area residents have utilized riprap (rock) to stabilize the river bank. Some residents are currently assessing the need for further armoring. Unfortunately riprap has the undesirable effect of pushing the problems of bank loss and increased sediment loading downstream to other properties.

Trout Unlimited is proposing to work with five private property owners to stabilize their river banks, and protect their properties, while improving water quality and aquatic and riparian habitat. This project should also be protective of the two bridges at the south end of the project. The restoration plans, which have already been developed, include: channel realignment, construction of hardened riffles, pools, rock cross vanes, floodplains, and root-wad bank treatments.

The completed project should protect valuable land, and provide further reaching benefits for the area, including the economic impacts on area fishing and tourism.

Our chapter's financial resources are limited so it is not clear at this time to what extent we may be able to provide financial support. However members of this chapter have been very willing to volunteer for river restoration projects in the past such as planting vegetation to protect against erosion as well as improving the habitat for the fish. The Big Wood is extremely important to us. We will have no problem enlisting volunteers to work on this project.

Sincerely,



Alan Richardson  
121 Audubon Place  
Hailey, ID 83333



**IDAHO DEPARTMENT OF FISH AND GAME**

MAGIC VALLEY REGION  
324 South 417 East, Suite 1  
Jerome, Idaho 83338

C.L. "Butch" Otter / Governor  
Virgil Moore / Director

April 27, 2017

Kira Finkler  
Trout Unlimited – Director, Idaho Water Project  
910 W. Main Street; Suite 342  
Boise, Idaho 83702

RE: Grant Support Letter: Big Wood River Habitat Restoration – Highway 75 Project

To whom it may concern,

The Idaho Department of Fish and Game is providing this letter in support of the Trout Unlimited grant application seeking funding to implement a habitat restoration project titled “Highway Project Area” on the Big Wood River in Blaine County, Idaho.

The Idaho Department of Fish and Game has reviewed the December 4, 2015 document titled “Design Report, Big Wood River, Highway 75 Project Area, Blaine County, Idaho” prepared for Trout Unlimited by Biota Research and Consulting, Inc. This document outlines data driven findings and recommends project designs to address identified impairments. Specifically, the “analysis indicates that sub-reaches of the project area display varying degrees of morphologic impairment that result in reduced fluvial processes associated with sediment movement, lateral channel stability, and aquatic ecosystem values.” The goal is to mitigate these impairments through instream construction ultimately to improve stream function, stability and instream habitat for aquatically dependent fauna.

Department biologists and engineers have reviewed the design report and believe the project is based on a thorough and proper assessment and the stated project objective are achievable. It is with this understanding that we recommend awarding Trout Unlimited the requested grant.

Please contact Doug Megargle-Regional Fishery Manager should you have questions or require elaboration.

Sincerely,

A handwritten signature in dark ink, reading "Douglas Megargle". The signature is fluid and cursive, with the first name "Douglas" and last name "Megargle" clearly distinguishable.

Douglas Megargle-Fishery Manager

*Keeping Idaho's Wildlife Heritage*

April 25, 2017

Kira Finkler  
308 N. Main St.  
Hailey, ID 83333

To Whom It May Concern:

I am writing to express the support of The Nature Conservancy (TNC) for Trout Unlimited's proposed Big Wood River Bridge-to-Bridge Restoration project located just north of the Highway 75 bridge south of Ketchum.

Over time the Big Wood River has borne the brunt of impacts resulting from human activity and development. The river has been disconnected by irrigation diversions; its floodplains have been altered; and many tributaries no longer reach the Big Wood at all. Water quality has been impaired and the potential for catastrophic flooding has increased. As part of Trout Unlimited's Big Wood River Home Rivers Initiative an integrated approach is being taken to implement a concerted plan, in collaboration with a variety of partners to implement restoration projects in key areas.

The Highway 75 bridge project is an important stepping stone in a visible location demonstrating the value of improving river function to the Big Wood River. This project will reduce sediment inputs from eroding streambanks, improve floodplain, instream, and riparian habitat condition, and improve river function and geomorphology. Restoring habitat in this reach of the watershed will enhance habitat conditions for wild trout, mountain whitefish, and Wood River sculpin. The project will increase floodplain, wetland and riparian footprints and improve overall ecological function. The project will restore river functionality and habitat complexity while providing Big Wood River property owners a more ecologically sensitive approach to enhancing their property and restoring habitat for fish. The completed project should protect valuable land, improve the local fishery and provide further reaching benefits for the area, including the economic impacts on area fishing and tourism.

TNC has worked in the Wood River watershed for more than 30 years. We have protected thousands of acres of habitat and miles of river corridor benefiting the people of the Wood River valley as well as fish and wildlife. We fully support the efforts of Trout Unlimited to restore the Big Wood River, specifically the Big Wood River Bridge-to-Bridge project.

Respectfully,



Mark Davidson  
Director of Conservation Initiatives  
116 1<sup>st</sup> Avenue North  
Hailey, Idaho



# WOOD RIVER LAND TRUST



## Board of Directors

Co-Chair:  
Richard Carr

Co-Chair:  
Kathie Levison

Treasurer:  
David Woodward

Secretary:  
Barry Bunshoft

Asst. Secretary:  
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Judy Cahill  
Rick Davis  
John French  
Trent Jones  
Trish Klahr  
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Sarah Michael  
Rebecca Patton  
Dan Smith  
Gayle Stevenson  
Steven Strandberg

Executive Director  
Scott Boettger



119 E. Bullion Street  
Halley, Idaho 83333  
Phone: 208.788.3947  
Fax: 208.788.5991

[www.woodriverlandtrust.org](http://www.woodriverlandtrust.org)  
Federal ID: 82-0474191



Proceeds from BMTS  
Benefit WRLT

April 21, 2017

Idaho Fish and Wildlife Foundation  
PO Box 2254  
Boise, ID 83701

Dear Idaho Fish and Wildlife Foundation:

I want to express Wood River Land Trust's support for Trout Unlimited's proposed Big Wood River Bridge-to-Bridge Restoration project.

The project, located just north of the Highway 75 bridge south of Ketchum, is designed to improve river and riparian habitat, and improve water quality, as well as to protect private property.

Wood River Land Trust is a partner with Trout Unlimited in our Big Wood Home Rivers Initiative, with goals of improving aquatic habitat, water conservation, and the fishery potential in the Wood River Watershed. This project is well-aligned with the goals of the Home Rivers Initiative because it addresses erosion and bedload migration, rip-rap of the river banks, and streambank loss. It also involves multiple landowners and funding sources, which will help us educate people about the importance of river restoration and streambank protection.

Trout Unlimited is proposing to work with five private property owners to stabilize their river banks, and protect their properties, while improving water quality and aquatic and riparian habitat. This project should also protect the two bridges at the south end of the project. The restoration plans, which have already been developed, include: channel realignment, construction of hardened riffles, pools, rock cross vanes, floodplains, root-wad bank treatments and riparian plantings.

The completed project should protect valuable land, and provide further reaching benefits for the area, including the economic impacts on area fishing and tourism.

Sincerely,

Scott Boettger  
Executive Director



Flood Control District 9  
P.O Box 3181  
Hailey, ID 83333  
[bwflood9@gmail.com](mailto:bwflood9@gmail.com)

Dave Bell - Chair, Div. 1  
Elizabeth Zellers - Treasure, Div. 2  
Bryan Dilworth- Vice Chair, Div. 3

June 3, 2019

Keri York  
308 N. Main St.  
Hailey, ID 83333

Dear Ms. York:

Flood Control District No. 9 supports Blaine County and Trout Unlimited's proposed Hospital Bridge Restoration project.

The project, located just north of the Highway 75 Bridge south of Ketchum, is designed to restore river and riparian habitat, improve water quality, and protect existing structures and recreational access points. The most downstream end of the project is adjacent to two bridges: a historic railroad bridge that now serves as a bike and pedestrian path, and the Idaho Transportation Department Highway 75 Bridge.

Trout Unlimited is proposing to work with private property owners and interested parties to reduce erosion and sedimentation, restore floodplain function and fish habitat, and improve water quality. This project will also help protect the two bridges on the downstream end. The restoration plans will include channel realignment, construction of hardened riffles, pools, rock cross vanes, floodplains, and root-wad bank treatments.

Flood Control District No. 9 supports projects that address flooding, flood plain reconnection, recreation, and safety issues in the Big Wood and works with partners to fund and implement projects. We support this project because it addresses ongoing flooding, bank erosion, public safety and recreation. After the high run-off in the spring of 2017, the swimming hole under the railroad bridge filled in. Perhaps this project will re-establish the popular swimming hole.

Sincerely,

A handwritten signature in black ink that reads 'Dave Bell'.

Dave Bell, Chair  
Flood Control District No. 9

# BOISE RIVER FLOOD CONTROL DISTRICT #10

PO Box 140396  
Garden City, Idaho 83714-0396



Idaho Water Resource Board  
322 East Front Street, Statehouse Mail  
Boise, Idaho 83720

June 21, 2019

Re: FCD 10 2019 Flood Management Grant Application

Please find attached an application for the Flood Management Grant Funding Program. The application has been completed pursuant to the criteria listed in the Flood Management Grant Funding Guidelines. The Boise River Flood Control District #10 ("FCD 10") Board of Commissioners has approved this application.

The application is accompanied by the following attachments:

- Attachment 1 – Project Map
- Attachment 2 – Project Description
- Attachment 3 – Project Cost Estimate/Budget
- Attachment 4 – Project Schedule
- Attachment 5 – Project Work Detail
- Attachment 6 – FCD 10 Past Projects
- Attachment 7 – List of Project Supporters, Collaborators & Funding Sources/Pledges
- Attachment 8 – Project Support Letters

Also enclosed with the application is a hard copy of an explanatory Powerpoint presentation. An electronic version is available on request.

As you will see from Attachments 7 and 8, as of the IWRB flood management grant application deadline, this project to develop the Boise River Management Tool ("BRMT") is supported by a wide range of entities, several of whom have pledged financial support. FCD 10 is pursuing additional financial commitments to match the \$160,000 flood management grant FCD 10 seeks from the IWRB through this flood management grant application. With a total project cost of \$527,000, FCD 10 expects to obtain commitments for \$367,000, to provide 70% matching funds.

If you have questions or need further information, please contact Mike Dimmick, District Manager, at [projectmgr@boiseriver.org](mailto:projectmgr@boiseriver.org) or (208) 861-2766. Also available for additional information, contact Steve Sweet at [steve@quadrant.cc](mailto:steve@quadrant.cc) or (208) 850-3452.

Thank you for your consideration of this application. Your support for Boise River flood management is greatly needed and appreciated.

Mike Dimmick, District Manager  
Boise River Flood Control District #10



## IDAHO WATER RESOURCE BOARD

322 East Front Street, Statehouse Mail

Boise, Idaho 83720

Tel: (208) 287-4800

FAX: (208) 287-6700



### APPLICATION FOR FLOOD MANAGEMENT GRANT

Answer the following questions and provide the requested material as directed. All pertinent information must be provided. Additional information may be requested by the Idaho Water Resource Board (IWRB) depending on the scope of the project and amount of funding requested.

**Incomplete documents will be returned and no further action will be taken by IWRB staff. All paperwork must be submitted within twenty-eight (28) working days prior to the next IWRB meeting.**

Board meeting agendas can be found at: <https://idwr.idaho.gov/IWRB/meetings>

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#### **I. Overview:**

This form applies to the *IWRB Flood Management Grant Program*. The Flood Management Grant Program provides financial assistance, on a competitive statewide basis, to eligible entities interested in pursuing flood damaged stream channel repair, stream channel improvements, flood risk reduction, or flood prevention projects. Pursuing flood management improvement and repair projects can assist in maintaining flow capacities in major waterways, prevent bank and channel erosion, and reduce property damage during flood events.

The grant funding shall require a 50% funding match by the sponsor of the total project costs. In-kind services can account for up to 30% of the total project costs. Legal/Administrative in-kind services are limited to 5% of total project costs.

Funds will be distributed by sponsor submitting funding reimbursement requests, which shall include:

1. Cover letter formally requesting a funding reimbursement, description of project activities, dates of project activities, and contractor or supplier invoices. Funds shall be distributed within 15-days of receipt of reimbursement request.

Upon completion of the project, sponsor and/or consultant, shall submit a notice of completion to the IWRB, and that the improvements and/or repairs were constructed in substantial conformance with the approved plans and specifications.

#### **Prepare and attach a "Grant Document" to this application.**

The Grant Application Document requirements are outlined in the IWRB Flood Management Grant Program Guidelines. The guidelines can be found at:

<http://idwr.idaho.gov/IWRB/Programs/Financial>

You can also obtain a copy by contacting IWRB staff.



---

## **II. General Information:**

### **A. Type of organization: (Check box)**

- ☒ Flood Control District  
☐ Municipality  
☐ County  
☐ Other

#### **Organization Name and Address:**

Boise River Flood Control District No. 10  
P.O. Box 140396  
Garden City, ID 83714

Mike Dimmick, District Manager  
Telephone number: 208-861-2766  
E-mail: Projectmgr@boiseriver.org

Taxpayer ID: #82-0419262

Project location/ legal description: Boise River: Diversion Dam to the confluence with Snake River at Parma (See Attachment 1 - Project Map & Attachment 2 – Project Description).

### **B. Is your organization registered with the Idaho Secretary of State's office? ☐ Yes ☒ No**

### **C. Purpose and project description for this grant application.**

- ☒ Stream Channel Repair  
☒ Stream Channel Improvement  
☒ Flood Risk Reduction  
☒ Flood Prevention  
☒ Other Floodplain Development Planning, Water Quality, Aquatic Habitat, Recreational Use & Irrigation Diversion - Management, Maintenance and Improvement (see Attachment 2 – Project Description).

---

## **III. WATER PROJECT/ACTIVITY:**

### **A. Water Source and Name: Boise River: Diversion Dam to Snake River**

- ☒ Surface      ☐ Reservoir  
☐ Other \_\_\_\_\_

**B. Describe the Flood Management Project/Activity and the primary purpose of this grant application?**

The purpose of this application is to develop a Boise River Management Tool (BRMT), by mapping river subsurface topography through bathymetric LiDAR, and developing a 2-D hydraulic model that will characterize and predict hydrodynamics affecting the river channel and floodplain. This management tool will provide the foundation to evaluate natural and man-made alterations to the Boise River channel, predict flood risks, determine and coordinate emergency response to flood events, evaluate and guide development within the floodplain, and identify, design and prioritize cost-effective flood management projects. See **Attachment 2** for further discussion of the BRMT's purposes, scope, uses and benefits.

The first river segment identified for modeling, designated as Area of Interest #1 (AOI-1) in **Attachment 1**, encompasses Flood Control District #10 ("FCD 10") from Veterans Memorial Parkway to the confluence of Indian Creek at Caldwell. With the funding sought through this application and from other sources (identified in **Attachment 7**), the BRMT will be expanded to include additional river segments, upstream to Diversion Dam (AOI-2) and downstream to Parma (AOI-3).

**C. Does this project/activity address multiple objectives? If so explain.**

In addition to its flood management uses and benefits, the BRMT will enhance decision making to evaluate stream channel alteration proposals, as well as manage, maintain and improve water quality, aquatic life, recreational uses and irrigation diversions in the Boise River. See **Attachment 2** for a discussion of the multiple uses and benefits of the BRMT.

**D. Will this flood management project/activity be implemented in a single year, or phased over multiple years?**

☒ 1-year      ☐ Multiple-years (Phased)

Note: The 2-D model will be completed by Summer 2020 (see **Attachment 4 – Project Schedule**). Thereafter, the model will be available for long-term use in Boise River Management.

**E. Project start and completion dates:**

Project start – September, 2019; Project completion – Summer 2020. See **Attachment 4 – Project Schedule**.

**F. Project detailed cost estimate, including all labor and materials:**

\$527,000. See **Attachment 3 – Project Cost Estimate/Budget & Attachment 5 – Project Work Detail**.

**G. Has your organization performed stream channel or stream bank repair and/or improvement projects in the past?**

Yes. See **Attachment 6 – FCD 10 Past Projects**.

**H. Provide the required regulatory approval and permit documents for this project.**

N/A.

#### **IV. FINANCIAL INFORMATION:**

**A. Does your organization have a regular assessment for a reserve or special needs fund?**

Yes ☒

**B. Does your organization have prior experience in working with the Idaho Water Resource Board?**

Yes ☒


**C. What other sources of funding have been explored to fund the project? (e.g. U.S. Army Corps of Engineers, NRCS, FEMA, Banks, Local Government, etc.)**

See Attachment 7 – List of Project Supporters, Collaborators & Funding Sources/Pledges & Attachment 8 – Project Support Letters.

**Amount of funds requested:** \$160,000 (30% of project cost)

*By signing this document you verify that all information provided is correct and the document is filled out to the best of your ability.*

**Authorized signature& date:**

 6-21-2019

## Attachment List

Attachment 1 – Project Map

Attachment 2 – Project Description

Attachment 3 – Project Cost Estimate/Budget

Attachment 4 – Project Schedule

Attachment 5 – Project Work Detail

Attachment 6 – FCD 10 Past Projects

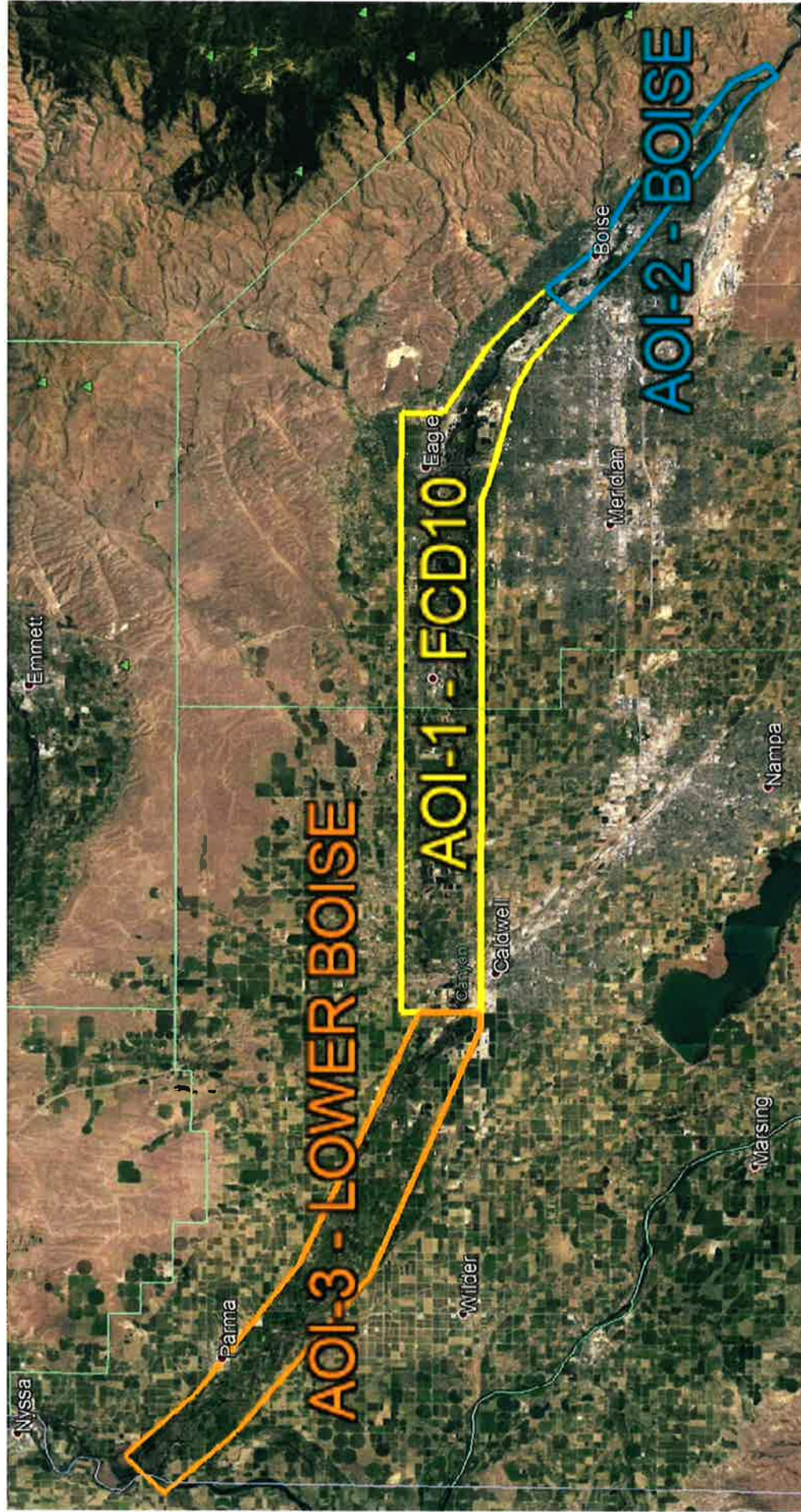
Attachment 7 – List of Project Supporters, Collaborators & Funding Sources/Pledges

Attachment 8 – Project Support Letters





**BOISE RIVER FLOOD CONTROL DISTRICT #10**  
PO Box 140396  
Garden City, Idaho 83714-0396



**Boise River Flood Control District #10 – Areas of Interest**  
**ATTACHMENT 1**



## Boise River 2-D Management Tool: Project Description

### Boise River Management Challenges

The Boise River is the centerpiece of Idaho's capital city and lifeblood for agriculture, industrial, municipal, and recreational activities in the Treasure Valley. The river provides irreplaceable natural, social and economic values that are the foundation for the way of life in the Treasure Valley.

Historically, major river management challenges have resulted from competing demands for water, periodic droughts and flood events, degraded water quality, and urban development within the floodplain and encroachment within the river corridor. Rapid population growth accentuates these challenges. Natural and manmade changes to the Boise River channel, river flow rates, and water quality have physical, biological, and chemical impacts, both upstream and downstream. These impacts have significant implications for river and land use management and planning. Implementing best management practices to comply with regulatory standards and meet community expectations for river and land use management require extensive commitments of time and financial resources.

### Time for an Upgraded River Management Tool

Sustainable, cost-efficient management of the Boise River and land use development within the Boise River corridor and floodplain requires the use of modern data gathering techniques and scientific analysis to inform collaborative decision making and planning among local communities, governmental agencies and stakeholders.

Historically, FEMA's one dimensional (1-D) flood models that were primarily created to establish flood insurance rates have provided the basis for planning, zoning, and engineering river design of streambank protection. However, these models are limited in the information they provide between measured cross sections, which span distances of a ¼ mile or more.

Data gathering and modeling to date have not produced a clear, continuous model of the morphology of the Boise River channel and riparian corridor. Substantial damages and changes wrought by 2017 high water and flooding highlight the need for a more comprehensive understanding and predictive capability of the impact of changing river flows on the river channel, corridor and floodplain.

#### 1-D vs. 2-D Hydraulic Modeling

Models can be used to describe the water movement in three dimensions:

upstream to downstream ("1-D" Model);

side-to-side - bank-to-bank and out of bank ("2-D" Model);

Up and down – between water surface & riverbed ("3-D" Model).

Computer models based on the assumption that river flows only upstream to downstream are "one-dimensional models."

Two-dimensional (2-D) models give us a new tool to better understand river flows that move in more than one direction. Until recently, 2-D models required enormous computing power and time to deliver results. Advances in computer technology have made 2-D modeling a fast, inexpensive, and invaluable management tool.





## 2-D Model Development

Boise River Flood Control District #10 (FCD 10) and the University of Idaho's Center for Ecohydraulics Research, are leading the development of a 2-D hydraulic model to be used in flood prevention, response and recovery, land use planning, stream channel alteration evaluation, and protection and improvement of the various beneficial uses of the river. Model development involves the following steps.

**Step 1 – Boise River Model Area and Budget.** The first step in developing the 2-D model is to identify the Boise River Model area. Three Boise River segments, shown below, have been designated as “Areas of Interest” (“AOI”): “AOI-1 - FCD 10,” from Garden City (Veterans Parkway, river mile 50) to Caldwell (Confluence with Indian Creek, river mile 20); “AOI-2 - Boise,” from Diversion Dam to Veterans Parkway, and “AOI-3 – Lower Boise,” from the Indian Creek confluence to the Snake River. AOI-1 was chosen as the first segment to be modeled because it encompasses multiple areas of flood management concern within FCD 10 boundaries, and can be modeled within the initial proposed project budget of \$295,000. Significant interest has been expressed in expanding the model to encompass the Boise River upstream and downstream from AOI-1, with the ultimate objective of modeling the river from Diversion Dam to the confluence with the Snake River. The model area will be expanded if sufficient funding is obtained to extend the LiDAR flight, gather additional calibration data, and expand the geographic scope of the 2-D model. The budget to model AOI-1 and AOI-2 is approximately \$381,000. The budget to model AOI-1 and AOI-3 is approximately \$440,000. The budget to model all three segments is approximately \$527,000. Additional budget detail is provided in **Attachment 4 – Project Cost Estimate/Budget**.



**Step 2 – LiDAR Survey (Fall/Winter 2019).** Recent advancements in Light Detection and Ranging (LiDAR) technology and two dimensional (2-D) modeling provide a more accurate and in-depth understanding of the morphology of the Boise River channel and riparian corridor, hydrology, plus water quality impacts and interactions. A bathymetric LiDAR device onboard a fixed-wing aircraft transmits and receives laser light pulses of up to one million per second, a relative position Global Positioning System (GPS)



measures aircraft position, and an inertial measurement unit (IMU) measures aircraft attitude. The LiDAR will be collected at 8 points per square meter to ensure a Quality Level 1 (QL1) final product.

Overlapping flight lines will be flown in opposing directions to maximize detection of swath-to-swath inconsistencies and to minimize any off-NADIR shadowing from vegetation or terrain. The topobathymetric LiDAR collection will be obtained during the optimal conditions for success, which include no fog/rain, low wind or other conditions affecting water clarity.

Data deliverables include a classified point cloud, hydro flattened water surface, and bare earth elevation model.

**Step 3 – Assemble Calibration Data (Fall/Winter 2019).** Existing flow measurements, aerial photographs, gravel grain sizes, and other data relevant to the proposed uses of the 2-D model will be collected from cooperating agencies who support this project. See **Attachment 7 – List of Project Supporters, Collaborators & Funding Sources/Pledges**, and **Attachment 8 – Project Support Letters**.

**Step 4 – Build the 2-D Model (Winter/Spring 2020).** The 2-D hydraulic model will be constructed using the LiDAR and calibration data by a qualified consultant under the direction of Dr. Andy Tranmer at the U of I Center for Ecohydraulics Research. The model is expected to be completed and ready for river management use by the summer of 2020. Model development work detail is provided in **Attachment 5 – Project Work Detail**.

## **2-D Model Outreach**

Once completed, information regarding the development and potential uses of the 2-D model will be shared with cooperating agencies, Boise River stakeholders, and other interested parties.

## **2-D Model River Management Uses**

The hydraulic 2-D model can be used to better understand and predict the impacts of changing river hydrodynamics on the river channel and floodplain. These results will inform the FCD 10 decision making processes and help prioritize flood management decisions (flood prevention, response, and recovery). The 2-D hydraulic model provides the physical foundation for understanding many other processes and informing management decisions in and along the river. The model can route sediment, nutrients, and biological data through the river network to identify and predict water quality impacts and interactions at different locations. The 2-D model can also accurately predict aquatic habitat for fish species in the channel and identify processes in the floodplain that support native riparian vegetation like cottonwood trees and willows. Additionally, the 2-D model can be used to model water temperature and hydraulic mixing to evaluate solutions for water renewal facilities and tributary drains.

The following list is indicative of the potential uses, cooperators and beneficiaries of this new Boise River Management Tool.





1. **Flood Management & Land Use Planning (FCD 10, FCD 11, Municipalities, Counties, Floodplain Administrators, Districts, TVWUA, Property Owners, Developers, IWRB, IDWR, USACE, USBR, USGS, NRCS<sup>1</sup>)**: Identify/predict areas and rates of channel migration, flood hazards, property, structures and infrastructure at risk, and sensitive river channel segments subject to instability and geomorphic change that require particular and/or specific management priorities.
2. **Instream Structure Assessments (FCD 10, FCD 11, Municipalities, Counties, Floodplain Administrators, Districts, TVWUA, Property Owners, Developers, IWRB, IDWR, USACE, USBR, NRCS)**: Understand near structure velocities and forces acting on irrigation diversions, bridge abutments, and other structures within or adjacent to the river channel.
3. **Water Quality Management (LBWC, IDEQ, USGS)**: Spatially identify and quantify concentrations and transport processes within the model area:
  - a. Inputs and transport of phosphorus, sediment and other fine particles;
  - b. Algae and periphyton growth areas;
  - c. Reach-scale areas of deposition and erosion;
  - d. Instream, drain and discharge temperatures, solar gain, and thermal mixing;
  - e. Lateral mixing from point sources such as drains and water renewal facility outfalls.
4. **Aquatic Habitat and Management (LBWC, IDEQ, IDFG, USGS)**: spatially quantify fish habitat from preference curves of depth, velocity, and temperature.
5. **Plan, Manage, and Maintain Recreational River Uses (LBWC, IDEQ, Municipalities, Recreational Users)**: Identify potentially hazardous locations for floaters, kayakers, and anglers, as well as opportunities to create or improve recreational use opportunities.
6. **Groundwater-Surface Water Interactions (IDWR, LBWC, Water District 63, TVWUA)**: Link hydraulics with Treasure Valley groundwater model for recharge dynamics and conjunctive management.
7. **Native Vegetation Management (FCD 10, FCD 11, IDWR, Floodplain Administrators, USACE, NRCS, Developers, Property Owners)**: Identify areas of natural vegetation recruitment in the floodplain and prioritize potential restoration sites.

## 2-D Model Benefits

1. Develop a communication tool to visually demonstrate and numerically quantify specific management alternatives and their resultant impacts.
2. Be prepared for future NFIP changes and how to reduce community impacts.

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<sup>1</sup> **Acronyms**: Idaho Department of Water Resources (IDWR); Idaho Water Resource Board (IWRB); Idaho Department of Environmental Quality (IDEQ); Idaho Department of Fish & Game (IDFG); Lower Boise Watershed Council (LBWC); Treasure Valley Water Users Association (TVWUA); Natural Resources Conservation Service (NRCS); U.S. Army Corps of Engineers (USACE); U.S. Bureau of Reclamation (USBR); U.S. Geological Survey (USGS).



3. Leverage existing investments in river research and data acquisition for smaller communities, which may be the ones in most need of cost-effective planning alternatives.
4. Provide a publically available, objective model to support sustainable planning decisions.
5. Provide emergency managers with the ability to model real-time threats during flood events.
6. Reduce future hazard-based vulnerabilities for both developed and developing communities.
7. Illustrate successful approaches to development that incorporate science-based planning.
8. Provide economic alternatives that satisfy societal/ecological/natural hazard constraints.

### Measuring Success

Project success for flood management purposes will be measured by the extent to which FCD 10 and other agencies use the model to prepare for, respond to, and recover from future flood events. A list of the FCD 10 uses of this model will be maintained to demonstrate the tool's ongoing usefulness. Success can also be measured by the number of river management projects and studies completed using the model or model data. Flood Control District 10 can request that parties using the model provide a brief explanation of their intended use and feedback for model improvement. Model use information will allow the District to identify the most common model applications and ways the model may be improved to provide greater benefit.



Boise River Flood Control District #10 Flood Management Grant Project Budget				
Item	Areas of Interest			
	AOI 1	AOI 1 + 2	AOI 1 + 3	AOI 1 + 2 + 3
LiDAR Acquisition	\$77,800	\$96,800	\$115,200	\$136,500
Model Development, Calibration & Documentation	\$158,000	\$208,000	\$237,000	\$285,000
Project Contingency (10%)	\$23,600	\$30,500	\$35,200	\$42,200
Planning/Project Management	\$23,600	\$30,500	\$35,200	\$42,200
Administration/Legal	\$11,800	\$15,200	\$17,600	\$21,100
Grand Total	\$294,800	\$381,000	\$440,200	\$527,000



**MODEL DEVELOPMENT COST ESTIMATES**  
**Provided by Local Certified Engineering Companies**

Areas	cbec	HDR		WEST	Average
		Low	High		
AOI 1	\$ 180,000.00	\$ 120,000	\$ 170,000	\$ 163,000	\$ 158,000
AOI 1 + 2	\$ 240,000.00	\$ 160,000	\$ 230,000	\$ 202,000	\$ 208,000
AOI 1 + 3	\$ 290,000.00	\$ 180,000	\$ 250,000	\$ 228,000	\$ 237,000
AOI 1 + 2+ 3	\$ 350,000.00	\$ 220,000	\$ 310,000	\$ 261,000	\$ 285,000



**Boise River Topobathy LiDAR – Cost Estimate**

Quantum Spatial, Inc. appreciates the opportunity to present Quadrant Consulting with a cost estimate for acquiring and processing 8 ppsm (QL1) topo/bathy LiDAR for the Boise River as shown in Figure 1.



Figure 1: Area of Interest (AOI), Boise River, Idaho.

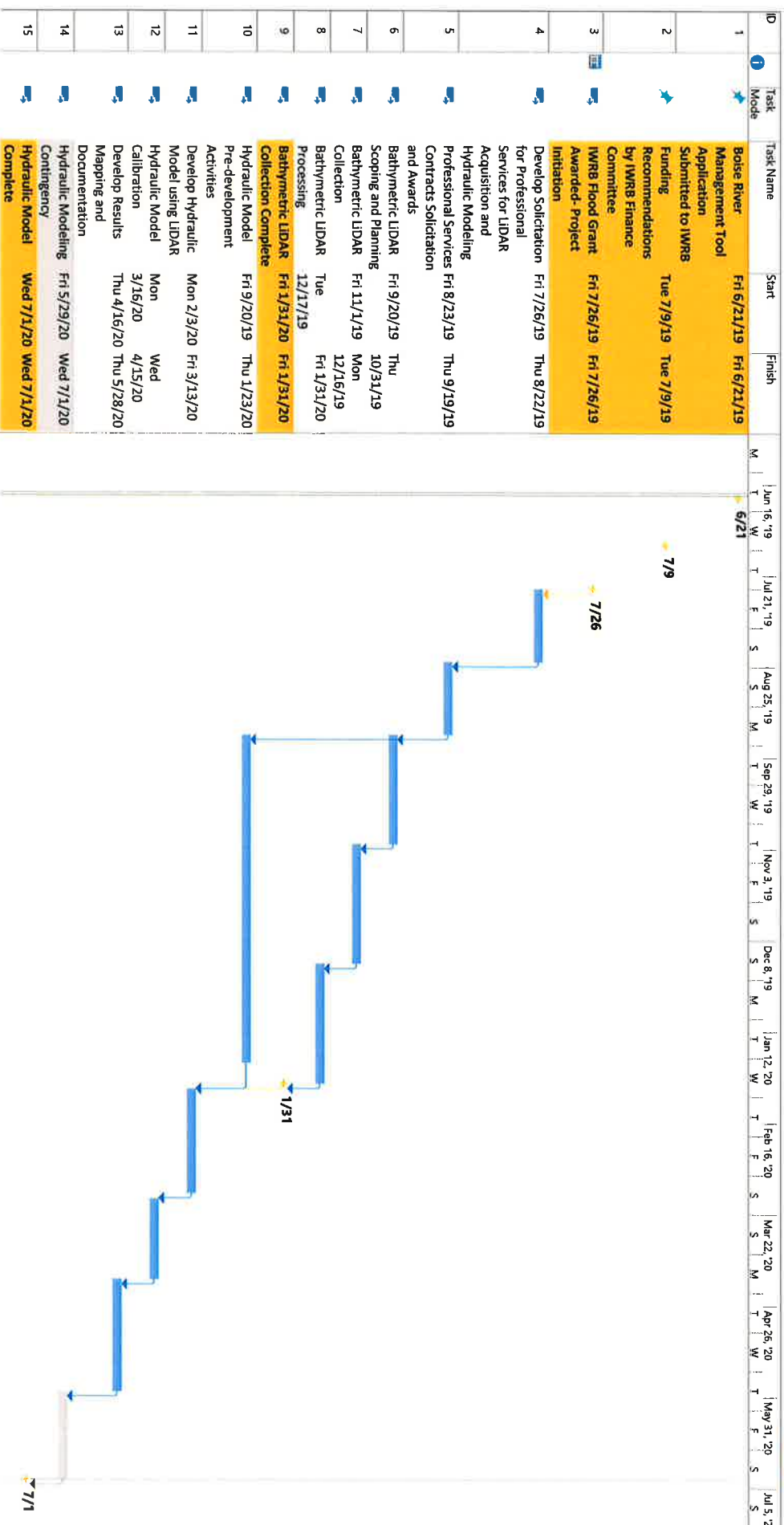
**Cost Estimate**

The cost estimate below reflects the options listed above.

Data type	Details	Acres	Total Cost
<b>Area 1</b>	FCD 10 (yellow polygon)	35,557	\$77,754
<b>Area 1 + 2</b>	FCD 10 and Boise (yellow and cyan polygons)	41,891	\$96,779
<b>Area 1 + 3</b>	FCD 10 and Lower Boise (yellow and orange polygons)	59,182	\$115,240
<b>Area 1 + 2+ 3</b>	FCD 10, Boise, and Lower Boise (yellow, cyan, and orange polygons)	65,515	\$136,467



# BOISE RIVER MANAGEMENT TOOL PROJECT SCHEDULE





## Boise River 2-D Management Tool: Model Development Work Detail

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The Boise River 2-D hydraulic model will be constructed using the LiDAR and calibration data by a qualified consultant under the direction of Dr. Andy Tranmer at the U of I Center for Ecohydraulics Research. The model is expected to be completed and ready for river management use by the summer of 2020. Model development includes the following steps:

**Model Selection** - FCD10 will meet with stakeholders to discuss the advantages and disadvantages of various available software packages. Limitations of the selected model will be identified and suitable resolutions will be considered to address software limitations. The goal of this task is to reach stakeholder consensus on the model platform on which the model will be developed and ultimately made available for other parties to use for their interests.

**Terrain Data Development** - Terrain data will be developed using bathymetric LiDAR topography flown during low-flow conditions in the Oct/Nov timeframe. Raw point file from the bathymetric LiDAR survey and a filtered surface data set will be provided. Breaklines describing the channel and linear overbank features will be reviewed and edited if necessary. A model surface will be developed from the bathymetric LiDAR data and breaklines.

**Surface Roughness Development** - Land cover data will be developed to approximate the Manning's roughness coefficient of various land cover types found in the channel and floodplain areas. Land cover data for much of the model area are available online (Treasure Valley UTC, National Landcover Database). These data will be reviewed and sections will be revised based on the most recent aerial photography. Manning's roughness coefficients will be estimated based on typical values for similar land cover types, identified in a literature review. Limited field verification will be completed to document vegetation height and density in representative areas.

**Mesh Development** - A computational model mesh will be developed to include the Boise River channel and floodplain. The mesh elements will be oriented to the anticipated flow direction in the channel and along linear features such as levees and berms. The mesh density will vary to represent areas of hydraulic complexity while not including excessive detail in less-complex areas (such as flat floodplain areas with low velocities). The model will typically include 8-10 mesh cells across the main channel of the Boise River.

Once a preliminary computational mesh is complete, a mesh density sensitivity analysis will be completed. A hydraulic solution will be considered suitable if the solution does not change (improve) with greater mesh resolution. This step also requires including structures (bridges, weirs, other obstructions) as features within the mesh. Data from the effective FEMA model or other readily-available, reliable sources will be used to provide data used to code these features into the model.

**Model Calibration** - The hydraulic model will simulate the peak flows associated with the 2017 high water event. Data collected by both FCD 10 and Boise City during the 2017 flood event, including high water marks and aerial photography of inundated areas, will be used to demonstrate the model is



predicting water surface elevations throughout the river. If warranted, Manning's roughness coefficients associated with different land cover types will be modified within the range of acceptable published values to better replicate the high water mark from the 2017 event. The model will be considered calibrated, if predicted water surface elevations are neither systematically high nor low when compared to the available data and the majority of points are within 0.5 feet of the surveyed high water marks. Low flow inundation extents can also be compared to model results for reasonable fit and hydraulic connectivity. Rating curves at USGS stream gages in the modeled area can also be used as an additional means to confirm the model is performing accurately.

**Model Evaluation** - The model will be used to simulate a range of flows on the Boise River, ranging from significant flooding (100-year or larger events) to critical low-flow conditions generally used in water quality evaluations. Raster (gridded) output files for results values such as depth, water surface elevation, and velocity will be exported and used to map spatial variability in hydraulic conditions for the range of flows. Output PDF maps, ArcGIS rasters, and Google Earth KMLs can be generated from these model outputs. These outputs would be the basis for other evaluations such as water quality, geomorphology, habitat suitability, and recreation safety analyses.

**Documentation** - The modeling consultant will develop a report summarizing the methods and assumptions used to develop the model including source data and calibration. The report will also include a summary of the hydraulic results. This report would document model development so other stakeholders can evaluate the model methods and assumptions to determine if changes that could be required to make it suitable for a specific application or evaluation.



**FCD10  
Permitting History Summary  
1987 - 2018**



PERMIT HOLDER	PERMIT		DATE	PROJECT TYPE				COMPLETED TO PERMIT STANDARDS YES/NO
	IDWR	USACE		Bank Stabilization	Bank Barb	Gravel Management	Channel Maintenance	
New Dry Cr Diversion	S63-20750	NWW-2018-00601	2018	X				YES
Duck Alley Pit Capture	S63-20661	NWW-2017-664-B03	2017	X				YES
Porter	S63-20752	NWW-2018-00603	2018			X		YES
Mulchay	S63-20754	NWW-2018-00599	2018			X		YES
Hafer (Leighton/Wells)	S63-20753	NWW-2018-00606	2018			X		YES
Clear Creek HOA	S63-20710	Note 1	2018	X	X			YES
Dillon	S63-20704	Note 1	2018	X	X			YES
Hannah	Note 2	NWW-2017-00741 (Note 3)	2018			X		YES
Hoff	Note 2	NWW-2009-023-B03	2018	X	X			YES
Ruff	Note 2	NWW-2008-521-B03	2018	X	X			YES
Woodland Properties	Note 2	NWW-2018-050-B03	2018	X	X			YES
AJP Farms	S63-20688	NWW-2016-086-B03	2017	X	X			YES
Bicandi	S63-20682	NWW-2012-00062	2017	X	X			YES
FCD10	S63-20648	Note 3	2017			X		YES
Glaesyer	S63-20684	NWW-2017-00739	2017	X	X			YES
Gwartney	S63-20683	NWW-2017-00472	2017	X	X			YES
Wallace	S63-20677	NWW-2017-00743	2017	X				YES
XL Ranch	S63-20594	NWW-2008-00176	2017	X	X			YES
AJP Farms	S63-20564	NWW-2016-086-B03	2016	X	X			YES
Bunderson	S63-20468	NWW-2013-88-B03	2014	X				YES
Lantz	S63-20471	NWW-2014-00126	2014	X	X			YES
Larson-Hickman	S63-20462	NWW-1997-200120 (2014)	2014	X	X			YES
Ruff	Note 2	NWW-2008-521-B03	2014	X	X			YES
Sali	S63-20470	NWW-2014-00125	2014	X	X			YES
Two Rivers HOA	S63-20467	NWW-2014-065-B03	2014	X	X			YES
Boyd	S63-20424	NWW-2022-2101840	2013		X			YES
Bunderson	S63-20426	NWW-2013-88-B03	2013	X	X			YES
Dillon	S63-20422	NWW-2009-68-B03	2013	X	X			YES
FCD10	S63-20415	NWW-2006-736-B01	2013			X		YES
Hoff	S63-20421	NWW-2009-23-B03	2013	X	X			YES
IDFG	S63-20427	NWW-2013-00081-B01	2013	X	X			YES
Larson	S63-20425	NWW-1997-200120	2013	X	X			YES
Porter	S63-20428	NWW-2007-379-B03	2013	X	X			YES
Ruff	S63-20423	NWW-2008-521-B03	2013	X	X			YES
Bicandi	S63-20382	NWW-2012-062	2012	X	X			YES
Carlson	S63-20384	NWW-012100440	2012	X				YES
Two Rivers HOA	S63-20360	NWW-2003-2100650	2011	X	X			YES
Bicandi	S63-20359	NWW-2010-581-B03	2010			X		YES
Wright	S63-20355	NWW-2010-582-B03	2010	X				YES
Dillon	S63-20314	NWW-2009-68-B03	2009	X				YES
Hoff	S63-20311	NWW-2009-23-B03	2009	X	X			YES
ID State Parks	S63-20312	Note 2	2009	X				YES
Wright	S63-20313	NWW-2009-022-B03	2009	X	X			YES
Sundance	S63-20271	NWW-2008-250-B03	2008	X	X			YES
XL Ranch	S63-20266	NWW-2008-176-B01	2008	X				YES
XL Ranch	S63-20267	NWW-2008-176-B01	2008	X	X			YES
Desilvia	S63-20209	NWW-2007-221-B03	2007	X				YES
FCD10	S63-20186	NWW-2006-756-B03	2007			X		YES
Gibson	S63-20208	NWW-2007-381-B03	2007	X	X			YES
Hoff	S63-20205	NWW-2007-285-B01	2007	X	X			YES
FCD10	S63-20185	NWW-2006-736-B01	2006			X		YES
FCD10	S63-20058	Note 2	2006				X	YES
Cladis	Note 2	NWW-062600018	2005	X				YES
FCD10	Note 2	NWW-012100350	2003				X	YES
FCD10	63-S-1649	NWW-022101640	2002				X	YES
FCD10	63-S-1550	Note 2	2001				X	YES
Bicandi	63-S-1473	Note 3	1999			X		YES
Gabica	63-S-1398	NWW-2200340	1999		X			YES
Payne	63-S-1475	Note 3	1999			X		YES
Phillips	63-S-1402	NWW-992200320	1999		X			YES
Hubler	63-S-1390	NWW-992200240	1998	X	X			YES
FCD10	63-S-1301	NWW-982100200	1997			X		YES
Gabica	63-S-1428	Note 2	1997	X	X			YES
Hubler	63-S-1289	NWW-982100040	1997			X		YES
Phillips	63-S-1050	Note 2	1995		X			YES
Phillips	63-S-928	Note 2	1993		X			YES
FCD10	63-S-738	Note 2	1990				X	YES
Phillips	63-S-654	Note 2	1987	X				YES

**Notes**

1. Permit in process
2. Permit copy not found
3. Letter of Non-Determination issued.



## Boise River 2-D Management Tool: Project Supporters, Collaborators & Funding Sources/Pledges (as of 6/21/19)

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As of the IWRB flood management grant application deadline (6/21/19), FCD 10 has contacted the following entities and provided them with project descriptions for the Boise River Management Tool ("BRMT"). Most of these entities have communicated their support for the BRMT, either verbally or in writing. Financial commitments to date are indicated below. FCD 10 is pursuing additional financial commitments, as indicated by "TBD" below. With a total project cost of \$527,000, FCD 10 expects to obtain commitments for \$367,000, to provide 70% matching funds for the \$160,000 flood management grant FCD 10 seeks from the IWRB through this flood management grant application.

<u>Supporter/Collaborator</u>	<u>Support Letter</u>	<u>Funding</u>
1. Flood Control District #10		\$ 100,000
2. City of Boise	Att. 8	\$ 25,000
3. City of Caldwell	Att. 8	\$ 18,000
4. City of Eagle		TBD
5. City of Meridian		TBD
6. City of Nampa		TBD
7. Eagle Sewer District		\$ 25,000
8. Lower Boise Watershed Council	Att. 8	\$ 100,000
9. Treasure Valley Water Users Assoc.		TBD
10. Pioneer Irrigation District	Att. 8	TBD
11. Ada County Emergency Management	Att. 8	TBD
12. Canyon County		TBD
13. Ada County Highway District		
14. Boise River Enhancement Network	Att. 8	
15. Flood Control District #11	Att. 8	TBD
16. USDA – NRCS		Grant/TBD
17. U.S. Reclamation	Att. 8	Grant/TBD
18. U.S. Army Corps of Engineers		Grant/TBD
<b>TOTAL TO DATE:</b>		<b>\$ 268,000</b>



## PUBLIC WORKS DEPARTMENT

MAYOR: David H. Bieter | DIRECTOR: Stephan Burgos

June 19, 2019

Idaho Water Resource Board  
322 E. Front Street  
Statehouse Mail  
Boise, ID 83702

Re: Support of Flood Control District No. 10 Grant Application

To Whom It May Concern:

The City of Boise ("City") supports the project proposed by Boise River Flood Control District No. 10 ("FCD 10") and the University of Idaho, Center for Ecohydraulics Research ("U of I") to collect LiDAR data and develop a 2-D hydraulic model for the Lower Boise River to be used as a tool for risk assessment, flood management, water quality applications, aquatic habitat analyses, and other river management decisions.

The City's support for the project includes collaborating with FCD 10, and a contribution of at least \$25,000. The basis for the City's support is that, in addition to flood risk assessment and substantial flood management benefits, the 2-D model will provide the foundation to better understand and predict the impacts of hydrology on sediment transport, water quality parameters, and provide a thorough analyses of the Lower Boise River instream channel parameters that have been estimated in previous models and have significantly changed since the 2017 sustained high river flows. In addition to the benefits listed above, the City is especially interested in this tool for identifying locations for river restoration projects, by showing low spots that could be easily turned into wetlands, or areas that would easily translate to side channel re-connection. The tool will allow the City to identify, evaluate, design and prioritize cost-effective projects to improve water quality and aquatic habitat.

We encourage the Idaho Water Resource Board and the Idaho Department of Water Resources to join us in supporting this important project.

Thank you,

A handwritten signature in black ink that reads "Kate Harris".

Kate Harris  
Water Quality Programs Manager



# CITY OF *Caldwell, Idaho*

June 18, 2019

**GARRET NANCOLAS**  
*Mayor*

208.455.3011  
(f) 208.455.3003

**City Hall**  
411 Blaine Street  
Caldwell, Idaho 83605

**Post Office Box**  
P.O. Box 1179  
Caldwell, Idaho 83606

For a list of the City  
Council members, visit:  
**Website**  
[www.cityofcaldwell.com](http://www.cityofcaldwell.com)

Mr. Mike Dimmick, District Manager  
Boise River Flood Control District #10  
PO Box 140396  
Garden City, ID 83714-0396

Dear Mr. Dimmick:

On behalf of the City of Caldwell Engineering Department, I am writing to express our interest in your project to develop a Boise River 2-D Model Management Tool. We understand and share many of the environmental challenges associated with sustainable development of a community near the Boise River. We support your decision to make this tool publically available for water quality improvement planning, as well as physical modifications within the 100 year floodplain.

We were disappointed to learn that the proposed scope of your LiDAR and Model project ends at the boundary of Flood District 10 and 11. We believe it would be of great benefit to the City of Caldwell (and its impact area) to extend the scope of this study to the confluence of Indian Creek and the Boise River.

If you achieve sufficient financial resources to move forward with this project, we would like to offer financial support up to \$18,000 in order to extend the scope of the bathymetric LiDAR flight and model downstream to the location where Indian Creek joins the Boise River.

Please call or email me if you have further questions or concerns.

Thank you,

Ashley Newbry, PE, CFM  
City of Caldwell  
Engineering Department  
(208) 455-3006





June 19, 2019

Idaho Water Resource Board  
322 East Front Street  
Statehouse Mail  
Boise, Idaho 83702

Re: Lower Boise Watershed Council Support of FCD 10 Grant Application

To Whom It May Concern:

The Lower Boise Watershed Council ("LBWC") supports the project proposed by Boise River Flood Control District No. 10 ("FCD 10") and the University of Idaho, Center for Ecohydraulics Research ("U of I") to collect LiDAR data and develop a 2-D hydraulic model for the Boise River to be used as a tool for flood management, water quality management and other river management decisions.

The LBWC's support for the project includes collaborating with FCD 10, and a grant of approximately \$100,000 from the federal 319 grant awarded to the LBWC by the Idaho Department of Environmental Quality ("DEQ"). The basis for the LBWC's support is that, in addition to substantial flood management benefits, the 2-D model will provide the foundation to better understand and predict the impacts of sediment, phosphorus and temperature on Boise River water quality, and to identify, evaluate, design and prioritize cost-effective projects to address those impacts.

We encourage the Idaho Water Resource Board and the Idaho Department of Water Resources to join us in supporting this important project.

Sincerely,

Clint Dolsby, Chair  
Lower Boise Watershed Council

cc: LBWC Board of Directors



DEPARTMENT OF THE ARMY  
U.S. ARMY CORPS OF ENGINEERS, WALLA WALLA DISTRICT  
201 NORTH THIRD AVENUE  
WALLA WALLA, WA 99362-1876

June 28, 2019

Idaho Water Resource Board  
322 East Front Street, Statehouse Mail  
Boise, Idaho 83720

Dear Sirs:

The U.S. Army Corps of Engineers, Walla Walla District (USACE) strongly supports the efforts by Flood Control District #10 (FCD10) to collect new topographic and bathymetric LiDAR and develop new 2-D hydraulic models for the Boise River. The current bathymetric LiDAR data was collected in 2007. LiDAR data for the floodplain is primarily from 2007, with some limited coverage that was collected in 2015. The flooding that occurred in 2017 demonstrated that the Boise River is dynamic. Some parts of the river changed dramatically due to sediment movement and deposition. The current LiDAR data is inadequate to fully understand and model these changed conditions.

The LiDAR that is collected will have direct applications for USACE, both in potential future projects with non-Federal partners as well as in our own internal modeling being developed for real-time simulations of flood events. While the new FEMA Flood Insurance Rate Maps (FIRMs) appeared to depict areas at risk of flooding fairly well in 2017, there were areas that flooded not depicted on the FIRMs. New LiDAR and subsequent planning modeling will help Ada County, Canyon County, and their jurisdictions better understand the current flood risk.

The new LiDAR and accompanying modeling will have numerous applications beyond FCD10's initial purposes. Applications in the modeling of sediment movement will be very useful. Gravel deposition at the head of Eagle Island had real and significant impacts to the flow distribution around the island, causing water levels to be higher both upstream and downstream of the flow split because of reduced capacity in the river. Better data and modeling may help identify locations where mitigation actions may be taken in the future to reduce these impacts, which will reduce the overall flood risk around Eagle Island. FCD10 is also proposing to use the data to examine sediment transport downstream of Ada County and into Canyon County, where significant gravels have been deposited over the year, reducing the conveyance of the river and increasing flood potential.

In closing, we believe the new topography/bathymetric LiDAR would be widely used by local, state, and Federal agencies, as well as by academia. The efforts enabled by this project in disaster response planning, hazard analysis, public outreach, and mitigation projects will be invaluable to everyone along the Boise River.

Sincerely,

A handwritten signature in blue ink, reading "Brandon W. Hobbs", is positioned above the printed name.

Brandon W. Hobbs, PE, CFM  
Idaho Outreach Coordinator

**Subject:** Boise River Flood Control District 10 - 2D LiDAR Model  
**From:** Mark Zirschky <mark@pioneerirrigation.com>  
**Date:** 6/18/2019, 3:28 PM  
**To:** Mike Dimmick <projectmgr@boiseriver.org>, "steve@quadrant.cc" <steve@quadrant.cc>, "Rex (waterdistrict63@qwestoffice.net)" <waterdistrict63@qwestoffice.net>  
**CC:** Alan Newbill <abnewbill@pioneerirrigation.com>

Mike,

Thank you for the opportunity to sit through your presentation this morning with the Bureau of Reclamation, regarding your recent interest in developing a 2D LiDAR Model tool to be used for maintaining proper streamflow in the Boise River.

I found your presentation to be very educational and of great interest to Pioneer Irrigation District. I can see the LiDAR Model being used to monitor and react to changes in the Boise River system to better serve everyone involved and those who divert water, reside and recreate in and around the river. As you specified in the presentation, knowing what is happening in the river during normal operations and flood control, can aid us in addressing hot spots at key locations before they become catastrophic situations. The pit capture scenario was spot on. As Steve explained, the "old" information that was available during the 2017 flood year, proved to save all our facilities downstream. However, without continuing to gather data, we will be at the mercy of a wandering and failing river at some point. As I stated at the presentation, knowing how and when to strategically manipulate the river around our diversions can be the difference between smooth operations and system failures.

I spoke to Pioneer Irrigation District's Board Chairman this afternoon, and we both find great value in supporting this effort to develop this tool. I look forward to seeing how Pioneer Irrigation District can be involved in this development.

Should you have any questions, please do not hesitate to contact me.

Mark Zirschky  
Superintendent  
Pioneer Irrigation District  
208-459-3617  
208-250-8481



## ADA COUNTY EMERGENCY MANAGEMENT & COMMUNITY RESILIENCE

7200 Barrister Drive

Boise, Idaho 83704

(208) 577-4750

Website: <http://www.adaprepares.id.gov>

Idaho Water Resource Board  
322 E. Front St., Statehouse Mail  
Boise, ID 83720

06/19/2019

Dear Idaho Water Resource Board Members,

Ada County Emergency Management & Community Resilience (ACEM) strongly supports the collection of Bathymetric LiDAR and the development of new hydraulic modeling of the Boise River. The current bathy LiDAR data set used as the basis for mapping was gathered in 2007 and used in a 1-D model to develop flow maps. A high flow event in 2012 and 101 days of flooding in 2017 have distinctly altered some river dynamics and new data is needed for future planning efforts.

In Ada County, the 2007 data set is used as the base for an interactive map that displays fifteen different flows on the river. This map, hosted on the National Weather Service's Advanced Hydrologic Prediction Service (AHPS) website, is used by emergency managers and responders for situational awareness and planning. It is also used as a public outreach tool to educate the public on the hazard of flooding. While it was quite useful in both 2012 and 2017, some of the flood inundated areas in 2017 were not depicted on the map. This flooding caused an evacuation of several homes. New bathymetric LiDAR and modeling could be used to update this map, increase its accuracy and help responders better forecast needed response actions.

New LiDAR and modeling could also provide additional information to sediment studies being performed by the University of Idaho. By comparing the 2007 LiDAR to a new LiDAR set, researchers could have a clearer picture of the alterations occurring in the riverbed. Sediment movement has contributed to changes in the way the river flows, particularly in regard to Eagle Island; discovering the sources and developing methods to mitigate the issues caused by sediment transport could help reduce the risk of flooding to the built environment.

A new bathymetric LiDAR set and updated modeling would be used by local, state and federal agencies, adding a much needed component to future hazard analysis, public outreach, mitigation and response planning. ACEM expresses its support for this research based on the positive impact it could have in all these areas.

Very Respectfully,

A handwritten signature in dark ink, appearing to read "Doug Hardman", followed by a long horizontal line.

Doug Hardman, Director  
Ada County Emergency Management  
& Community Resilience





June 19, 2019

**Project Title:** Boise River 2-D Management Tool

Dear Idaho Water Resources Board,

I am writing to express the Boise River Enhancement Network's (BREN's) support for Flood Control District 10 (FCD 10) and their proposal to develop a 2-D hydraulic model of the Boise River.

A 2-D hydraulic model of the Boise River will provide FCD 10 and other agencies a comprehensive understanding of how changing flows affect the river channel, riparian corridor and floodplain. The model can be used in numerous applications including flood management, land use planning, instream structure and aquatic habitat assessment, water quality modeling, and enhancement activities, among others. From an enhancement perspective, the model can be used to spatially identify and quantify fish habitat, water pollutants, areas of natural vegetation recruitment, etc., in order to best implement and prioritize projects. The development of a 2-D hydraulic model has also been identified as an important next step in the Boise River Enhancement Plan.

We fully support the FCD 10's project proposal and look forward to its implementation.

Sincerely,

A handwritten signature in black ink that reads "Tamsen Binggeli". The signature is written in a cursive, flowing style.

Tamsen Binggeli

BREN Board of Directors and Coordinating Team

June 19, 2019

Mr. Mike Dimmick  
Flood Control District 10

Re: Participation in 2D Modeling

Dear Mr. Dimmick:

In regard to FCD 10's pursuit of Grant funds for developing a 2-D model for the Boise River, FCD #11 would be interested in participating in the project. Our goal is to eventually have a 2-D model that covers the region covered by our district. Please include us in your pursuit in working with several City, County and Federal agencies and stakeholder groups to obtain funds for the required match money. Please also include us in the application when you apply for the IWRB Flood Mitigation Grant Program.

FCD 11 does not have a large budget, but would be interested in supporting this project to the extent it is financially possible.

Sincerely,  
**BOISE RIVER FLOOD CONTROL DISTRICT NO. 11**

*Jim Thorpe*  
Commissioner



1010 W. Jefferson, Ste. 101, Boise, ID 83702 | [www.iwua.org](http://www.iwua.org)  
P: 208-344-6690 F: 208-344-2744 E: [iwua@iwua.org](mailto:iwua@iwua.org)

July 3, 2019

Idaho Water Resource Board  
322 E. Front Street  
Boise, ID 83702

*RE: Support of Flood Control District #10's Grant Application*

To Whom it May Concern:

On behalf of the Idaho Water Users Association (IWUA), I am writing to express support for the efforts by Flood Control District #10 (FD10) to develop a 2D LiDAR Model of the Boise River. This new model will significantly benefit management of the Boise River and may be used as a template to address other rivers in the state.

IWUA is a non-profit corporation representing approximately 300 canal companies, irrigation districts, ground water districts, municipal and public water suppliers, hydroelectric companies, aquaculture interests, agri-businesses, professional firms and individuals throughout Idaho. Our purpose is to promote, aid and assist in the development, control, conservation, preservation and utilization of Idaho's water resources.

As discussed in the application, a 2D model will have real, significant and substantive impacts on the operation of the Boise River. The improved management resulting from these efforts will benefit all who use the river as well as those who reside around the river.

In addition to the flood control benefits addressed in the application, there are valuable water quality benefits offered by a 2d LiDAR Model of the river. Understanding the movement of sediments and other materials in the river will enhance the ability to improve water quality in the Boise River. IWUA members throughout Idaho – and, in particular, southwest Idaho – are actively involved in efforts to improve water quality in their local rivers and streams. The information provided by this model will improve the opportunity for success of these efforts.

Thank you for your consideration of this project. Please don't hesitate to give me a call if you have any further questions or need additional comments (208-404-9436).

Sincerely,

Paul Arrington  
Executive Director & General Counsel



## United States Department of the Interior

BUREAU OF RECLAMATION  
Pacific Northwest Region  
Snake River Area Office  
230 Collins Road  
Boise, ID 83702-4520

IN REPLY REFER TO:

MSF-1100  
2.2.4.21

JUN 21 2019

VIA ELECTRONIC MAIL ONLY

Mr. Mike Dimmick  
District Manager  
Boise River Flood Control District #10  
P.O. Box 140396  
Garden City, ID 83714  
[projectmgr@boiseriver.org](mailto:projectmgr@boiseriver.org)

Subject: Boise Watershed Analysis Tool for Environmental Risk

Dear Mr. Dimmick:

Thank you for sharing your vision for a Boise Watershed Analysis Tool for Environmental Risk to be used for flood control and other water resource management decision-making, a project led by the Boise River Flood Control District #10 and the University of Idaho, Center for Ecohydraulics Research.

As you and your team presented to Reclamation staff on June 18, 2019, this project proposes to collect high resolution bathymetric and terrestrial Light Detection and Ranging data, to develop a two-dimensional hydraulic model for one or more segments of the lower Boise River, and to make the resulting data and model publicly available for use by the broader water management community. This project is a positive step forward in developing a valuable, robust decision support tool applicable to a wide range of water management challenges.

Reclamation supports this project and may have opportunities to assist both locally and at the Bureau level. Reclamation's Science and Technology Program is a competitive, merit-based applied research and development program. The program focuses on innovative solutions for water and power challenges and has contributed many of the tools and capabilities Reclamation and western water managers use today. I encourage you to consider applying to partner with Reclamation through its Science and Technology Program as you form other partnerships for this project.

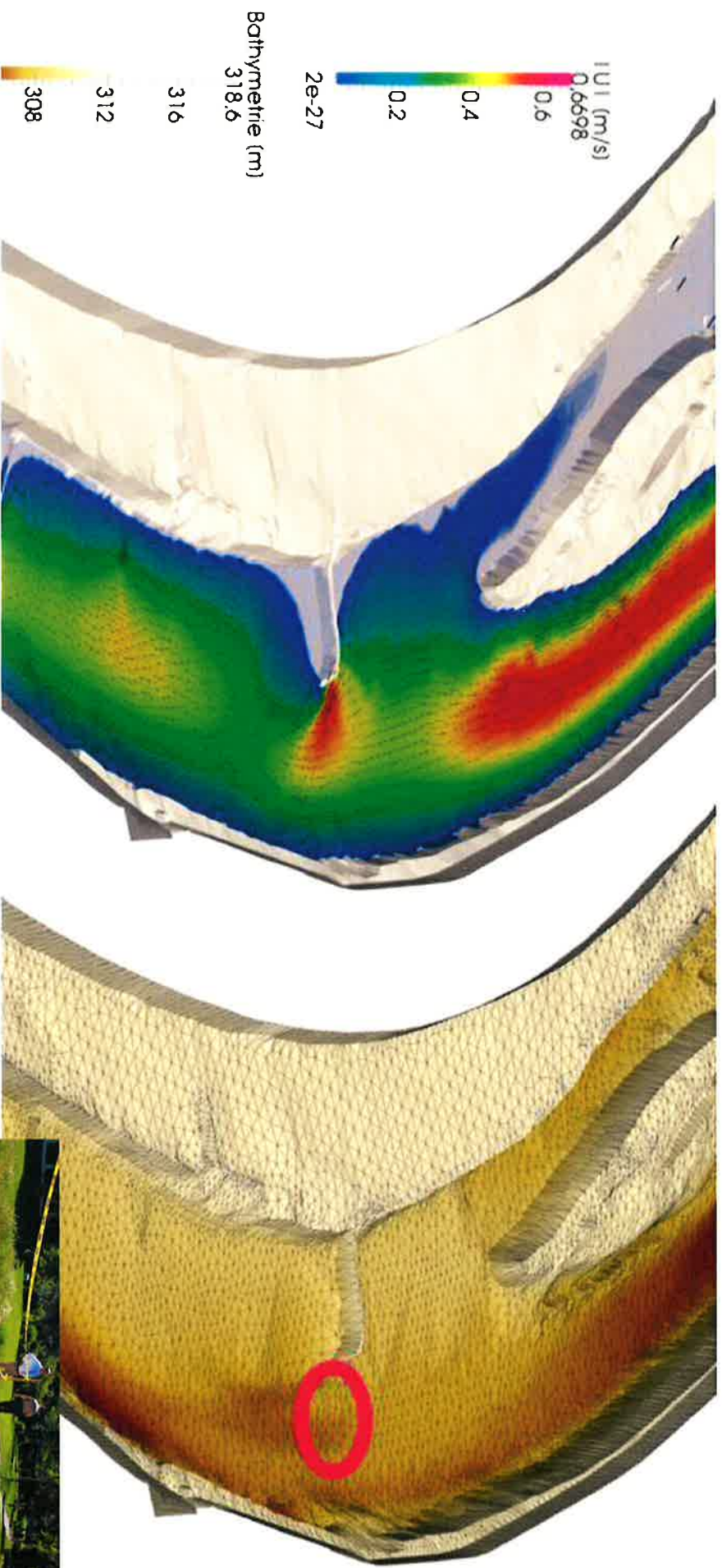
Sincerely,

Roland K. Springer  
Area Manager

cc: See next page.



cc: Mr. Dan Steenson  
Attorney at Law  
Sawtooth Law Offices  
P.O. Box 7985  
Boise, ID 83707  
[dan@sawtoothlaw.com](mailto:dan@sawtoothlaw.com)



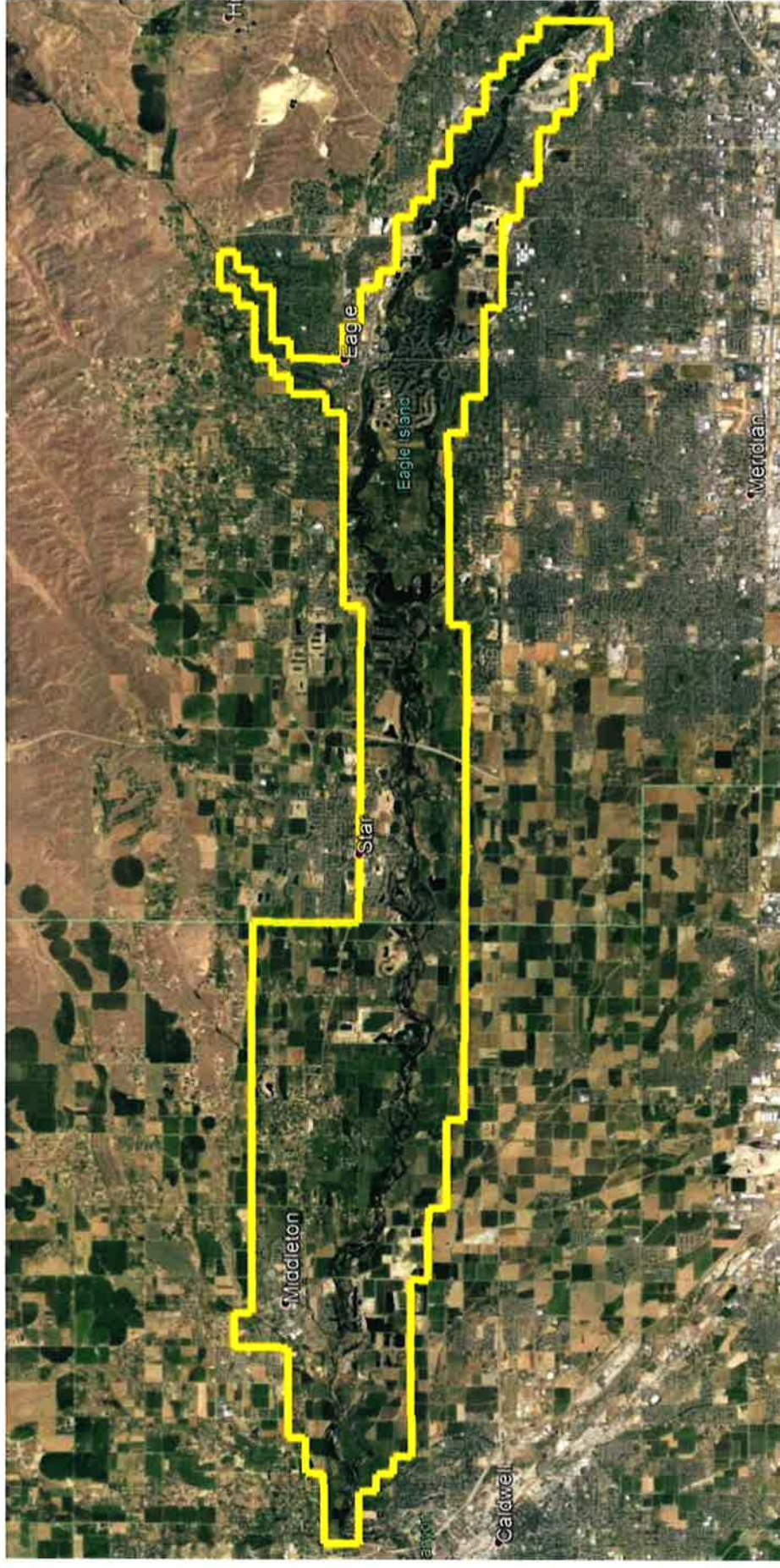
# LiDAR and 2-D Model Tools

A new approach to managing the Boise River





# FCD10 – District Facts



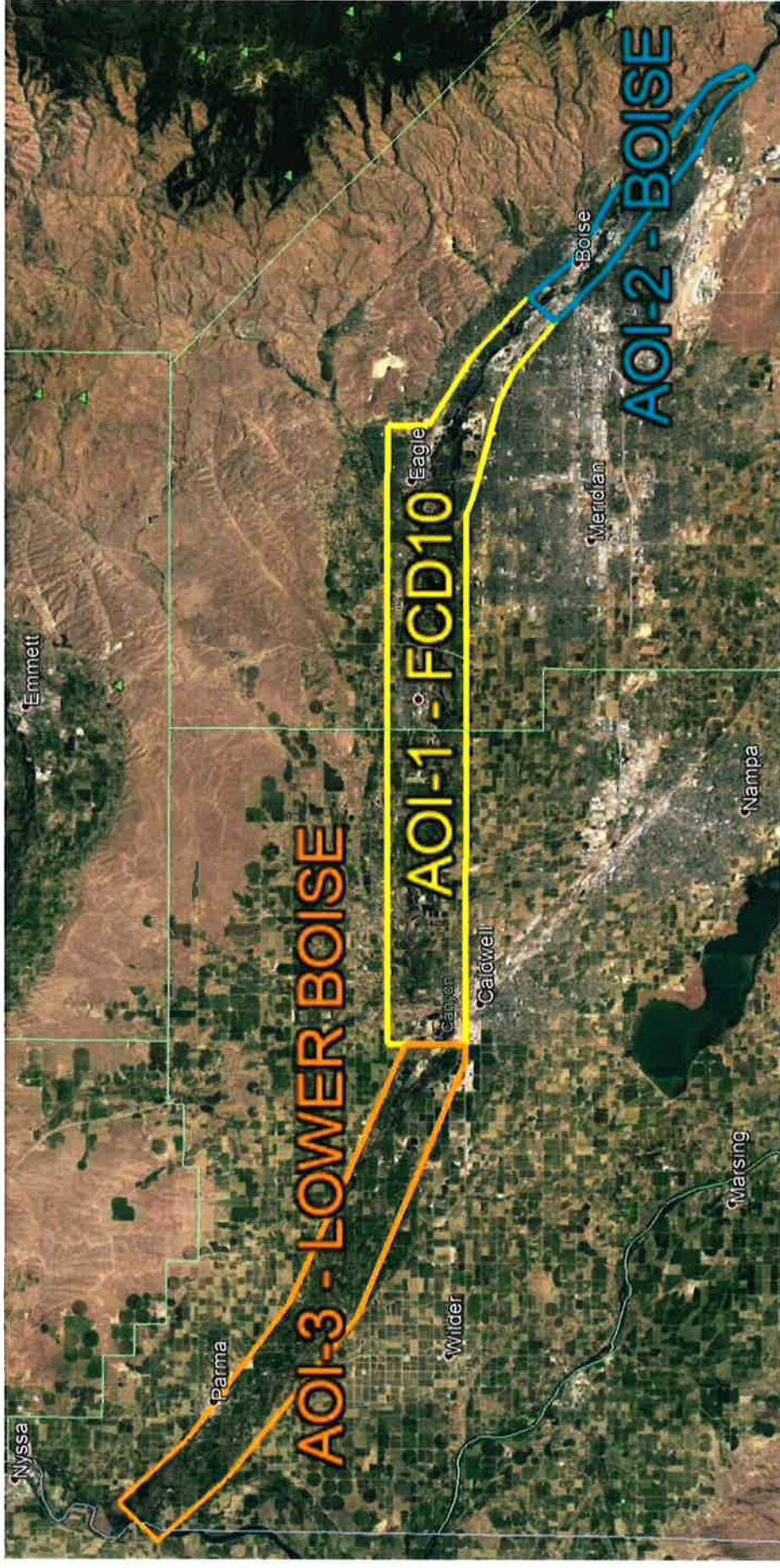


# FCD10 – Area of Interest 1

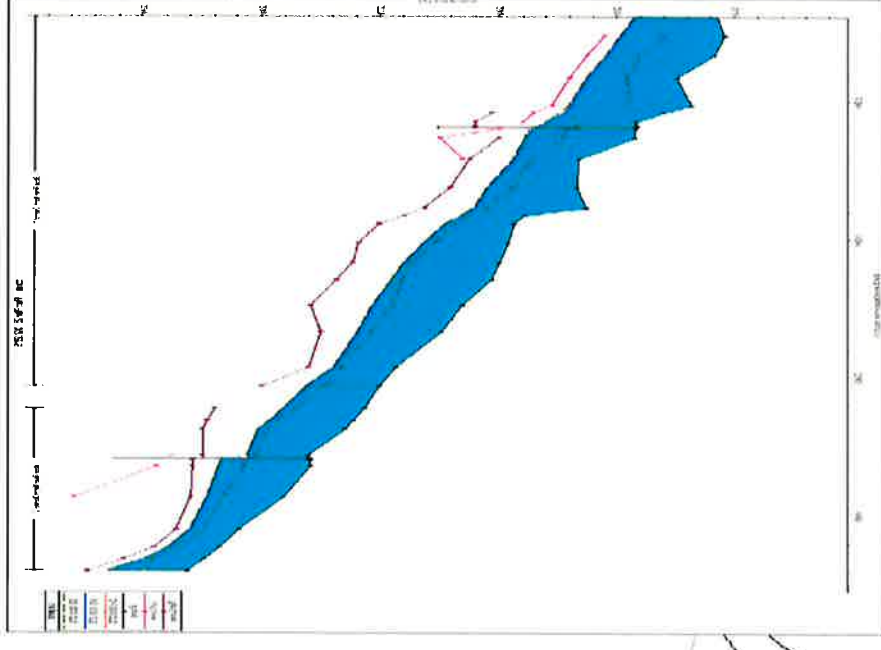
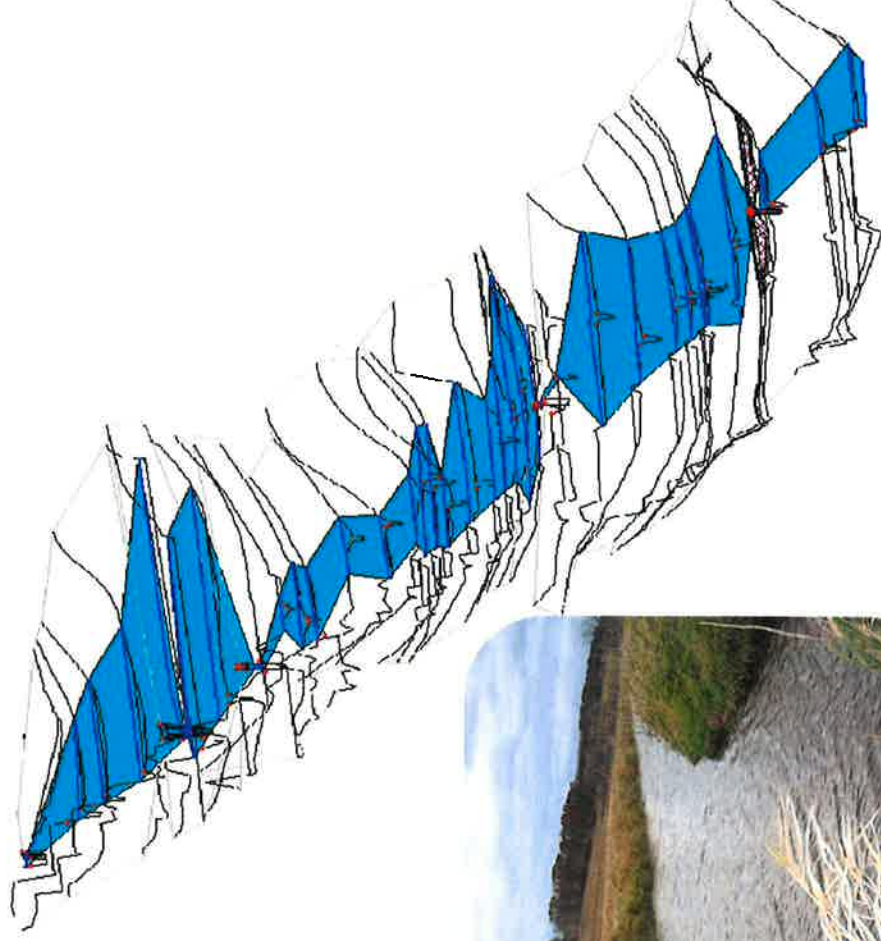




# FCD10 – Additional Areas of Interest



# Current FEMA Flood Model Approach -- 1-D





# 1-D Modeling: Ideal for a Simple River or a Canal



# What Happens with a Real River?



Boise River at Midland Road – capture hydraulic processes in a complex river form



# What Happens with a Real River?



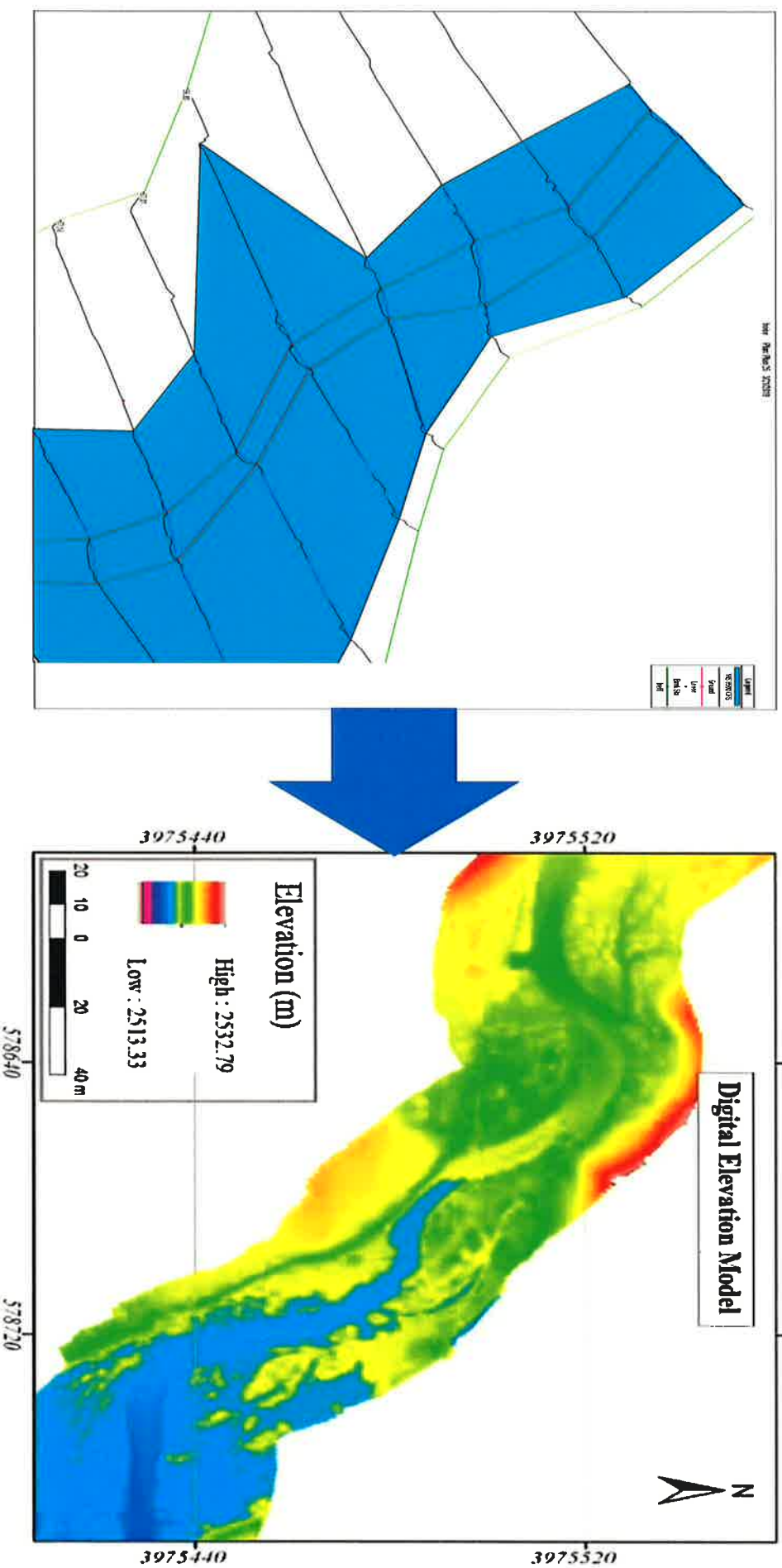
Boise River at Midland Road – capture hydraulic processes in a complex river form

# What Happens with a Real River?



Boise River at Midland Road – capture hydraulic processes in a complex river form

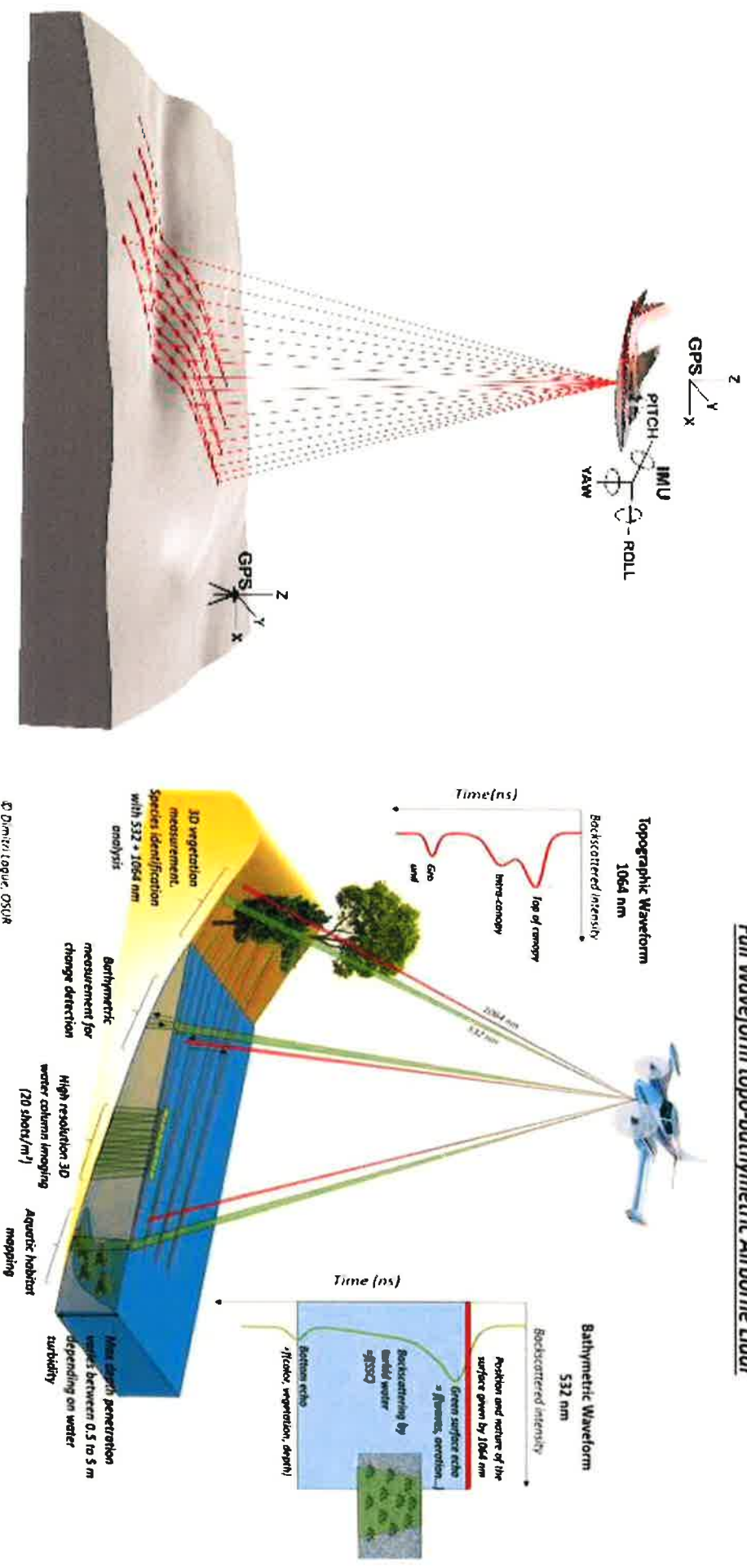
# Quantum Leap – 1-D to 2-D Modeling





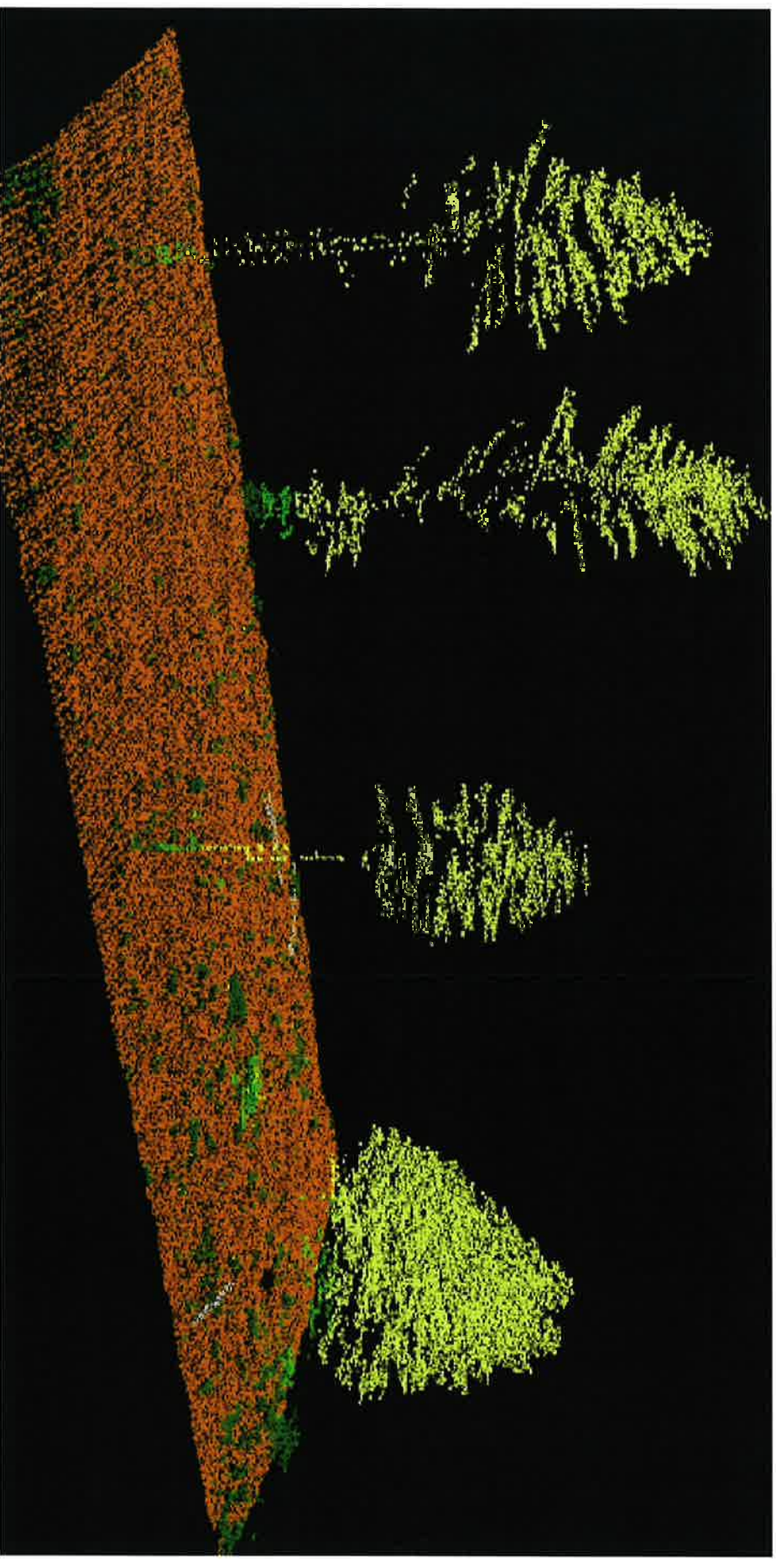
# New Technology – Bathymetric (Green) LiDAR

## Full Waveform topo-bathymetric Airborne Lidar

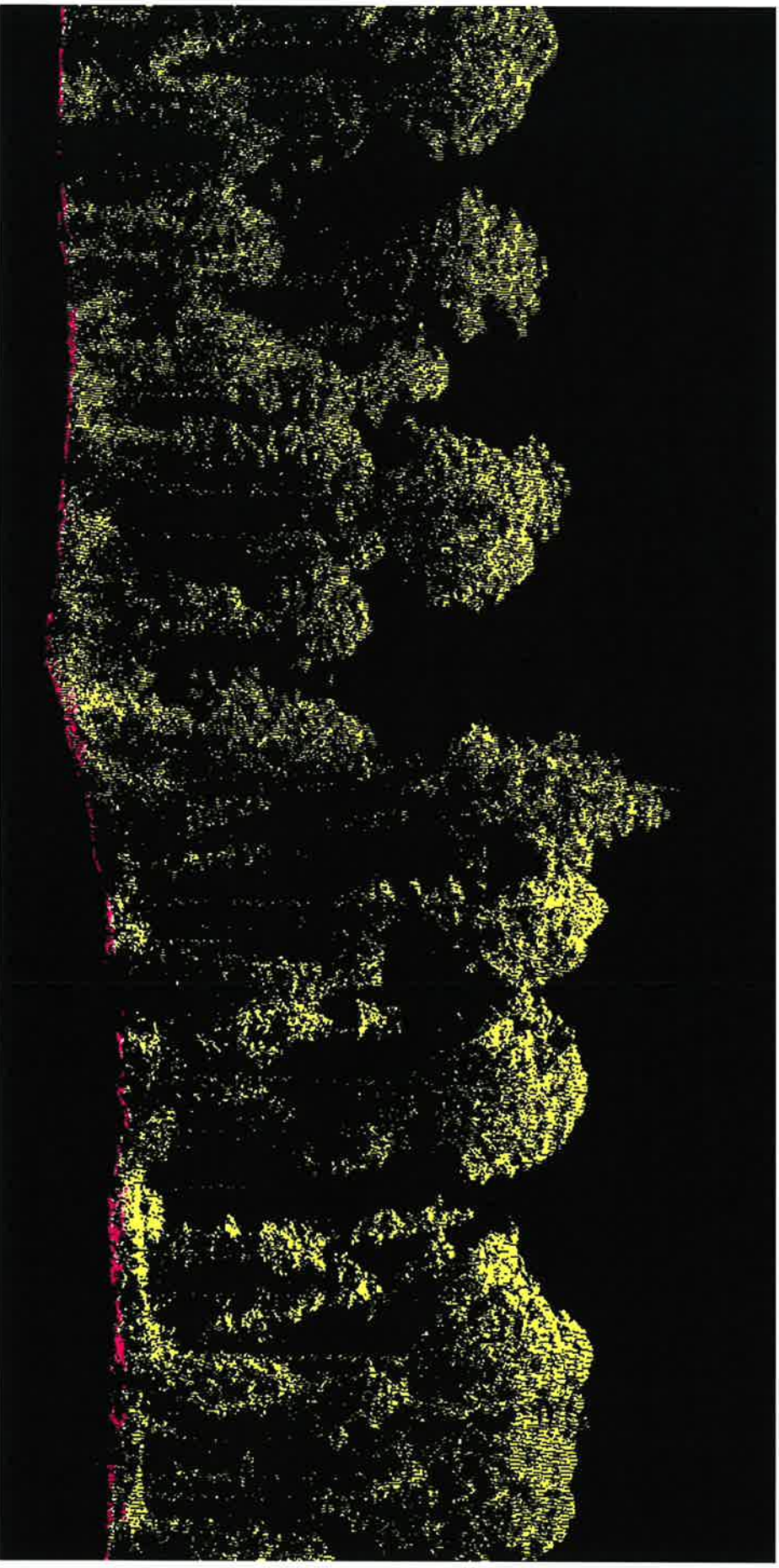




# Technology Provides Details

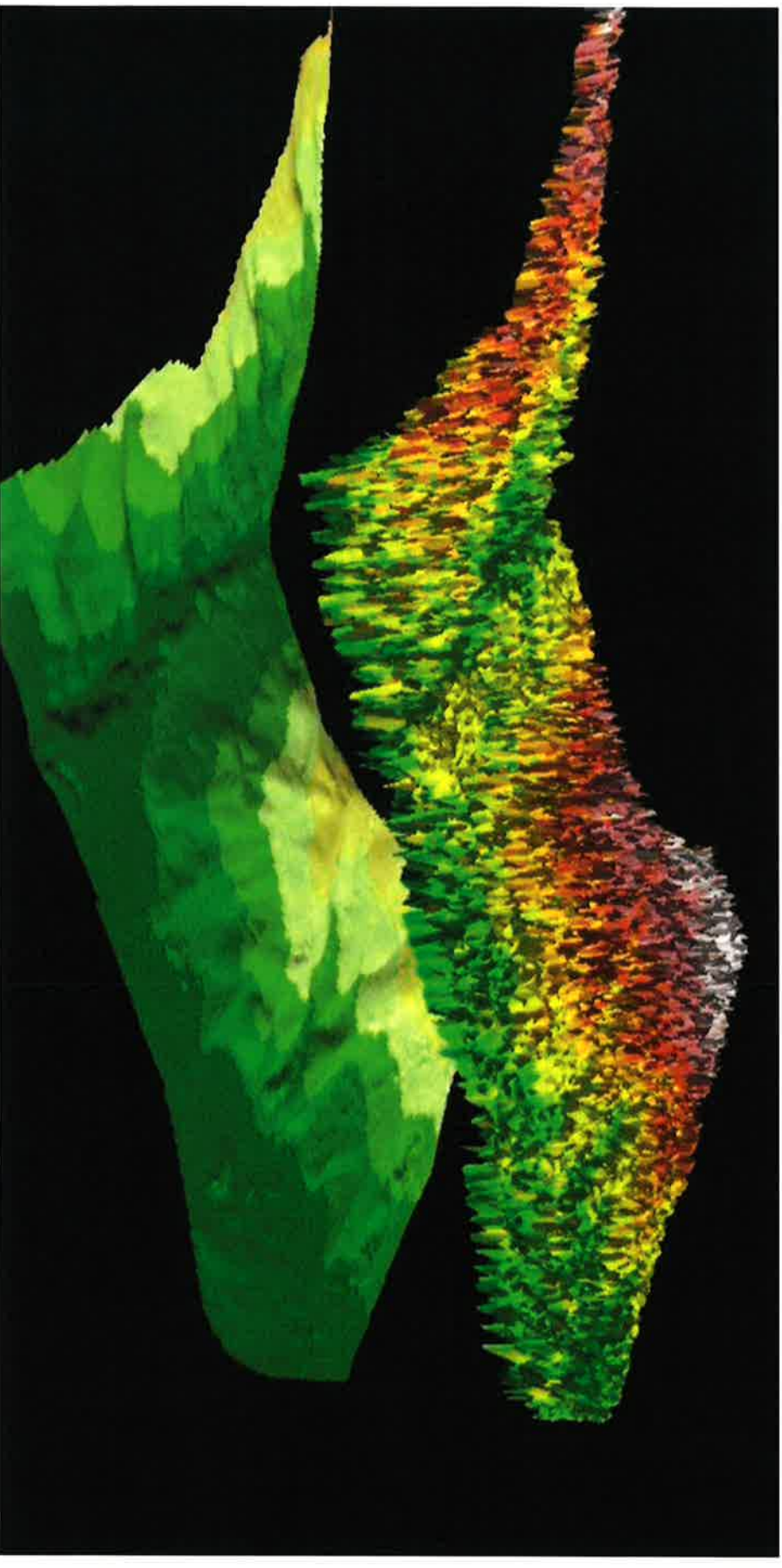


# Airplane: From Tree to Forest Scale



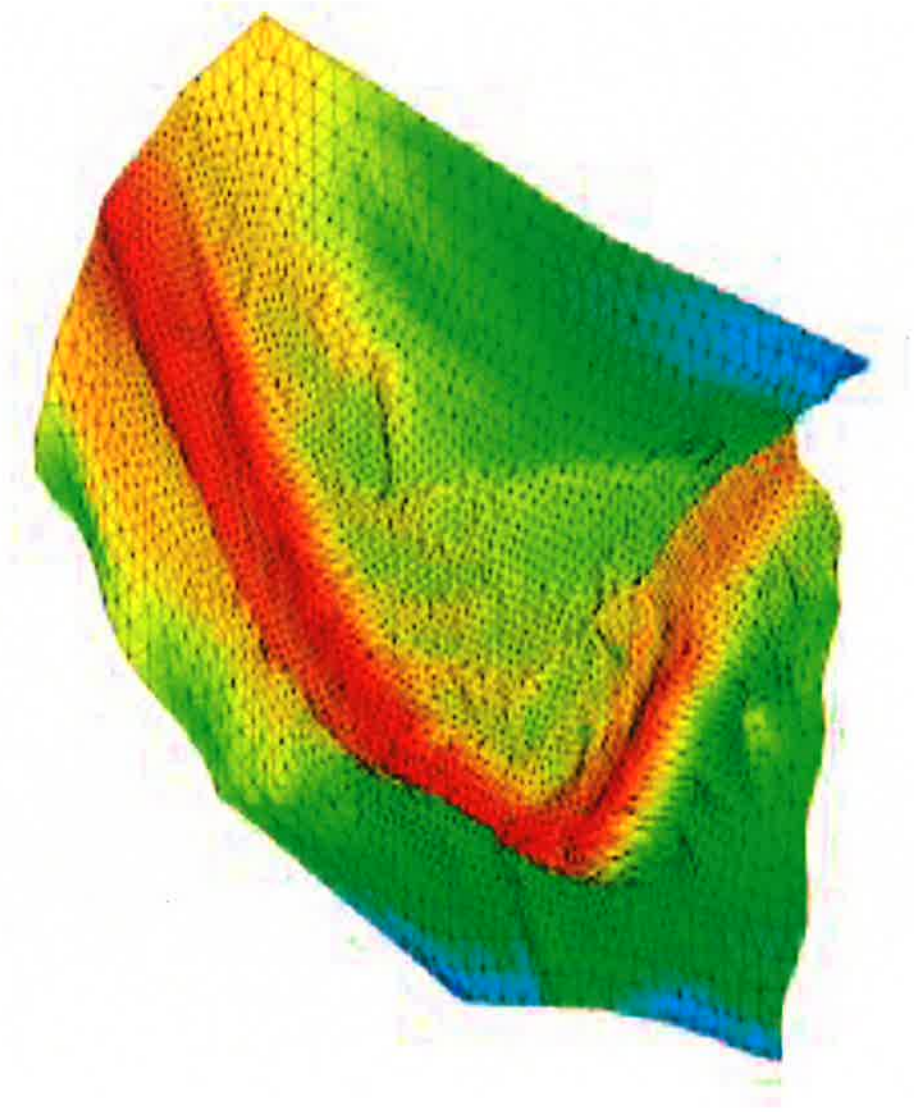


# Scrape Off the Vegetation to Bare Earth



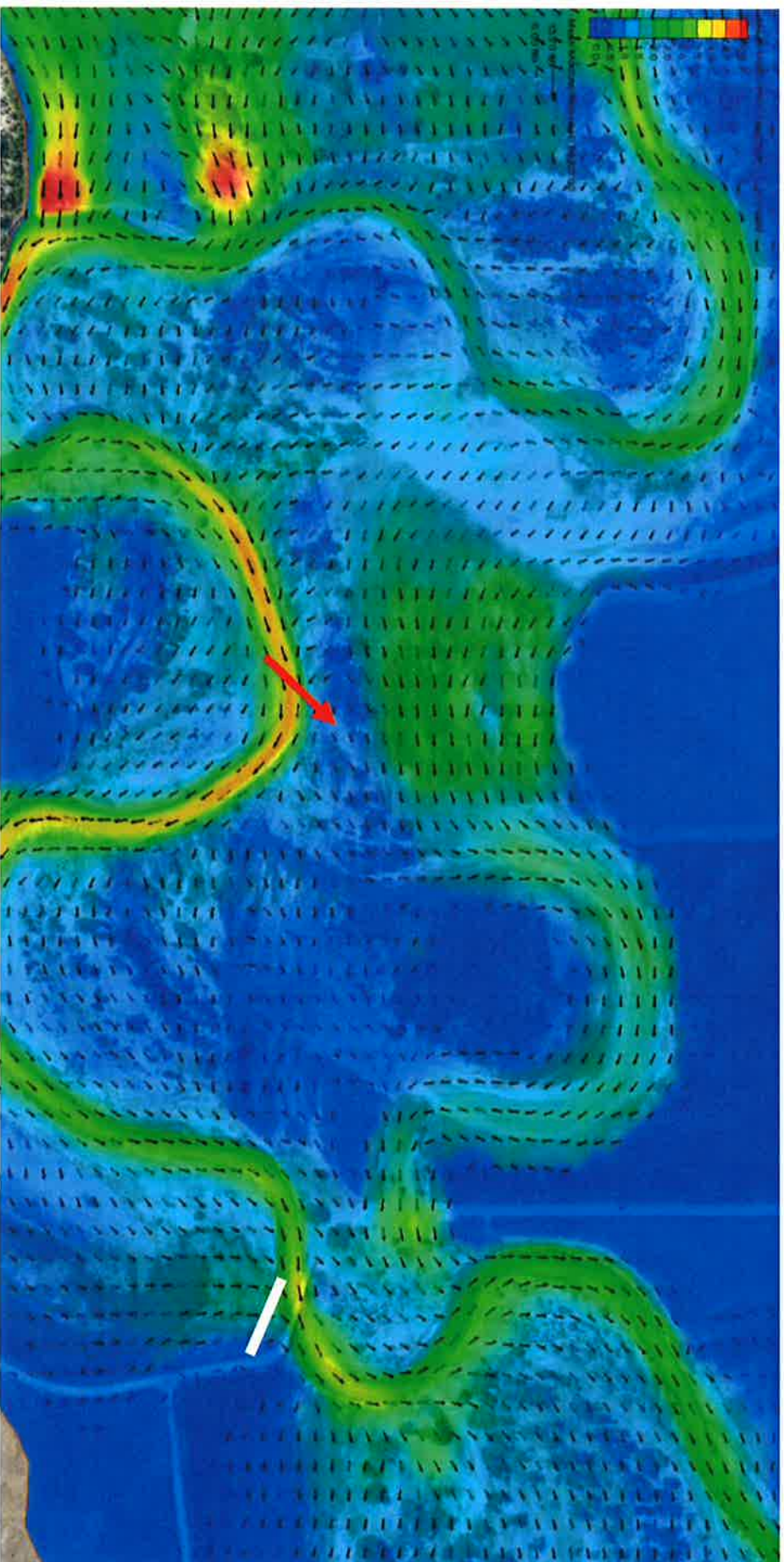
# Digital Elevation Model

1. Capture a surface
  2. Apply a numerical grid
  3. Flood the model
- Calculate volumetric changes from year to year





# Complex Hydraulics – Channel & Floodplain – 2-D



# High Flow - Preferential Flow Paths

- Flood management
- Emergency safety scenarios
- Geomorphic hazards
- Instream structures
- Native vegetation management





# Sediment Transport, Erosion, & Deposition



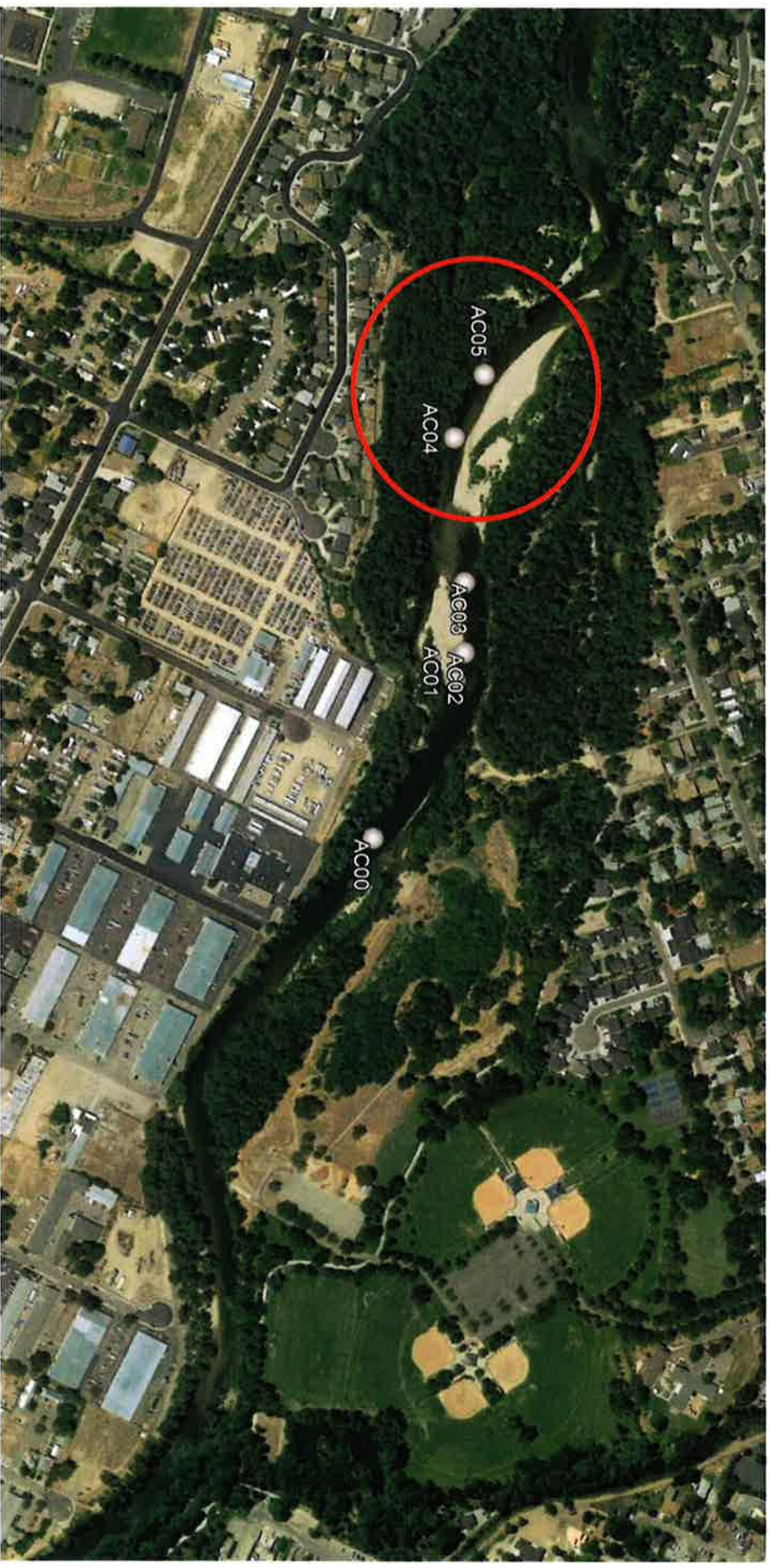
Identify bank erosion or bed scour risk

Spatially locate and quantify deposition zones



Assess flood elevations from gravel bar advancement

# Identifying Geomorphic Hotspots





# Hidden Sediment Source – One flood

2017 Outerbank Erosion = 35 ft, Bank loss = 9,000 yds<sup>3</sup>

900 Dump Trucks of Bank Sediment



# Hydraulics, Structures, & Habitat



Analysis of forces near structures

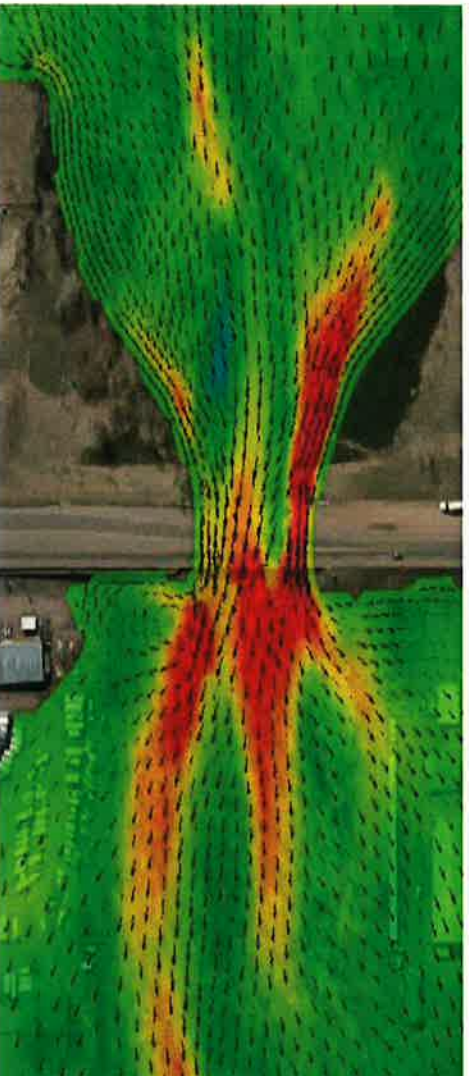
Water parks

Irrigation diversions

Bridge openings and

piers

Streambank stability structures



Sedimentation behind diversions

Aquatic habitat around structures

Quantify and improve fish habitat



# Native Riparian Vegetation Cottonwood & Willow



Average Year Seedling Recruitment



Wet Year Seedling Recruitment



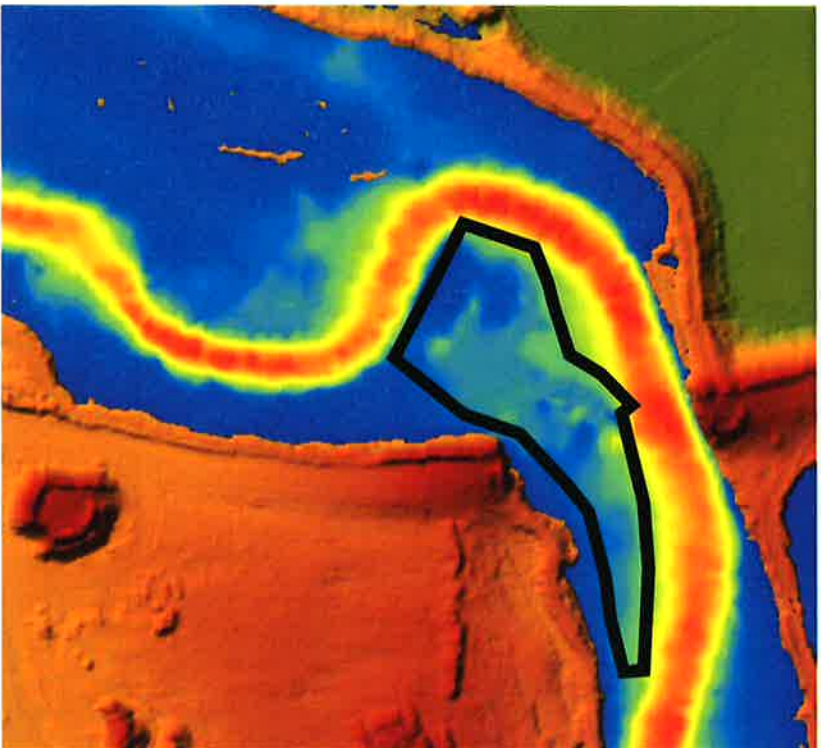
# Irrigation Flow – WQ and GW-SW Dynamics

- Groundwater-surface water (GW-SW) interactions
- Plan and manage recreational uses
- Identify and prioritize Water Quality (WQ) management areas
- Hydraulic mixing of drain plumes
- Instream temperature
- Aquatic habitat management





# Fine Sediment Transport & Associated Nutrients



Locate fine sediment deposition zones

Eddies

Flow divergence

Quantify areas of critical settling velocity



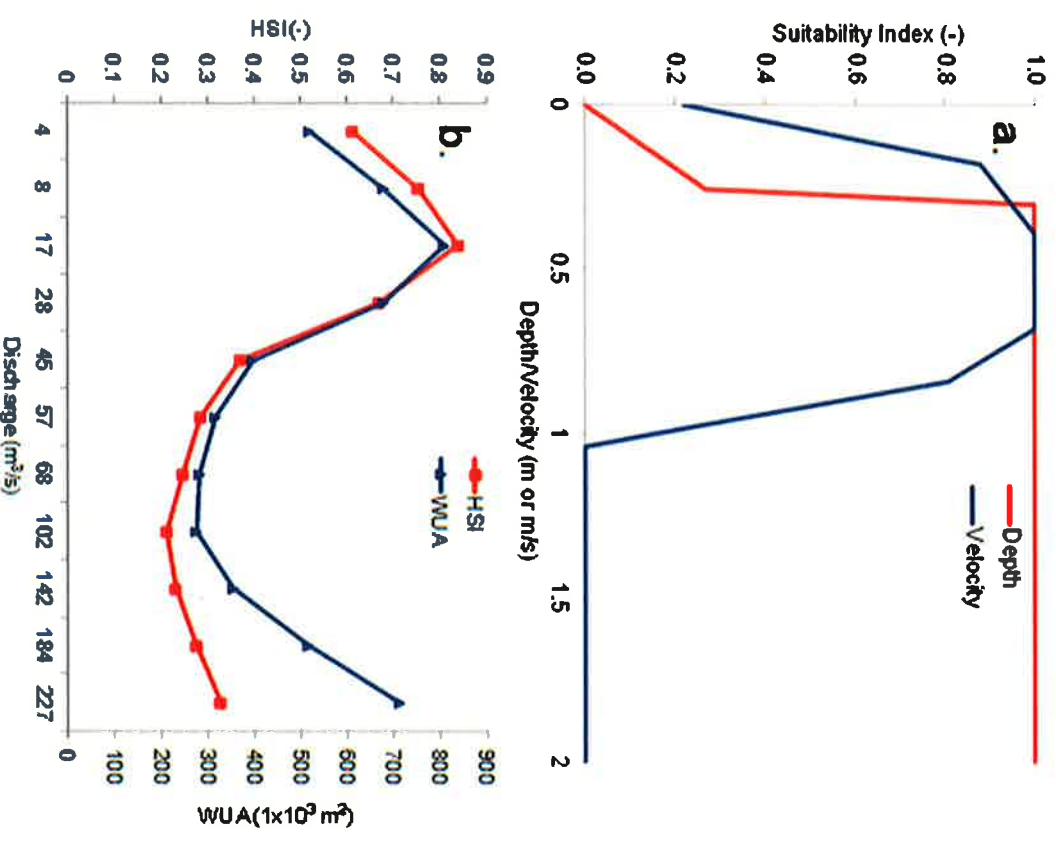
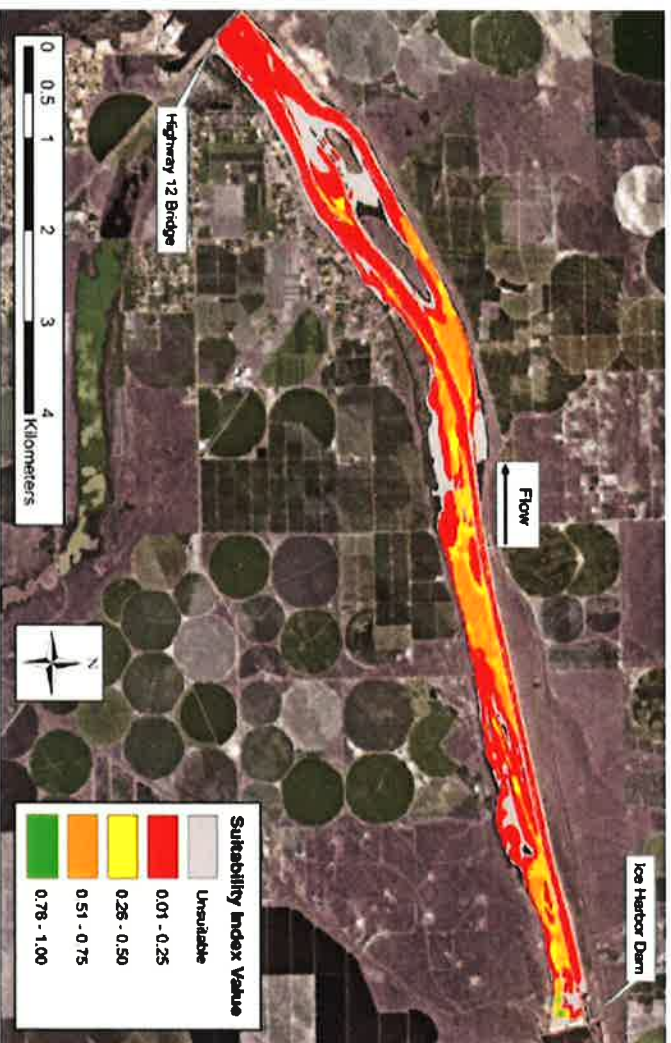
# Quantification of Periphyton Extent

- Identify shallow areas with upstream nutrient loads
- Calculate critical velocity for periphyton removal
- Prioritize remediation areas accordingly



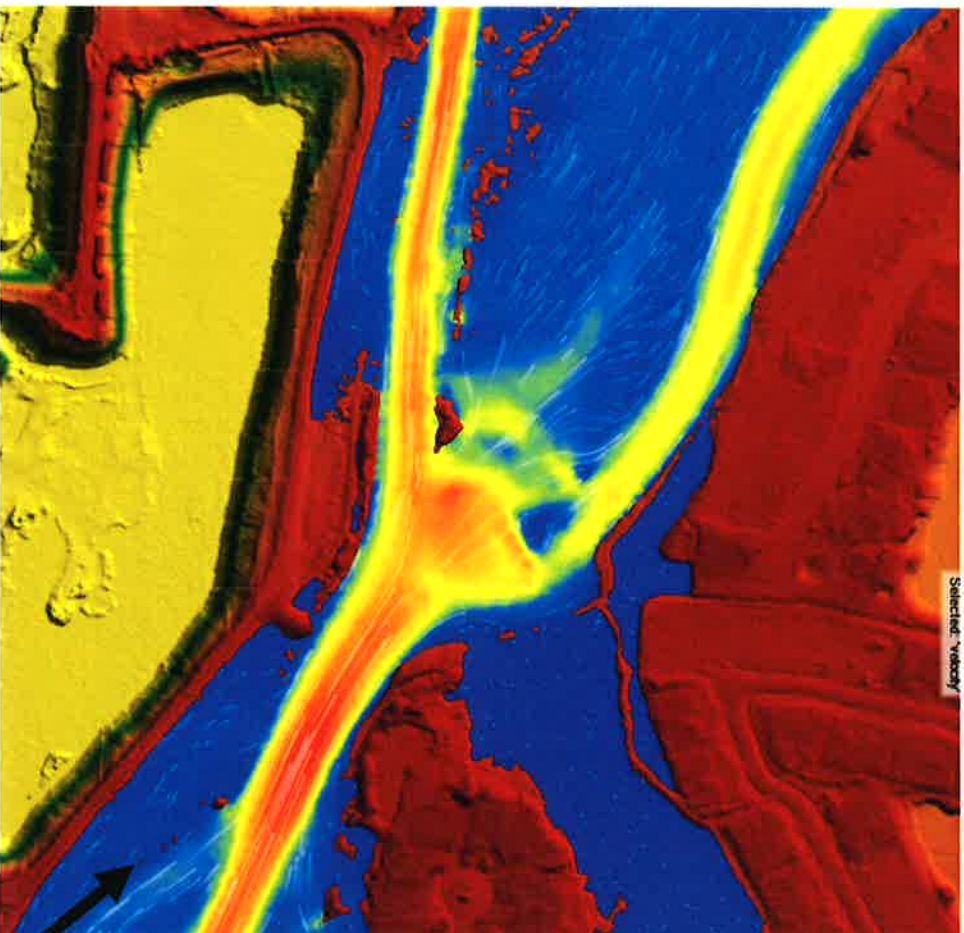
# Periphyton Habitat Model

- Quantify useable area and suitability at each flow
- Calibrate to available periphyton data





# Future Model “Build-Ons”



Aquatic habitat – fish, macroinverts

Evaluate water temperature

Assess TMDL requirements

Incorporate with aquatic habitat

Assess fate of tributary inputs

Nutrient and fine sediment

concentrations

Nutrient simulation modules (e.g.

CE-QUAL-W2)

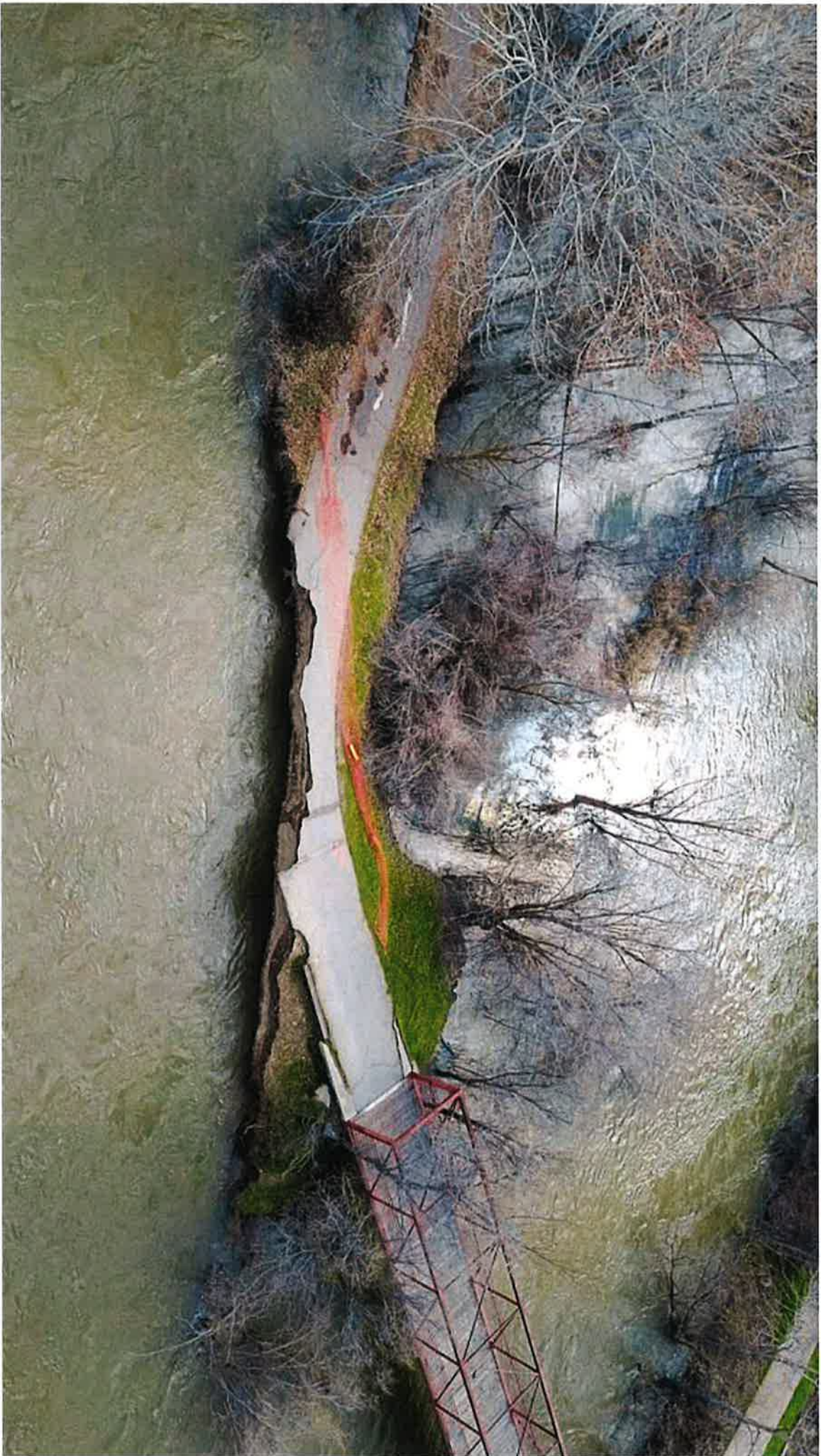
Predict geomorphic change

Morphodynamic predictions

Future areas of

deposition/erosion



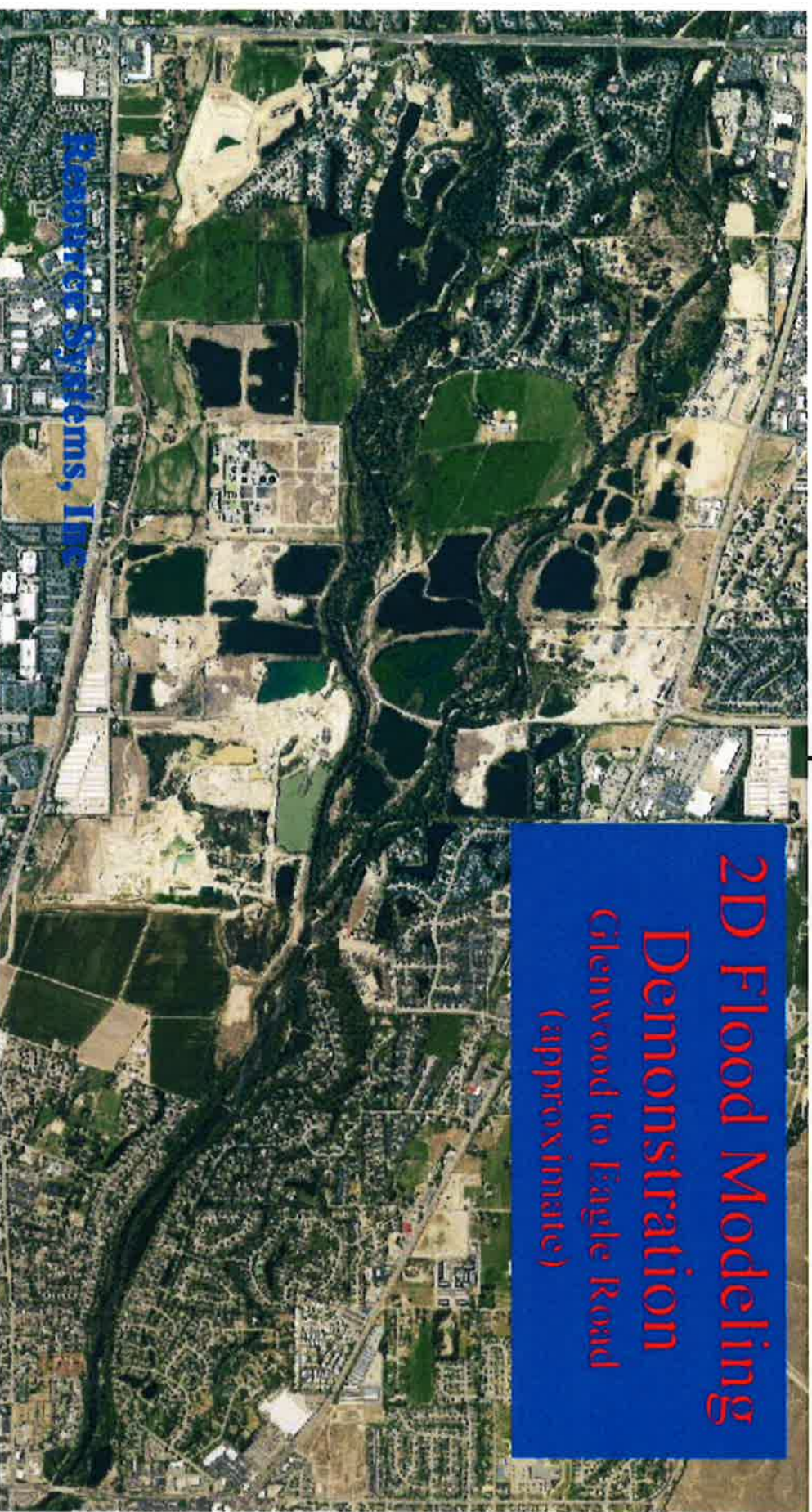


# BRMT – Boise River Management Tool

1. Underlying environmental data for model construction, calibration
2. Foundational hydraulic model for environmental analysis
3. Modules built from the hydraulic model
  1. Periphyton model
  2. Fine sediment-phosphorus model
  3. Solar gain and temperature model
  4. Fish habitat model
4. Archived versions for historic analysis

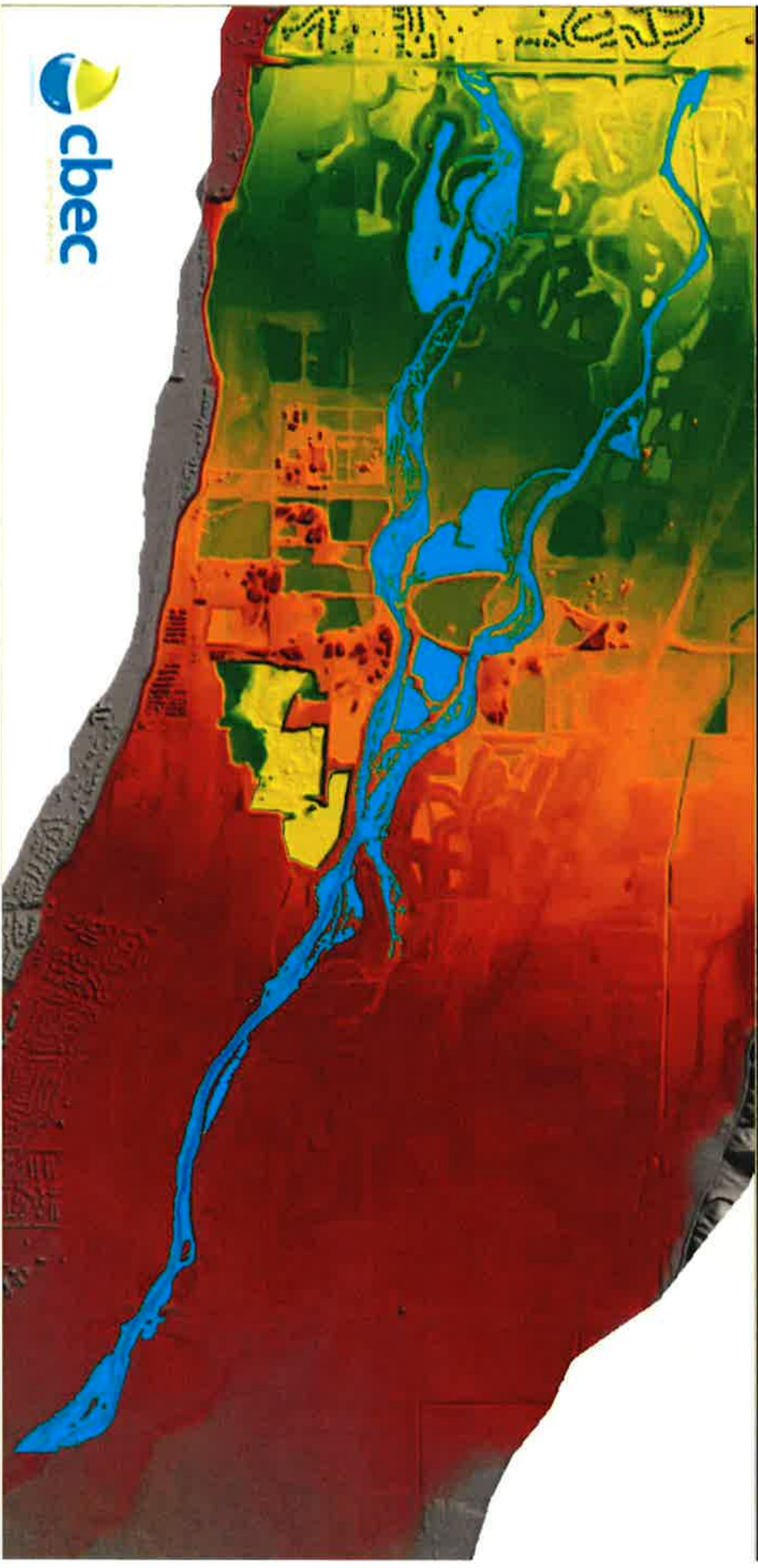


# FCD10 2-D Model Example

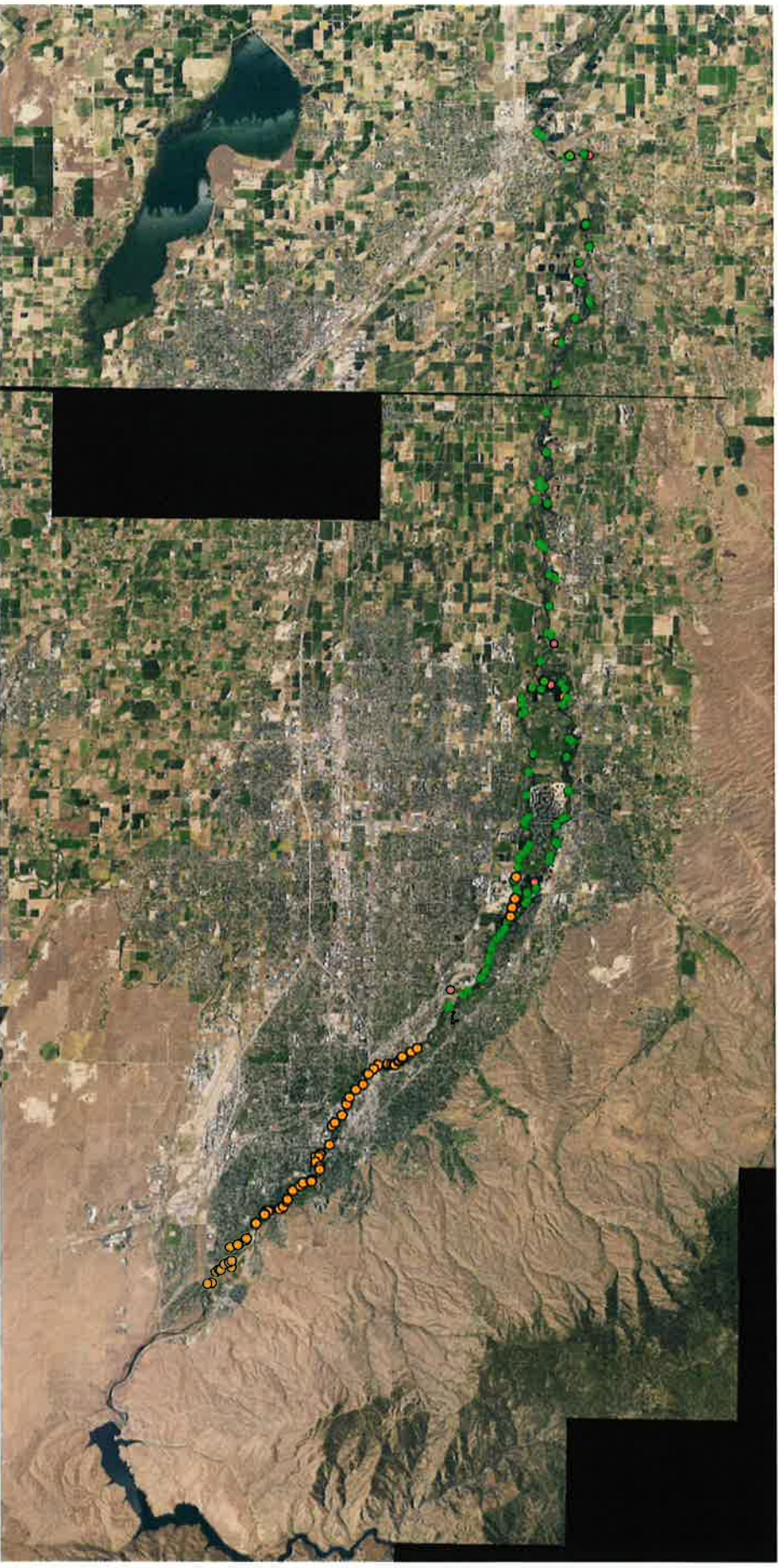




# FCD10 2-D Model Example



# Calibration Using Existing Water Surface Elevations





# Challenges for a Public Access Area





## THE BOARD OF BLAINE COUNTY COMMISSIONERS

206 FIRST AVENUE SOUTH, SUITE 300

HAILEY, IDAHO 83333

PHONE: (208) 788-5500 FAX: (208) 788-5569

[www.blainecounty.org](http://www.blainecounty.org) [bcc@co.blaine.id.us](mailto:bcc@co.blaine.id.us)

Jacob Greenberg, Chairman \* Angenie McCleary, Vice-Chairman \* Dick Fosbury, Commissioner

June 18, 2019

Idaho Water Resources Board  
Attn: Mr. Rick Collingwood  
PO Box 83720  
Boise, ID 83720

Re: Idaho Water Resources Board Grant – Broadford Road Fisherman's Access Project

Dear Mr. Collingwood and Selection Committee:

Blaine County is requesting Idaho Water Resource Board (IWRB) grant funding for the Broadford Road Fisherman's Access Project. The total cost of the project is estimated to be \$263,498, and Blaine County is requesting \$100,000 in grant funding. Blaine County will provide a cash match of \$100,000 and \$10,000 for in-kind administrative costs. Flood Control District 9 has committed \$50,000 in match funds, and a local landowner has agreed to contribute \$3,498 in-kind with rocks and plants. The pledged match funding is \$163,498 or 62% of the total project cost.


The spring flooding of 2017 resulted in channel migration, severe bank erosion, and loss of critical habitat at many locations throughout the Big Wood River and its tributaries. The Broadford Road Fisherman's Access Project aims to repair and restore an area commonly referred to as the Fisherman's Access area located near a public road and bridge (Broadford Bridge). This area was severely damaged in 2017 and continues to have erosion issues to this day. Threats to the road and bridge include channel instabilities and potential avulsion, severe bank erosion, and a variable sediment transport regime. This road serves approximately 500 cars a day and provides important access for emergency response to area residents. Critical measures were taken during May 2017 to slow down further erosion and potential infrastructure loss, but Blaine County needs to complete permanent work to protect the road and bridge from further property loss.

We have enclosed the Idaho Water Resource Board grant application and supporting documents for your review. We appreciate your time and consideration of our application. If you have any questions, please contact Chris Corwin by phone at 208-788-5508 or email at [ccorwin@co.blaine.id.us](mailto:ccorwin@co.blaine.id.us).

Sincerely,

  
Jacob Greenberg  
Chairman

  
Angenie McCleary  
Vice-Chair

  
Dick Fosbury  
Commissioner

## APPLICATION FOR FLOOD MANAGEMENT GRANT

### II. General Information

A. Type of Organization: (Check box)

- ☐ Flood District  
☐ Municipality

☒ County

☐ Other

Blaine County

Organization Name

Chris Corwin, GIS Analyst/Disaster Services

Name and title of Contact Person

206 1st Avenue South

PO Box/Street Address

208-788-5508

Contact telephone number

Hailey, Blaine, Idaho, 83333

City, County, State, Zip Code

ccorwin@co.blaine.id.us

e-mail address

82-6000283

Tax Payer ID#

**Project Location/Legal Description:** The project is located within Blaine County and in the Big Wood River near the Boardford Road, North of the Boardford Bridge, just west of Bellevue, Idaho. The GPS coordinates of the project are N 43.46944 W 114.27110. The project area is in unincorporated Blaine County but there are rural residential structures in the neighborhood.

B. Is your organization registered with the Secretary of State's office? ☒ Yes ☐ No

C. Purpose and Name of Project for this Grant Application.

- ☒ Stream Channel Repair  
☒ Stream Channel Improvement  
☐ Flood Risk Reduction  
☐ Flood Prevention  
☐ Other \_\_\_\_\_

**Name of Project:** Boardford Road Fisherman's Access

### III. Water Project/Activity

A. Source of Water and Name:

☒ Surface: Big Wood River

☐ Reservoir



☐ Other

**B. Describe the Flood management Project/Activity – What is the primary purpose of this grant application?**

The restoration strategy for the Fisherman's Access area is to address the channel instabilities, severe bank erosion, and unstable sediment transport. It will repair damages from the 2017 flood. Project restoration and enhancement designs were developed using an iterative process that identified stable channel morphology based upon existing hydrologic regime, sediment inputs, and site conditions. A "Natural Channel Design" approach was applied to define appropriate morphology for the project area reach using analogy, empirical, and analytical design techniques. Throughout the design development process, constraints that could potentially inhibit restoration were identified, considered, and incorporated into project designs, where needed. Examples of constraints considered for the project area include flood risk, infrastructure (e.g. existing roads and downstream bridge), and land use conflicts. Active restoration efforts incorporate grading and earthwork to establish the desired channel form (alignment and cross sectional geometry). Treatments include channel excavation, floodplain creation, bank toe hardening, and the installation of wood structures. Precise wood structure configurations, or designed log jams, are presented in order to establish specific components of channel form and function.

**C. Does this project/activity address multiple objectives? If so explain.**

Project objectives were identified based upon existing site conditions, previous geomorphic assessment, land use constraints, and fluvial system potential. Project objectives include the following:

1. Protect Broadford Road and Broadford Bridge abutments from being undermined;
2. Repair damages to floodplain due to 2017 flooding;
3. Identify the stable functional channel form appropriate under the current (anthropogenically altered) hydrologic regime;
4. Restore sufficient capacity to transport the sediment load while providing opportunities for storage of surplus sediment;
5. Increase lateral channel stability;
6. Reduce aggradation, or severe localized deposition;
7. Reduce channel enlargement potential;
8. Reduce sediment input to the watershed resulting from bank erosion;
9. Implement fluvial enhancement treatments that reduce, or leave unaltered, the flood hazard proximate to development;
10. Identify self-maintaining treatments that maximize the ecological and recreational values of the Big Wood River.

**D. Will this flood management project/activity be implemented in a single year or phased over multiple years?**

☒ 1-year

☐ Multiple-years (Phased)

**E. Project start and completion date:**

September 14, 2019

Funding Awarded

September – October 2019

Blaine County Stream Alteration Permitting

October 29, 2019

Construction Commence

November – February

Construction

March

Project Closeout and Inspection

**Project detailed cost estimate, including all labor and materials:**

See Attached Detailed Budget

**F. Has your organization performed stream channel or stream bank repair and/or improvement projects in the past year?**

Yes. In the Fall of 2018, Blaine County hired Biota (the same firm who has designed this project) to complete the Heagle Park Side Channel Activation project that was awarded funds from the Idaho Water Resource Board to complete. Biota completed the work in November of 2018.

**G. Provide the required regulatory approval and permit documents for this project.**

The project would require authorization under Section 404 of the Clean Water Act and the State's Stream Channel Protection Act. This project already has an approved permit from Idaho Department of Water Resources and the U.S. Army Corps of Engineers. The attached project has changed slightly and will require a change request to these permits. This would be accomplished through submittal of a Joint Application for Permits that would be delivered to the Army Corps of Engineers and ID Department of Water Resources. The Corps would likely authorize this work under Nationwide Permits 13, 27 and/or 45. IDWR would likely authorize this work through issuance of a Stream Alteration Permit. The project would also require local authorization through a Blaine County Stream Alteration Permit. The project will take place on county land and private land. We have received letters of support from the land-owners for the project to occur on their property. Since the project is located inside of the mapped floodway, a No-Rise Certification is required. If base flood elevations (BFEs) are increased at all, a Conditional Letter of Map Revision (CLOMR) may be required to be submitted to and approved by FEMA prior to construction and a Letter of Map Revision (LOMR) would be required after construction is completed in order to update the Flood Insurance Rate Maps (FIRM).

**IV. Financial Information:**

**F. Has your organization performed stream channel or stream bank repair and/or improvement projects in the past year?**

Yes. In the Fall of 2018, Blaine County hired Biota (the same firm who has designed this project) to complete the Heagle Park Side Channel Activation project that was awarded funds from the Idaho Water Resource Board to complete. Biota completed the work in November of 2018.

**G. Provide the required regulatory approval and permit documents for this project.**

The project would require authorization under Section 404 of the Clean Water Act and the State's Stream Channel Protection Act. This project already has an approved permit from Idaho Department of Water Resources and the U.S. Army Corps of Engineers. The attached project has changed slightly and will require a change request to these permits. This would be accomplished through submittal of a Joint Application for Permits that would be delivered to the Army Corps of Engineers and ID Department of Water Resources. The Corps would likely authorize this work under Nationwide Permits 13, 27 and/or 45. IDWR would likely authorize this work through issuance of a Stream Alteration Permit. The project would also require local authorization through a Blaine County Stream Alteration Permit. The project will take place on county land and private land. We have received letters of support from the land-owners for the project to occur on their property. Since the project is located inside of the mapped floodway, a No-Rise Certification is required. If base flood elevations (BFEs) are increased at all, a Conditional Letter of Map Revision (CLOMR) may be required to be submitted to and approved by FEMA prior to construction and a Letter of Map Revision (LOMR) would be required after construction is completed to update the Flood Insurance Rate Maps (FIRM).

**IV. Financial Information:**

**A. Does your organization have a regular assessment for the reserve or special needs fund?**

☒ Yes ☐ No

**B. Does your organization have prior experience in working with the Idaho Water Resource Board?**

☒ Yes ☐ No

**C. What other sources of funding have been explored to fund the project? (e.g. U.S. Army Corps of Engineers, NRCS, FEMA, Banks, Local Government, etc.)**

For this project, we have applied for funds from the FEMA Hazard Mitigation Grant Program.

Amount of funds requested: \$100,000.00

By signing this document, you verify that all information provided is correct and the document is filled out to the best of your ability.



Authorized Signature

Jacob Greenberg, Chairman

Date

6.18.19

ATTEST

JoLynn Drage  
Blaine County Clerk



## **Broadford Road Fisherman's Access Project Grant Document**

### **Purpose:**

The Broadford Road Fisherman's Access Project aims to repair and restore an area commonly referred to as the Fisherman's Access area near a public road. Threats to the road currently include channel instabilities and potential avulsion, severe bank erosion, and a variable sediment transport regime. Project cost is estimated to be \$263,498 of which Blaine County is requesting \$100,000 from the Idaho Water Resource Board. The project would accomplish the primary objective as stated above through identifying a stable and functional channel form appropriate under the current (anthropogenically altered) hydrologic regime; restore sufficient capacity to transport sediment load while providing opportunities for storage of surplus sediment; increase lateral channel stability; reduce aggradation, or severe localized deposition; reduce channel enlargement potential; reduce sediment input to the watershed resulting from bank erosion; implement fluvial enhancement treatments that reduce, or leave unaltered, the flood hazard proximate to development and identify self-maintaining treatments that maximize the ecological and recreational values of the Big Wood River.

During the winter of 2016-2017, the Big Wood River watershed received record amounts of snow. In the spring of 2017, the runoff from the snow melt caused extreme changes in the course and profile of the Big Wood River floodplain. A location referred to locally as "The Fisherman's Access" was completely lost and further erosion threatened Broadford Road at that location. The Blaine County Road and Bridge Department, with guidance from the Blaine County Engineer, completed emergency work to slow the erosion by placing rip rap along the eroded and unstable bank. According to State and County Code, follow-up work is required to complete a permanent restoration project at that location. The value of the road that will be protected was determined to be \$500,000 by the Blaine County Road and Bridge Manager. The road is an important corridor for the neighborhood with an estimated 500 vehicles traveling the road each day.

In the spring of 2018 and again in 2019, with a near normal snowpack and an approximately average runoff, severe erosion started to occur just upstream from the location where the emergency work was completed the year before. Due to this change in the flow of the Big Wood River, there is an urgency to complete this project by next runoff in order to protect the road and from having more erosion occur.

The project would require authorization under Section 404 of the Clean Water Act and the State's Stream Channel Protection Act. This project already has an approved permit from Idaho Department of Water Resources and the U.S. Army Corps of Engineers. The attached project has changed slightly and will require a change request to these permits. This would be accomplished through submittal of a Joint Application for Permits that would be delivered to the Army Corps of Engineers and IDWR Department of Water Resources. The Corps would likely authorize this work under Nationwide Permits 13, 27 and/or 45. IDWR would likely authorize this work through issuance of a Stream Alteration Permit. The project would also require local authorization through a Blaine County Stream Alteration Permit. The project will take place on county land and private land. We have received letters of support from the land-owners for the project to occur on their property. Since the project is located inside of the mapped floodway, a No-Rise Certification is required. If base flood elevations (BFEs) are increased at all, a Conditional Letter of Map Revision (CLOMR) may be required to be

submitted to and approved by FEMA prior to construction and a Letter of Map Revision (LOMR) would be required after construction is completed in order to update the Flood Insurance Rate Maps (FIRM).

#### **Project location/ legal description**

The project is located within Blaine County and in the Big Wood River. Blaine County owns a parcel of land where some of the work will be completed but work will also be done on three adjacent parcels that are privately owned. Blaine County will have to obtain a right of way agreement with the land owner. We have included letters of support of the land owners. The GPS coordinates of the project are N 43.46944 W 114.27110. The project area is in unincorporated Blaine County but there are rural residential structures in the neighborhood.

#### **Previous Projects and Studies**

Attached to this application are two recent studies that have been completed within the Big Wood River. The first was a Geomorphic Study of the Big Wood River in 2014. Also in 2018, Biota completed the Big Wood River Restoration Project, Broadford Road Bridge Area in February 2018. This design report created a project that would restore the Bigwood River from Star Bridge to the Broadford Bridge.

#### **Project Sponsor**

Blaine County is a county government in the state of Idaho. In 1895, Blaine County was created by the Idaho State legislature by combining Alturas and Logan Counties. It was a large county consisting of five other present-day counties, Lincoln, Gooding, Minidoka, Jerome and Camas. Blaine County's current boundaries were established on February 8, 1917 as described in Idaho Code 31-109. Blaine County was formed under The Idaho Constitution – Article XVIII and Idaho Statutes Title 31 contains Idaho Code pertaining to counties.

Prospectors entered the Wood River area soon after the beginning of the 1862 Boise Basin mining boom. The County's first permanent settlers were farmers who arrived in 1879. The 1880 Wood River mining boom brought the first large population influx, including a significant number of Irish, Welsh, German and Chinese immigrants. Also starting in 1880, was the feeding and shipping of sheep. By 1900, more than 2 million sheep had been raised or trailed through the Wood River Valley. With the construction of Sun Valley Resort in 1936, Blaine County experienced a second boom. Averell Harriman, Chairman of the Board of the Union Pacific Railroad, conceived the idea of establishing, near Ketchum, a first-class resort for skiers, the first in the United States. Blaine County's topography, geographic location and seasonal variation in climate create a unique and varied natural environment, ranging from the scenic, high alpine country in the north to the desolate lava plains and high-desert mountains in the south. As a recreational area, Blaine County is known throughout the world for the quality and beauty of its natural environment and recreational opportunities.

Blaine County's revenue source is from assessments. Blaine County is a local government that provides public services to the citizens of Blaine County, Idaho. Blaine County has a three person county commissioner's board and a county administrator. Blaine County has approximately 20 different departments and 166 employees. The departments include: Administrative Services, Assessors Office, Commissioners Office, Coroner, County Services, County, Emergency Communications, DMV, Elections, Facilities, GIS, Information Technology, Land Use and Building Services, Probation, Prosecuting Attorneys, Clerk/Recorders, Recycling, Road & Bridge, Sheriff, Treasurer and Weed Department. Blaine

County has an official County Code that was last updated by ordinance 2018-03, passed February 13, 2018. In the county code under Chapter 7 is the county commissioner bylaws. Given the size of Blaine County workforce and with their knowledge and experience, Blaine County has the organizational capacity to undertake and complete the project described in this application. Blaine County's project lead, Chris Corwin, has worked on several FEMA grants within the past 18 months, including the Emergency Management Program Grant, State Homeland Security Grant Program and the Hazard Mitigation Grant Program. Chris will work with other county staff including the County Engineer and Floodplain Manager to ensure the work being complete meets both engineering standards and floodplain regulations. The amount of time that will need to be dedicated to this project is difficult to determine at this time but Chris has the flexibility in his job responsibilities to be able to dedicate the required time to complete the project timely, efficiently and properly. The project will take place on a parcel of land that is owned by Blaine County and within their jurisdiction. As mentioned previously, some work will also be completed on the adjacent private land and appropriate approvals will be obtained. The local flood control district number 9 has provided a letter of support and has been working with the private land owner on a project just upstream of this project.

### **Project Description**

The restoration strategy for the Fisherman's Access area is to address the channel instabilities, severe bank erosion, and unstable sediment transport. Project restoration and enhancement designs were developed using an iterative process that identified stable channel morphology based upon existing hydrologic regime, sediment inputs, and site conditions. A "Natural Channel Design" approach was applied to define appropriate morphology for the project area reach using analogy, empirical, and analytical design techniques. Throughout the design development process, constraints that could potentially inhibit restoration were identified, considered, and incorporated into project designs, where needed. Examples of constraints considered for the project area include flood risk, infrastructure (e.g. existing roads and downstream bridge), and land use conflicts. Active restoration efforts incorporate grading and earthwork to establish the desired channel form (alignment and cross sectional geometry). Treatments include channel excavation, floodplain creation, bank toe hardening, and the installation of wood structures. Precise wood structure configurations, or designed log jams, are presented in order to establish specific components of channel form and function. Project objectives were identified based upon existing site conditions, previous geomorphic assessment, land use constraints, and fluvial system potential. Project objectives include the following: 1. Protect Broadford Road from being undermined; 2. Identify the stable functional channel form appropriate under the current (anthropogenically altered) hydrologic regime; 3. Restore sufficient capacity to transport the sediment load while providing opportunities for storage of surplus sediment; 4. Increase lateral channel stability; 5. Reduce aggradation, or severe localized deposition; 6. Reduce channel enlargement potential; 7. Reduce sediment input to the watershed resulting from bank erosion; 8. Implement fluvial enhancement treatments that reduce, or leave unaltered, the flood hazard proximate to development; 9. Identify self-maintaining treatments that maximize the ecological and recreational values of the Big Wood River.

The benefits of this project are protection of public infrastructure and repairing and restoring floodplain that was damaged in the 2017 flood. Broadford Road and bridge serves an average of 500 vehicles a day, with local residents and commuters. With implementation, Broadford Road and bridge will no longer be threatened by annual erosion near the road right of way and the vehicle traffic will not have to be detoured 5 miles or 15 minutes of travel. The river channel will be restored to its historic



course and relieve pressure off of the Broadford Levee and bridge just immediately downstream of the project site. Streambank erosion on adjacent upstream private property will be alleviated by the floodplain restoration or reconnection to the natural floodplain resulting in a functioning river system. Work on the private property will be done in conjunction with this project to develop a river-reach wide project that will benefit both public and private landowners.

Please see the attached concept plans in Appendix C for more details.

### **Cost Estimate**

A detailed cost estimate of the project can be found in Appendix B.

### **Implementation Schedule**

September 2019	Funding Awarded
September – October 2019	Blaine County Stream Alteration Permitting
October 29, 2019	Construction Commence
November –February	Construction
March	Project Closeout and Inspection

### **Financial Feasibility Analysis**

The total cost of the project is estimated to be \$263,498 and Blaine County is requesting \$100,000 from the Idaho Water Resource Board Grant. Blaine County is matching with \$100,000 in cash and \$10,000 in-kind for administrative costs. Flood Control District 9 will be matching \$50,000. A local land owner will be matching with \$3498 in-kind with rocks and plants from her property. A total match of \$163,498 or 62%.



Flood Control District 9  
P.O Box 3181  
Hailey, ID 83333  
[bwflood9@gmail.com](mailto:bwflood9@gmail.com)  
(208) 309-9009

Dave Bell – Chair, Div. 1  
Elizabeth Zellers - Treasure, Div. 2  
Bryan Dilworth- Vice Chair, Div. 3

June 3, 2019

Chris Corwin  
GIS Analyst/Disaster Services Coordinator  
Blaine County  
1650 Aviation Dr.  
Hailey, ID 83333  
208-788-5508  
[ccorwin@co.blaine.id.us](mailto:ccorwin@co.blaine.id.us)

Re: Broadford Road Fisherman's Access

Dear Chris,

Consider this a letter of support for Blaine County's application for a grant from the Idaho Water Resource Board's 2018 Flood Management Grant Program for the Broadford Road Fisherman's Access Project.

Per State and local codes, it is our understanding this is for permanent repairs to the Broadford Road Fisherman's Access to the emergency repairs made in the spring of 2017.

This project will help restore and protect the fisherman's access, Broadford Road, the Broadford Bridge, adjacent private property and some of the Big Wood River's natural characteristics.

The Flood Control District #9 is committed to contributing \$50,000 to this project if the grant is awarded.

Dave Bell

A handwritten signature in dark ink that reads 'Dave Bell'.

Chair & Commissioner Div. 1  
Flood Control Dist. 9

**Implementation Cost Estimate  
Broadford Road Fisherman's Access Project Area  
Blaine County, Idaho**



Wednesday, May 29, 2019

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL COST
<b>MOBILIZATION</b>				
Equipment Mobilization and Demobilization	1	ea	\$7,500	\$7,500
<b>SUBTOTAL</b>				<b>\$7,500</b>
<b>RIVER AND FLOODPLAIN RESTORATION</b>				
Floodplain Bench Construction	7,395	cy	\$5	\$36,975
Rock Toe Construction	1,643	cy	\$50	\$82,150
Pool and Riffle Construction	4,446	cy	\$5	\$22,230
Side Channel Excavation	286	cy	\$4	\$1,144
Sediment Storage Area Construction	1,481	cy	\$4	\$5,924
Floodplain Wood Structures (w/ harvested wood material)	9	ea	\$1,000	\$9,000
Channel Margin Structure (w/ harvested wood material)	6	ea	\$2,500	\$15,000
Meander Bend Structure (w/ harvested wood material)	7	ea	\$3,500	\$24,500
Bank Deflector Jam Structure (w/ harvested wood material)	1	ea	\$4,000	\$4,000
Willow Bundles (river bank treatment)	249	ea	\$25	\$6,225
Brush Trenches (floodplain bench treatment)	107	ea	\$50	\$5,350
Parking Area Construction	5,900	sq ft	\$2	\$11,800
Site Reclamation, Seeding, Clean-up	1	ea	\$2,800	\$2,800
<b>SUBTOTAL</b>				<b>\$227,098</b>
<b>CONSTRUCTION ADMINISTRATION</b>				
Construction Staking and Supervision	14	days	\$1,350	\$18,900
<b>SUBTOTAL</b>				<b>\$18,900</b>
<b>PROJECT COST</b>				<b>\$253,498</b>

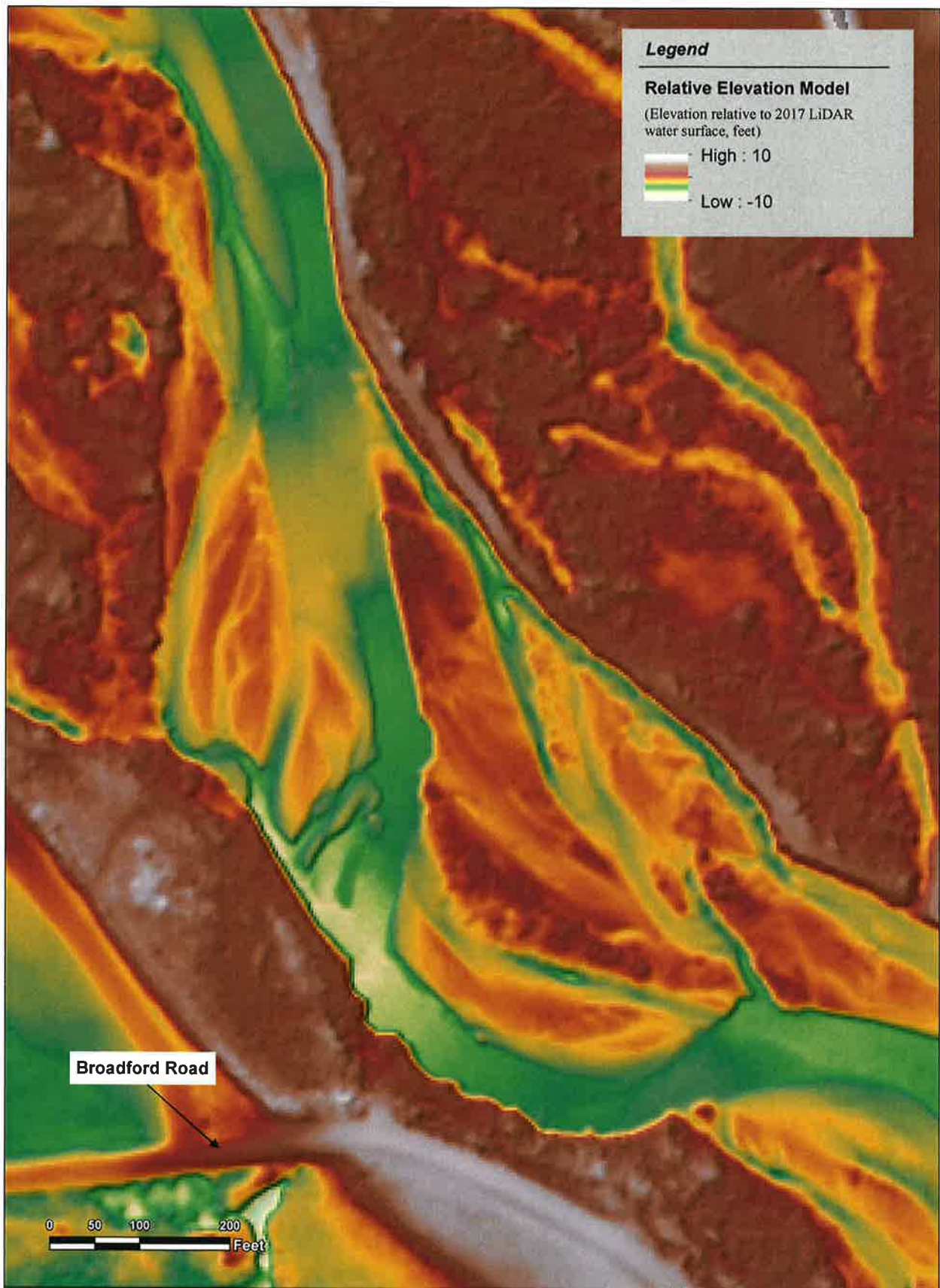
**NOTICE:**

*The information contained here was prepared in May 2019 and is based on information available at that time. Actual costs to complete proposed project activities may vary depending on changing conditions, availability of materials and workforce, regulatory requirements, and the unique needs of the client at the time of project implementation*









Date: 05/28/2019  
Description: Existing Conditions  
Scale 1 inch = 100 feet  
2017 LiDAR Hillshade

Drawing:

**SHEET 2**

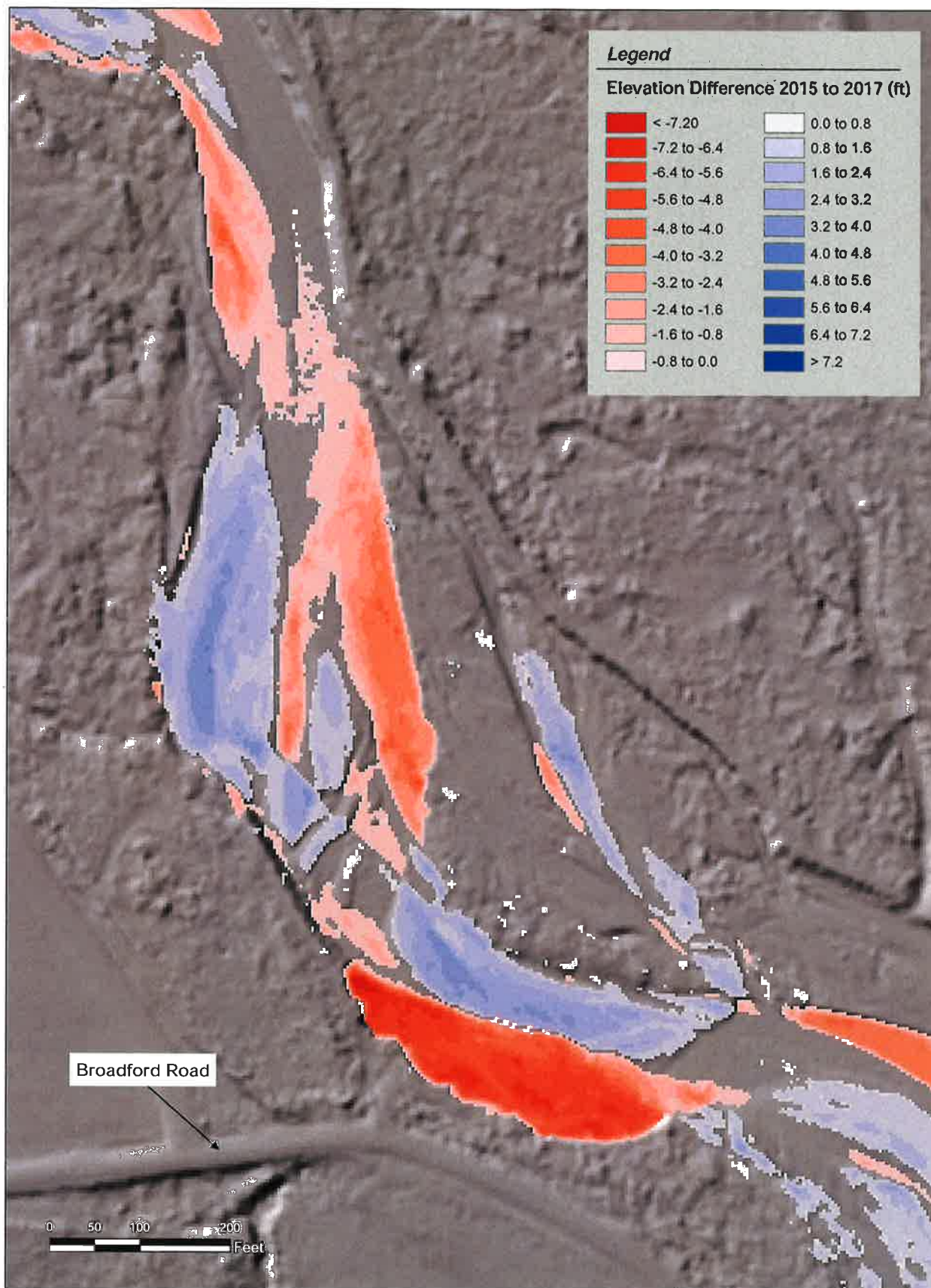
## RELATIVE ELEVATION MODEL

**Big Wood River Restoration Project,  
Broadford Fisherman's Access Area**

**Blaine County, Idaho**



PO Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83002



Date: 05/28/2019  
 Description: Existing Conditions  
 Scale 1 inch = 100 feet  
 2017 LIDAR Hillshade

Drawing:

**SHEET 3**

## GEOMORPHIC CHANGE DETECTION

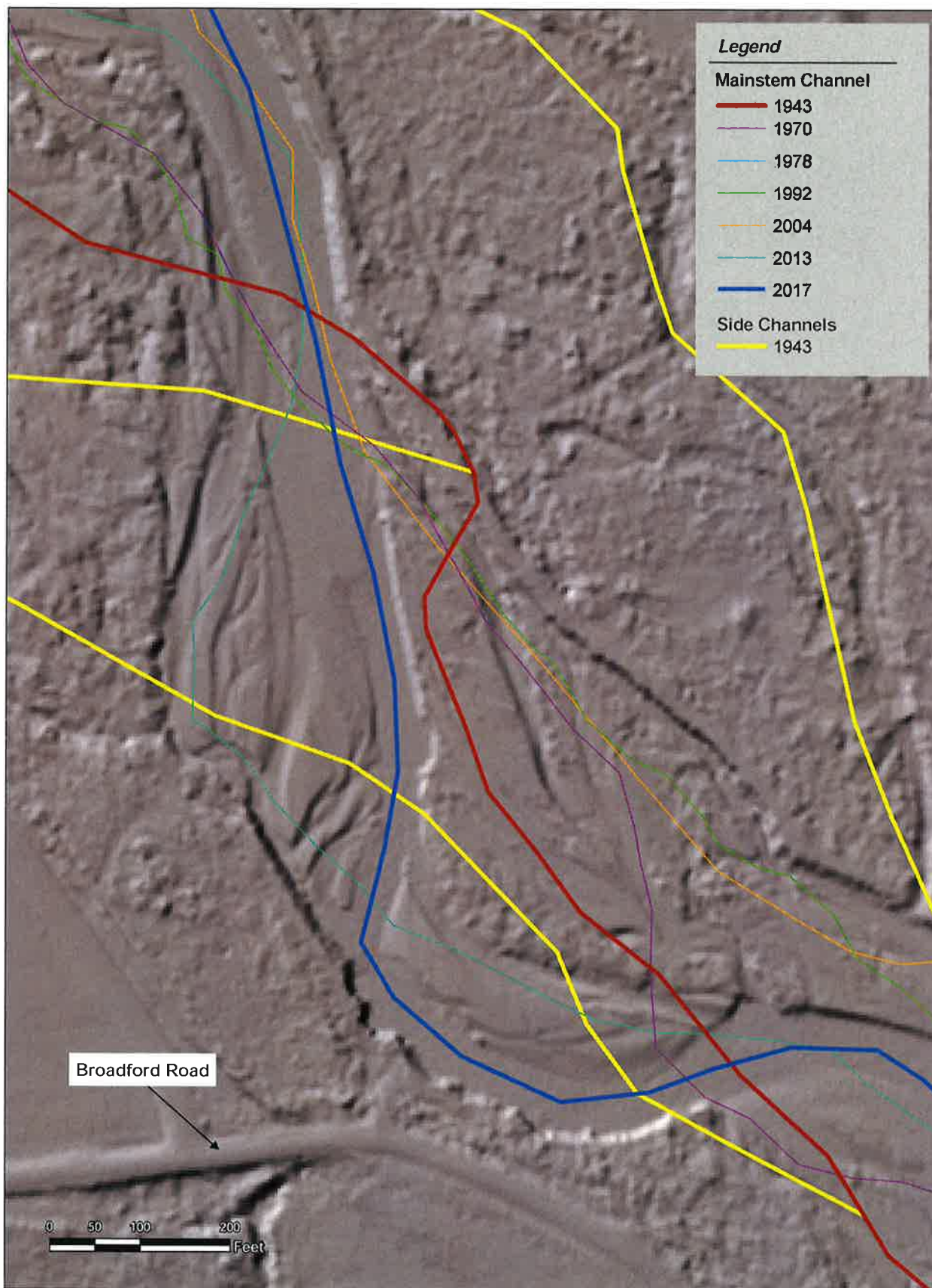
Big Wood River Restoration Project,  
 Broadford Fisherman's Access Area

Blaine County, Idaho



PO Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83002





Date: 05/28/2019  
 Description: Existing Conditions  
 Scale 1 inch = 100 feet  
 2017 LiDAR Hillshade

Drawing:

**SHEET 4**

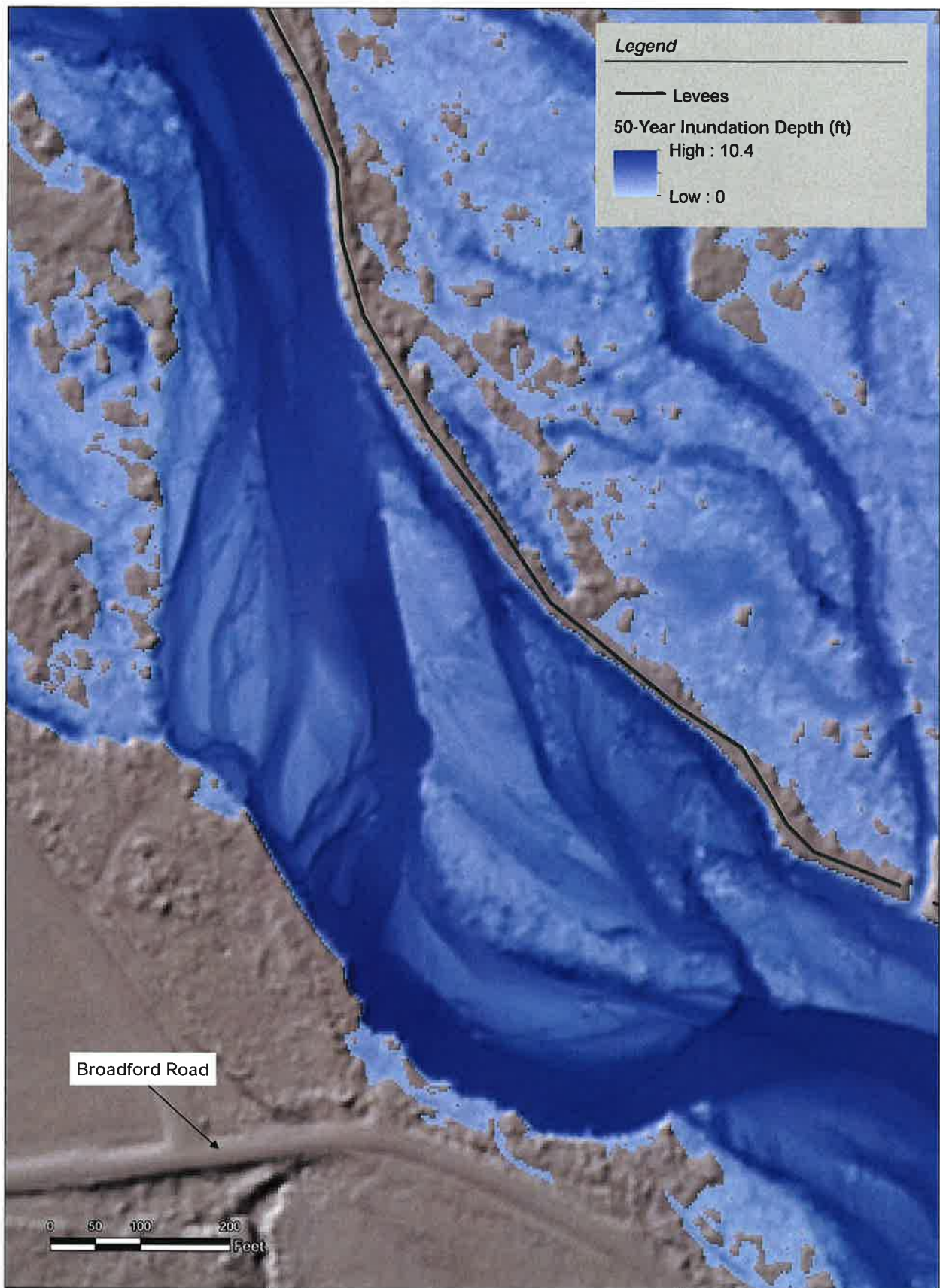
## HISTORIC CHANNEL MAPPING

Big Wood River Restoration Project,  
 Broadford Fisherman's Access Area

Blaine County, Idaho



PO Box 6576, 140 E Broadway, Suite 23, Jackson, WY 83002



Date: 05/28/2019  
 Description: Existing Conditions  
 Scale 1 inch = 100 feet  
 2017 LIDAR Hillshade

Drawing:

**SHEET 5**

## FLOODPLAIN INUNDATION

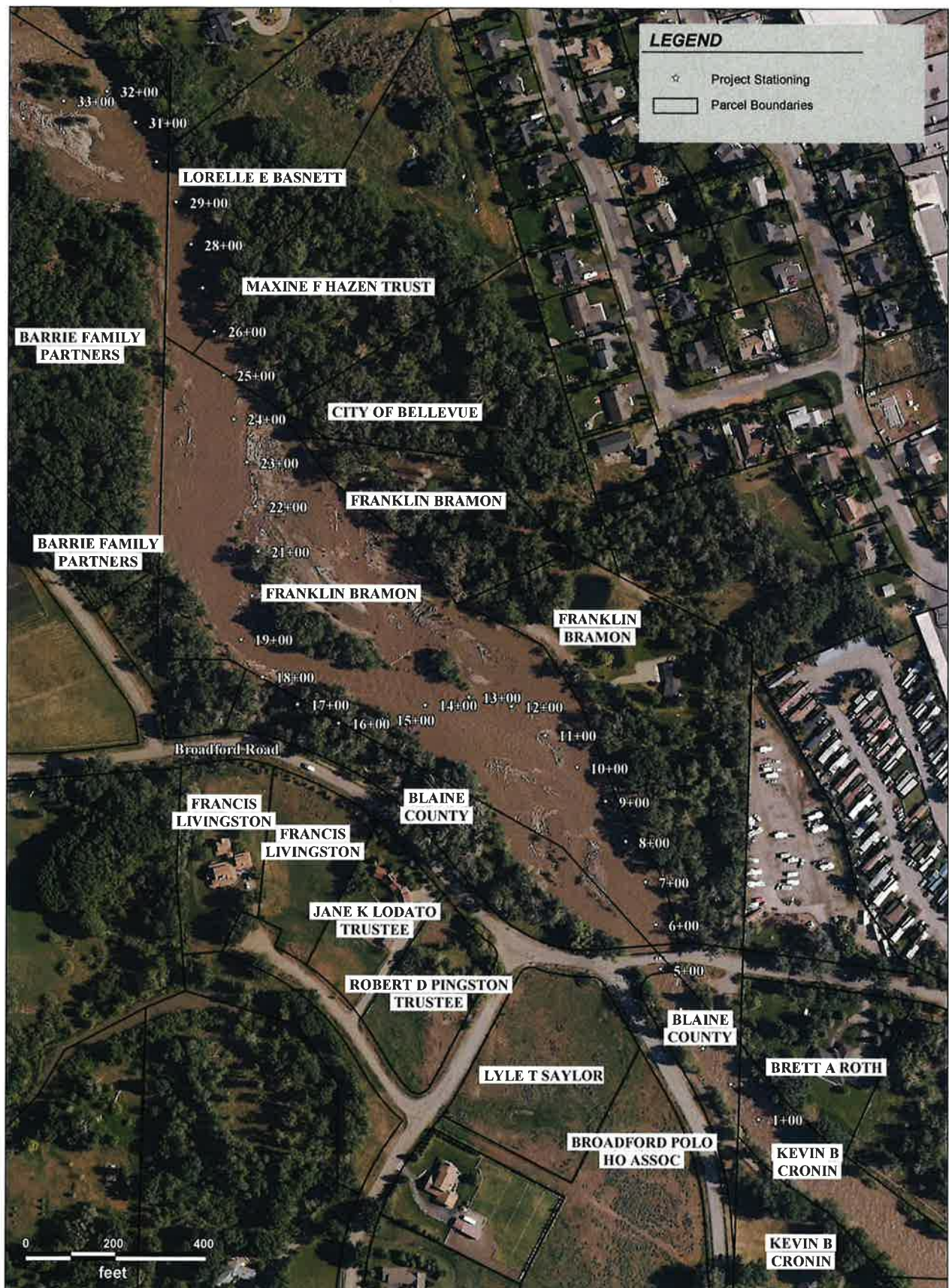
Big Wood River Restoration Project,  
 Broadford Fisherman's Access Area

Blaine County, Idaho



PO Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83002





Date: 05/28/2019  
Description: Design Drawings  
Scale 1 inch = 200 feet June  
2, 2017 Aerial Imagery

Drawing:

**SHEET 6**

## PROJECT AREA LAND OWNERSHIP

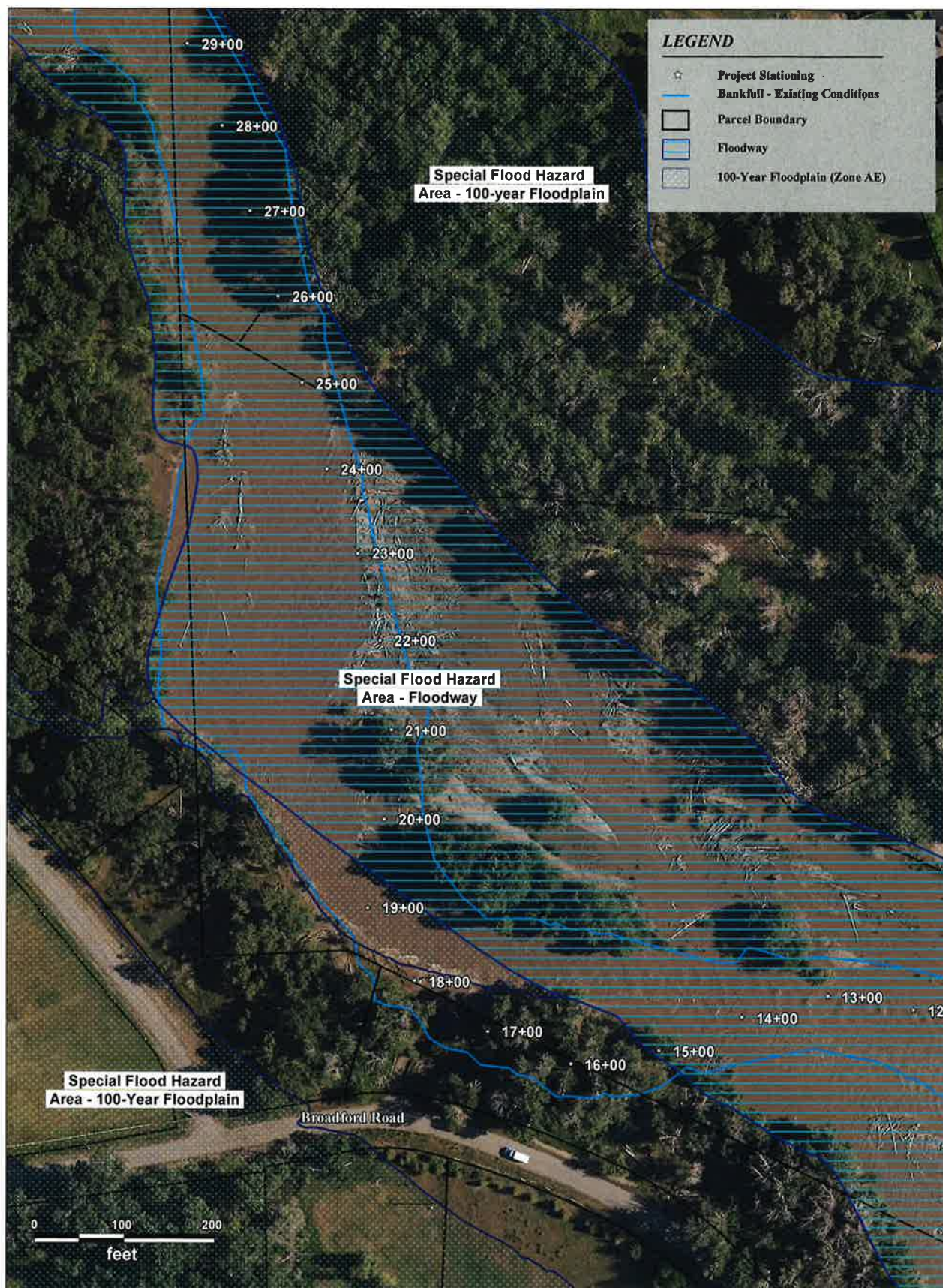
Big Wood River Restoration Project,  
Broadford Fisherman's Access Area

Blaine County, Idaho



PO Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83302





Date: 05/28/2019  
 Description: Design Drawings  
 Scale 1 inch = 100 feet  
 June 2, 2017 Aerial Photography

Drawing:

**SHEET 7**

## SPECIAL HAZARD FLOOD AREA

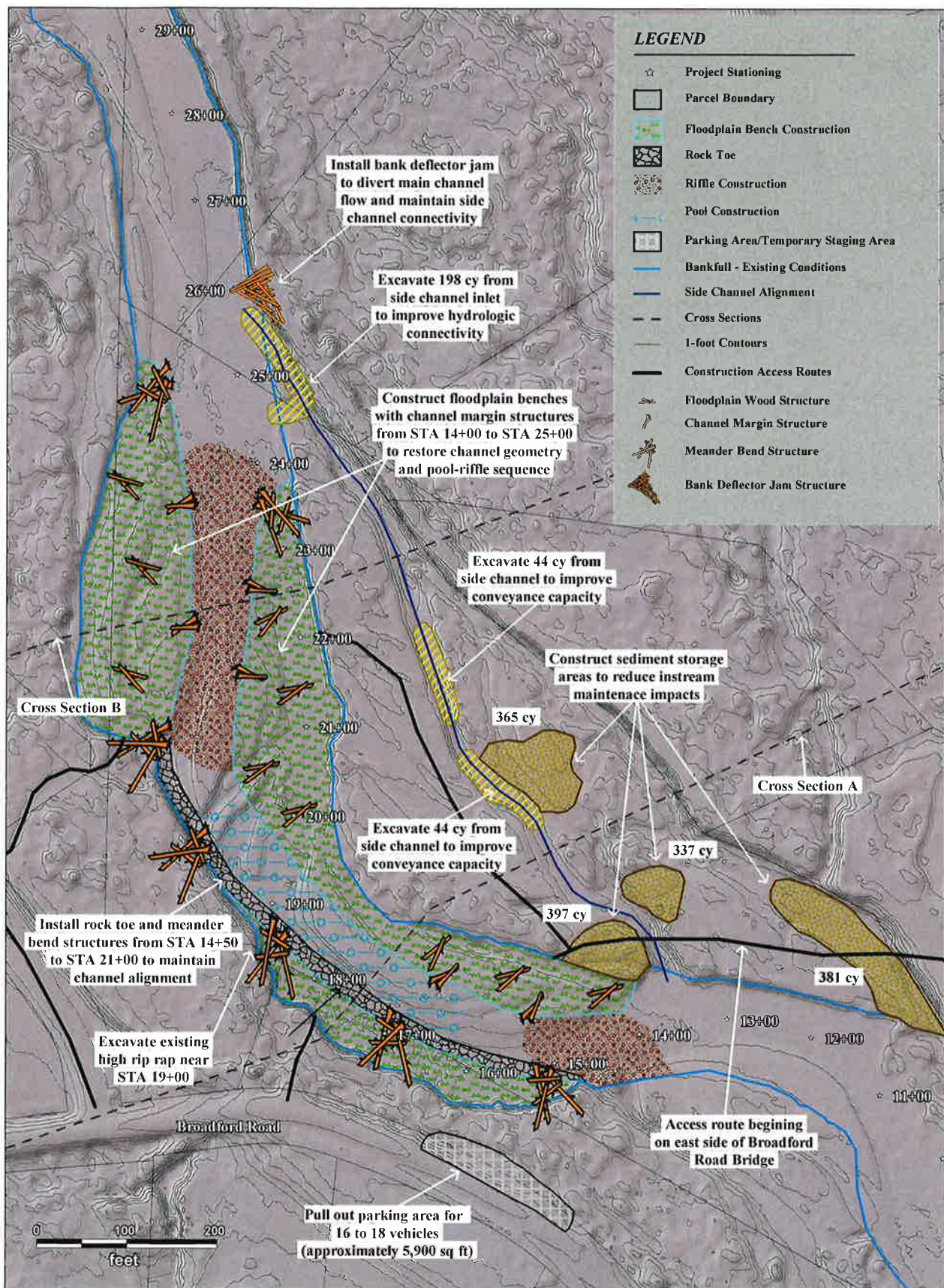
Big Wood River Restoration Project,  
 Broadford Fisherman's Access Area

Blaine County, Idaho



PO Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83002





Date: 05/28/2019  
Description: Design Drawings  
Scale 1 inch = 100 feet  
2017 LiDAR Hillshade

Drawing:

**SHEET 8**

## FINAL SITE PLAN

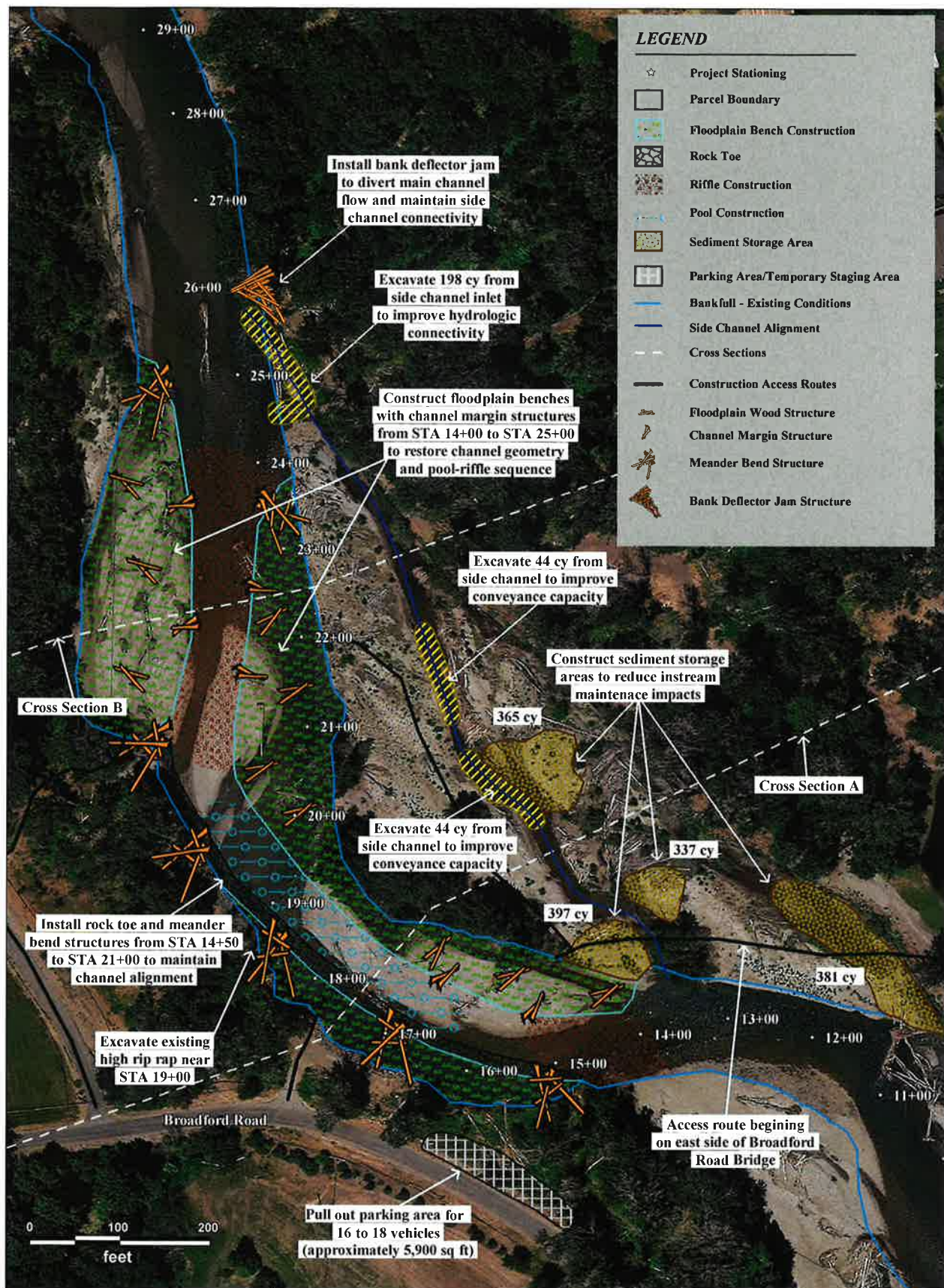
Big Wood River Restoration Project,  
Broadford Fisherman's Access Area

Blaine County, Idaho



PO Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83002





Date: 05/28/2019  
Description: Design Drawings  
Scale 1 inch = 100 feet  
July 2017 Aerial Imagery

Drawing:

**SHEET 9**

## FINAL SITE PLAN

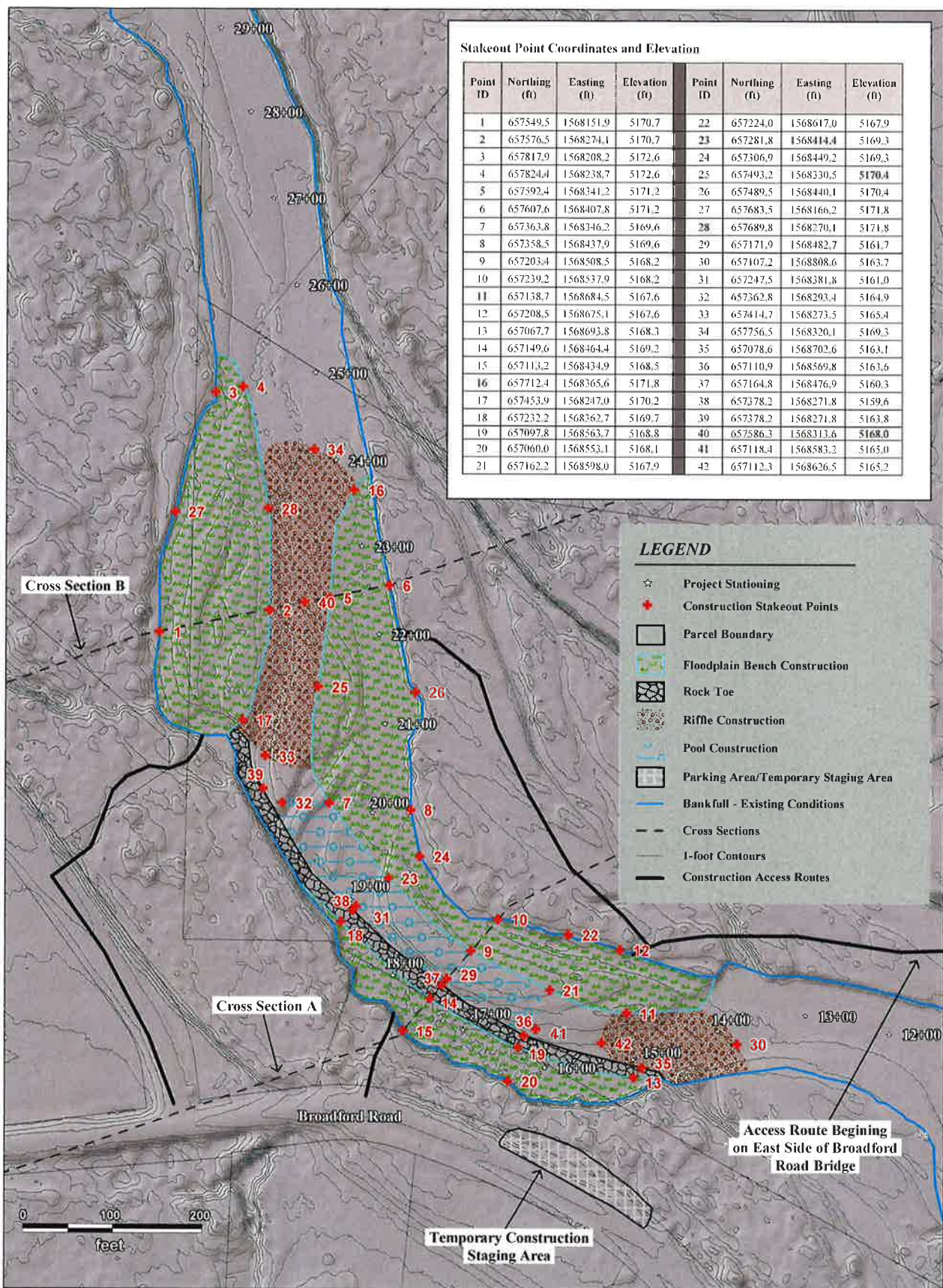
Big Wood River Restoration Project,  
Broadford Fisherman's Access Area

Blaine County, Idaho



PO Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83002





Date: 05/28/2019  
Description: Design Drawings  
Scale 1 inch = 100 feet  
2017 LiDAR Hillshade

Drawing:

**SHEET 10**

## SITE PLAN

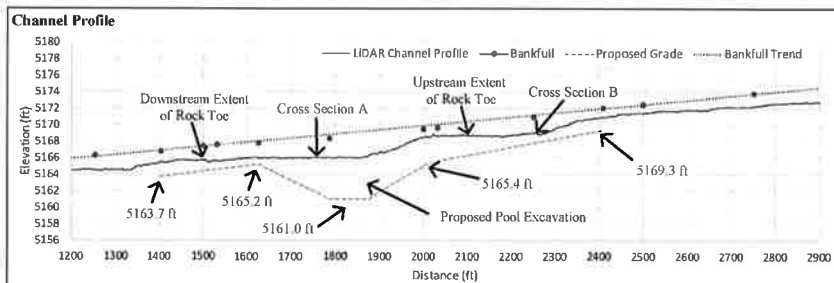
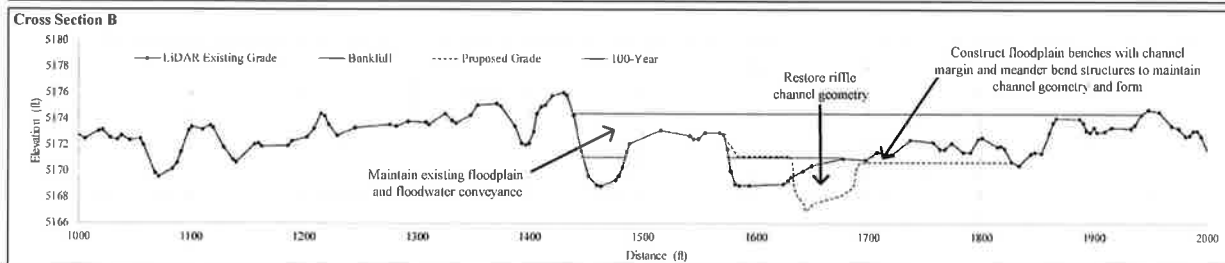
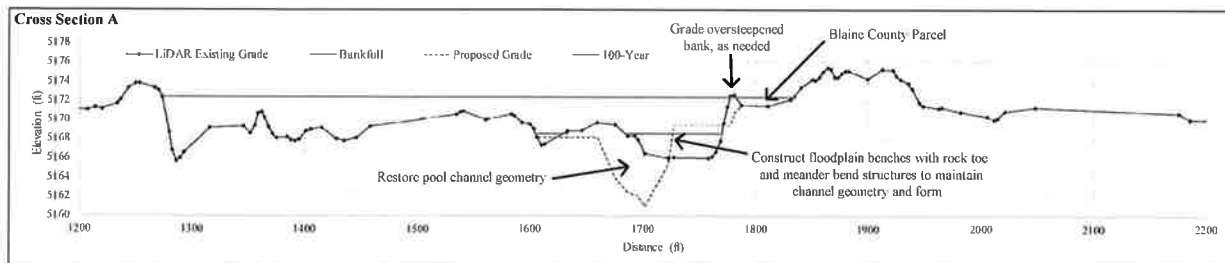
Big Wood River Restoration Project,  
Broadford Fisherman's Access Area

Blaine County, Idaho



PO Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83002

## TREATMENT TYPICAL CROSS SECTIONS



Note: channel profile derived from 2017 LiDAR data which does not include bathymetric data.

### Design Channel Geometry

Bankfull Width (ft)	Mean Depth (ft)	Maximum Depth (ft)	W/B Ratio	Slope (%)	Bankfull Area (sq ft)	Wetted Perimeter (ft)	Hydraulic Radius (ft)
58	1.5	4.2	1.3	0.10%	654	48	1.7

### Design Criteria

Parameter	Design Criteria		
	Min Value	Max Value	Min Value
Meander Width Ratio			
Riffle Length Ratio	0.8	1.4	0.8
Riffle Depth	0.8	0.8	1.3
Scour Holes to rock toe	18	21	18
Riffle Length Ratio	0.15%	0.10%	1.7%
Pool Length Ratio	0.18	0.18	0.18
Pool Width Ratio	0.18	0.18	0.18
Pool Depth Ratio	0.18	0.18	0.18
Pool Slope Ratio	0.18%	0.18%	0.18%
Pool Spacing Ratio	1.18	1.18	1.18
Scour Holes Length Ratio	0.18	0.18	0.18
Scour Holes Length Ratio	0.18	0.18	0.18
Ratio of Channel Width	0.18	0.18	0.18



Blaine County, Idaho  
PO Box 1578, 143 E Broadway, Suite 23, Jackson, WY 83202

## TREATMENT DETAIL

Big Wood River Restoration Project,  
Broadford Fisherman's Access Area,  
Blaine County, Idaho

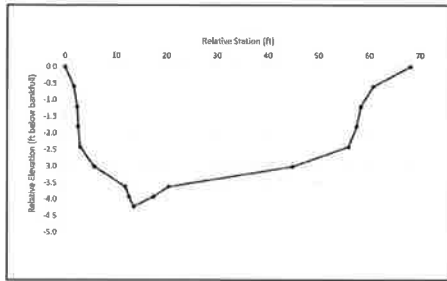
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Description: Treatment Details  
Scale: N/A

Drawing:

**SHEET 11**

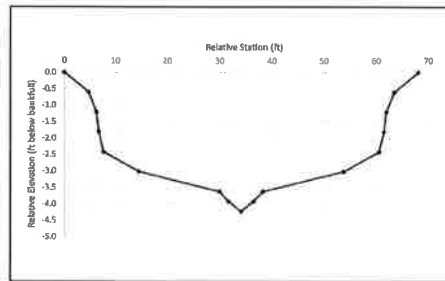
## TYPICAL DESIGN CHANNEL GEOMETRY

Typical Rifle Geometry - Thalweg Left



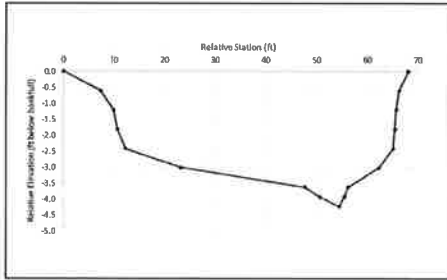
Point ID	Relative Station (ft from left bank)	Relative Elevation (ft below bankfull)
A	0	0
B	1.4	-0.3
C	3.4	-1.3
D	7.3	-1.9
E	14.1	-2.4
F	20.8	-3.0
G	27.5	-3.6
H	34.2	-3.9
I	40.9	-4.2
J	47.6	-4.5
K	54.3	-4.5
L	61.0	-4.4
M	67.7	-4.2
N	74.4	-3.9
O	81.1	-3.6
P	87.8	-3.0
Q	94.5	0

Typical Rifle Geometry - Thalweg Mid



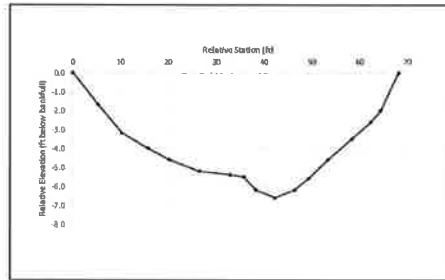
Point ID	Relative Station (ft from left bank)	Relative Elevation (ft below bankfull)
A	0	0
B	1.4	-0.3
C	3.4	-1.3
D	7.3	-1.9
E	14.1	-2.4
F	20.8	-3.0
G	27.5	-3.6
H	34.2	-3.9
I	40.9	-4.2
J	47.6	-4.5
K	54.3	-4.5
L	61.0	-4.4
M	67.7	-4.2
N	74.4	-3.9
O	81.1	-3.6
P	87.8	-3.0
Q	94.5	0

Typical Rifle Geometry - Thalweg Right



Point ID	Relative Station (ft from left bank)	Relative Elevation (ft below bankfull)
A	0	0
B	1.4	-0.3
C	3.4	-1.3
D	7.3	-1.9
E	14.1	-2.4
F	20.8	-3.0
G	27.5	-3.6
H	34.2	-3.9
I	40.9	-4.2
J	47.6	-4.5
K	54.3	-4.5
L	61.0	-4.4
M	67.7	-4.2
N	74.4	-3.9
O	81.1	-3.6
P	87.8	-3.0
Q	94.5	0

Typical Pool Geometry



Point ID	Relative Station (ft from left bank)	Relative Elevation (ft below bankfull)
A	0	0
B	1.4	-0.3
C	3.4	-1.3
D	7.3	-1.9
E	14.1	-2.4
F	20.8	-3.0
G	27.5	-3.6
H	34.2	-3.9
I	40.9	-4.2
J	47.6	-4.5
K	54.3	-4.5
L	61.0	-4.4
M	67.7	-4.2
N	74.4	-3.9
O	81.1	-3.6
P	87.8	-3.0
Q	94.5	0



PO Box 8576, 142 E Broadway, Suite 22, Jackson, WY 83202

### CHANNEL GEOMETRY DETAIL

Big Wood River Restoration Project,  
Broadford Fisherman's Access Area,  
Blaine County, Idaho

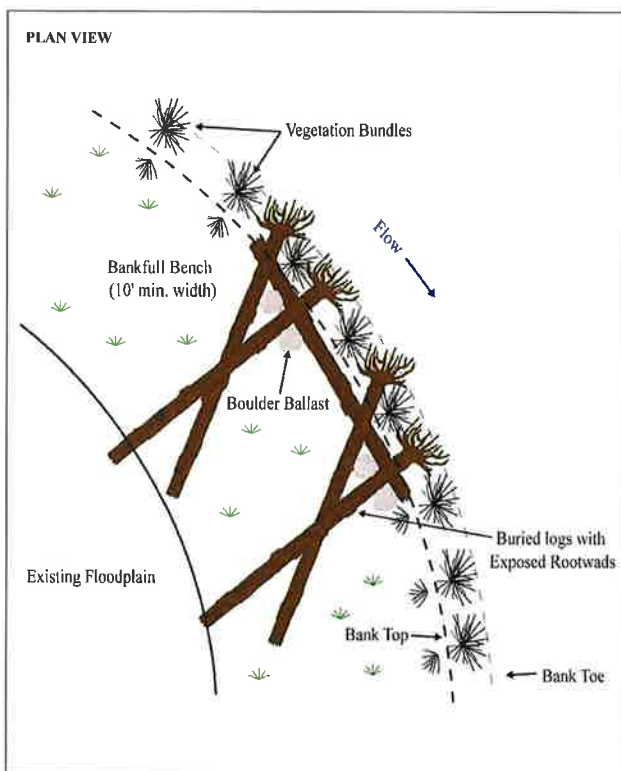
Date: 05/28/2019  
Description: Treatment Details  
Scale N/A

Drawing:

**SHEET 12**



## CHANNEL MARGIN STRUCTURE DESIGN DETAILS



### Work Description

This work includes the creation of an inset bankfull floodplain bench and installation of wood channel margin structures with bioengineering techniques as shown on the typical design drawing. The intent of this structure is to provide bank stabilization to provide temporary protection for the inset floodplain bench, increase habitat complexity, and provide fish cover.

### Construction Notes

Grade the inset floodplain bench to the local bankfull elevation specified in the construction stakeout points. Construct inset floodplain using native alluvium for fill. Compact fill material with an excavator bucket or similar force in a series of consecutive lifts. Place coarse native materials on the river side of the inset floodplain bench to increase bank stability.

Place dormant hardwood vegetation bundles at an 8 ft spacing along the banks of the inset floodplain bench using the installation procedure described on the revegetation detail sheet. Revegetate floodplain bench with native herbaceous and woody vegetation and reclaim those areas with broadcast seeding with a native transitional seed mix.

Place channel margin structures as shown on the typical design drawing. Backfill the buried portion of the structure with a minimum depth of 1 ft and compact native fill material with an excavator bucket or similar force in a series of consecutive lifts. Place logs with root wads exposed within the bankfull channel along the channel banks. The orientation of logs should generally follow the typical design drawing for optimal function and stability but may require field adjustments to address site specific conditions during implementation. Place boulders for ballast downstream of structure logs. Place slash and small wood irregularly along the bank and root wads to provide structure and cover. The channel margin structure material quantity sizing is as follows:

- Logs with root wads greater than 18 in diameter and 30 ft length (4 each);
- Broken logs greater than 12 in diameter and 30 ft length (1 each);
- Ballast boulders greater than 24 in diameter (4 each).



PO Box 4578, 142 E Broadway, Suite 22, Jackson, WY 83202

### TREATMENT DETAIL

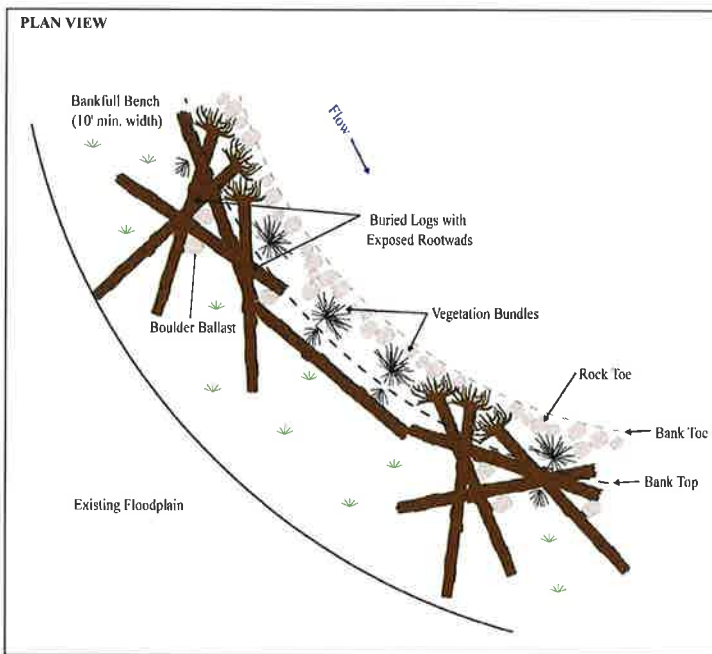
Big Wood River Restoration Project,  
Broadford Fisherman's Access Area,  
Blaine County, Idaho

Date: 05/28/2019  
Description: Treatment Details  
Scale: N/A

Drawing:

**SHEET 13**

## MEANDER BEND TREATMENT DESIGN DETAILS



### Work Description

This work includes the creation of an inset floodplain bench and installation of wood meander bend structures with bioengineering techniques as shown on the typical design drawing. The intent of this structure is to provide bank stabilization, increase habitat complexity, and provide fish cover.

### Construction Notes

Grade the inset floodplain bench to the local bankfull elevation specified in the construction stakeout points. Construct inset floodplain using native alluvium for fill. Compact fill material with an excavator bucket or similar force in a series of consecutive lifts. Place coarse native materials on the river side of the inset floodplain bench to increase bank stability. A rock toe comprised of native alluvium or imported boulders may be needed under high erosion potential conditions.

Place dormant hardwood vegetation bundles at an 8 ft spacing along the banks of the inset floodplain bench using the installation procedure described on the revegetation detail sheet. Revegetate floodplain bench with native herbaceous and woody vegetation and reclaim these areas with broadcast seeding with a native transitional seed mix.

Place channel margin structures as shown on the typical design drawing. Backfill the buried portion of the structure with a minimum depth of 1 ft and compact native fill material with an excavator bucket or similar force in a series of consecutive lifts. Place logs with root wads exposed within the bankfull channel along the channel banks. The orientation of logs should generally follow the typical design drawing for optimal function and stability but may require field adjustments to address site specific conditions during implementation. Place boulders for ballast downstream of structure logs. Place slash and small wood irregularly along the bank and root wads to provide structure and cover. The channel margin structure material quantity sizing is as follows:

- Logs with root wads greater than 18 in diameter and 30 ft length (6 each);
- Broken logs greater than 12 in diameter and 30 ft length (5 each);
- Ballast boulders greater than 24 in diameter (6 each);
- Rock toe boulders, as needed.



PO Box 4574, 140 E Broadway, Suite 23, Jackson, WY 83302

### TREATMENT DETAIL

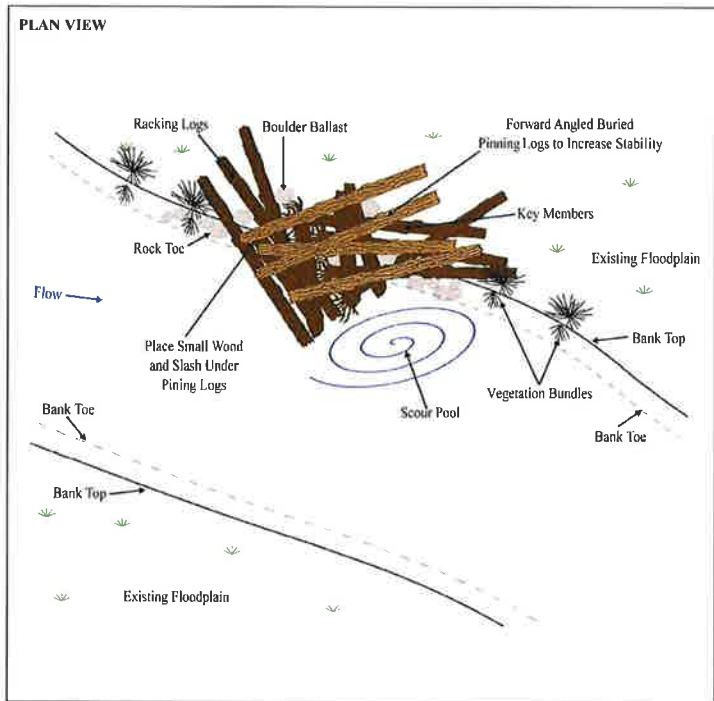
**Big Wood River Restoration Project,  
Broadford Fisherman's Access Area,  
Blaine County, Idaho**

Date: 05/28/2019  
Description: Treatment Details  
Scale: N/A

Drawing:

**SHEET 14**

## BANK DEFLECTOR JAM STRUCTURE TREATMENT DETAILS



### Work Description

This work includes the installation of a wood bank deflector jam structure with associated bioengineering techniques as shown on the typical design drawing. The intent of this structure is to divert the flow path to increase habitat complexity, promote the formation and maintenance of scour pools, and provide fish cover.

### Construction Notes

Place the bank deflector jam structure logs as shown on the typical design drawing. Backfill the buried portion of the structure with a minimum depth of 1 ft and compact native fill material with an excavator bucket or similar force in a series of consecutive lifts. Place key member logs with root wads facing upstream and protruding into the bankfull channel, where feasible. Place the buried portion of the pining logs and rock toe material below the potential scour depth. The orientation of logs should generally follow the typical design drawing for optimal function and stability but may require field adjustments to maximize flow diversion during implementation. Place boulders for ballast downstream of structure logs. Place slash and small wood irregularly in front of the pining logs and root wads to provide structure and cover. The bank deflector jam structure material quantity sizing is as follows:

Logs with root wads greater than 18 in diameter and 30 ft length (4 each);  
Racking logs greater than 12 in diameter and 30 ft length (4 each);  
Pining logs greater than 12 in diameter and 20 ft length (4 each);  
Ballast boulders greater than 24 in diameter (8 each);

Grade the construction area around the jam structure to the local bankfull elevation specified in the construction stakeout points using native alluvium for fill. Compact fill material with an excavator bucket or similar force in a series of consecutive lifts. Place coarse native materials on the river side of the structure to increase bank stability. A rock toe comprised of native alluvium or imported boulders may be needed under high erosion potential conditions.

Place the dormant hardwood cutting vegetation bundles at an 8 ft spacing along the banks of the inset floodplain bench. Revegetate the floodplain bench with native herbaceous and woody vegetation and reclaim these areas with broadcast seeding with a native transitional seed mix.



PO Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83202

### TREATMENT DETAIL

Big Wood River Restoration Project,  
Broadford Fisherman's Access Area,  
Blaine County, Idaho

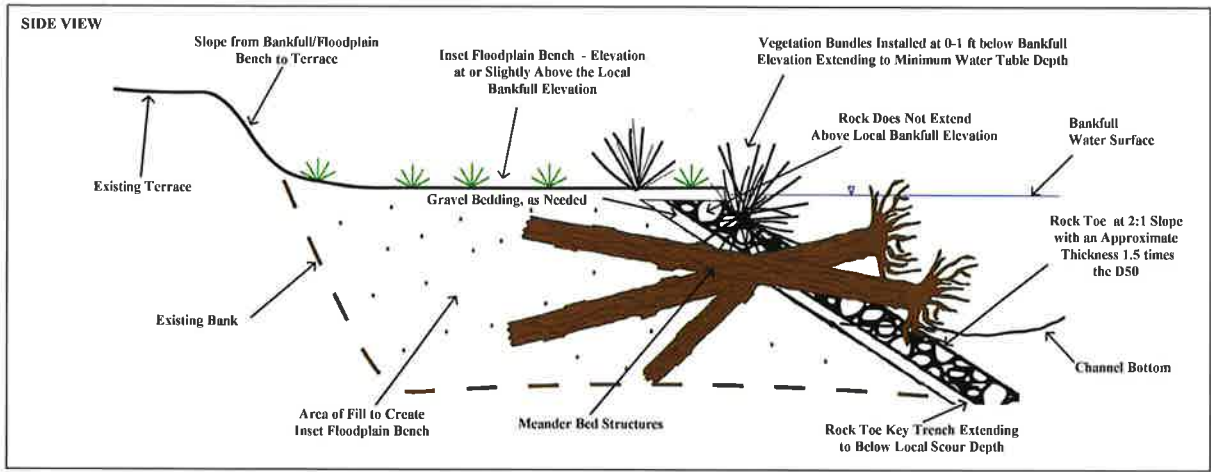
Date: 05/28/2019  
Description: Treatment Details  
Scale N/A

Drawing

**SHEET 15**



# ROCK TOE STRUCTURE DESIGN DETAILS



## Work Description

This work includes the creation of an inset bankfull floodplain bench and installation of a rock toe with meander bend structures and bioengineering techniques as shown on the typical design drawing. The intent of this structure is to provide bank stabilization to protect the inset floodplain bench while increasing habitat complexity, and providing fish cover.

## Construction Notes

Grade the inset floodplain bench to the local bankfull elevation specified in the construction stakeout points. Construct inset floodplain using native alluvium for fill. Compact fill material with an excavator bucket or similar force in a series of consecutive fills. Place coarse native materials on the river side of the inset floodplain bench to increase bank stability.

Place dormant hardwood vegetation bundles at an 8 ft spacing along the banks of the inset floodplain bench using the installation procedure described on the revegetation detail sheet.

Construct a rock toe on the river side of the of the inset floodplain bench for bank protection. The revetment rock should have a median (D50) size of 24 inches and a maximum (D100) size of 36 inches with an appropriate gradation and approximate thickness of 50 inches. The rock toe should extend from just below the floodplain bench elevation to the local scour depth at 3.4 feet below the channel bed elevation. The installed rock toe should have a horizontal to vertical slope of 2:1.

Install meander bend structures at designated locations following the construction notes included on the Meander Bend Structure design detail sheet.



PO Box 8578, 142 E Broadway, Suite 22, Jackson, WY 83202

## TREATMENT DETAIL

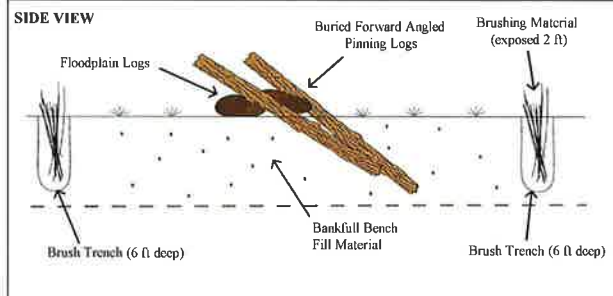
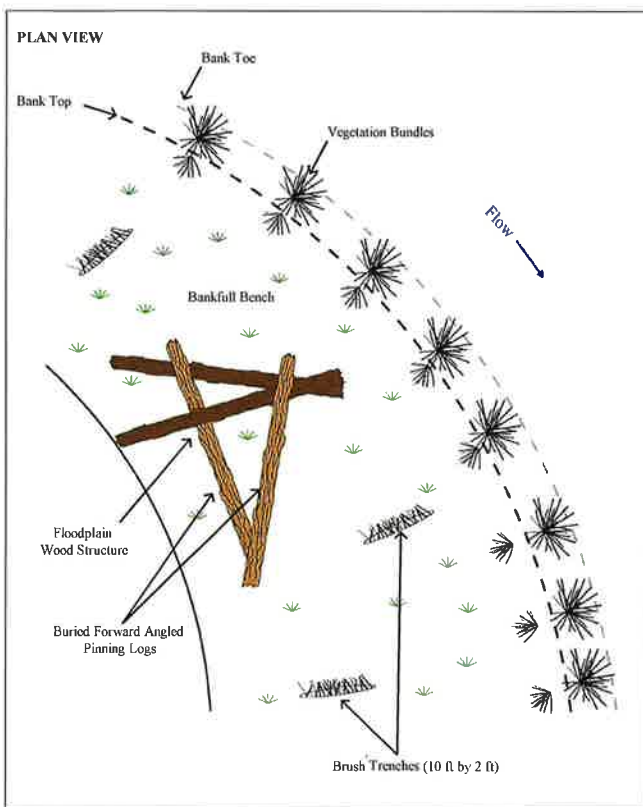
Big Wood River Restoration Project,  
Fisherman's Access Area,  
Blaine County, Idaho

Date: 05/28/2018  
Description: Treatment Details  
Scale N/A

Drawing:

**SHEET 16**

## FLOODPLAIN WOOD STRUCTURE DESIGN DETAILS



### Work Description

This work includes the installation of floodplain wood structures and brush trenches. The intent of the woody material on the surface of the inset floodplain is to reduce the velocity of flow on the floodplain and to encourage deposition of fine sediments. The floodplain structure logs are held to the surface of the bankfull floodplain to increase structure stability.

### Construction Notes

Place floodplain wood structures as shown on the typical design drawings. Backfill the buried portion of the pinning logs with a minimum depth of 3 ft at the downstream end of the logs. Compact native fill material with an excavator bucket or similar force in a series of consecutive lifts. The orientation of logs should generally follow the typical design drawing for optimal function and stability but may require field adjustments to address site specific conditions during implementation. Place slash and small wood irregularly as racking material on the upstream side of the structure.

Place brush trenches perpendicular to flow at a spacing of 1 per 1,000 sq ft. Excavate an area 10 ft by 2 ft by 5 feet deep for the brush trench. Woody Material and live dormant woody vegetation cuttings will be placed in the trenches. Place brushy materials into the trench with an average of 2 ft exposed above the inset floodplain surface. Backfill the trench with a 50/50 mixture of topsoil and native alluvium. To the extent possible, tamp backfill material with the teeth of an excavator bucket, or other suitable method.

Place dormant hardwood vegetation bundles at an 8-ft spacing along the banks of the inset floodplain bench using the installation procedure described on the revegetation detail sheet. Revegetate floodplain bench with native herbaceous and woody vegetation and reclaim these areas with broadcast seeding with a native transitional seed mix.



PO Box 8578, 142 E Broadway, Suite 22, Jackson, WY 83202

### TREATMENT DETAIL

Big Wood River Restoration Project,  
Broadford Fisherman's Access Area,  
Blaine County, Idaho

Date: 05/28/2019  
Description: Treatment Details  
Scale: N/A

Drawing:

**SHEET 17**

## REVEGETATION TREATMENT DESIGN DETAILS

### Work Description

Dormant hardwood cuttings will be utilized to facilitate bioengineering techniques including, vertical bundles, 45-degree bundles, and brush trenches. Cuttings will be harvested from healthy vigorous plants during the dormant season (i.e., between dormancy/leaf abscission in the fall and bud break in the spring). Care will be taken to avoid harvesting cuttings from donor plants that exhibit signs of damage by disease or insects. Cuttings will be comprised of willow, cottonwood, and dogwood stems that have a minimum bottom diameter of 1-inch, have a minimum length of 7 feet, and are relatively straight. Cuttings will be removed from the donor plant with a clean diagonal cut at the base of the stem using lopping shears, bypass pruners, or a sharp saw. The diagonal surface will differentiate the bottom (i.e., rooting end) from the top (i.e., above ground portion), and allow for easier installation. The terminal buds and a few upper branches will be left intact until installation. All other branches will be removed by clipping them as close to the stem as possible. Caution will be used to avoid damaging the stem while trimming the lateral branches. Cuttings will be bundled by type (i.e., willow, dogwood, cottonwood) and kept cool, moist, and shaded during transportation and on-site storage. The cuttings will be soaked in water for 7-14 days prior to installation. At least half of the length of the cutting should be in contact with water while soaking, and cuttings should be weighted down when soaked. The vertical bundle and 45-degree bundle treatments will utilize bundles of 3 willow and/or dogwood cuttings; therefore, it will be necessary to break down any larger bundles into bundles of 3 for these treatments. Vertical bundles and 45-degree bundles will be installed on 4-foot spacing throughout the treatment area, in an alternating fashion (i.e., one vertical bundle, then one 45-degree bundle, then another vertical bundle, and so on).

### Vertical Bundles

Bundles of dormant willow and/or dogwood cuttings will be installed vertically under the toe rock during construction. The preparation and installation procedure for vertical bundles will be as follows:

1. Bundle 3 willow and/or dogwood cuttings together in the same orientation (tops up and butts down). Bundles will be as uniform as possible, and the butts of the cuttings will be at the same level to ensure that no butts will be out of the water when installed. Tie bundles one foot from the top end and one foot from the butt end with pre-stretched cotton string, sisal rope, cord or non-galvanized tie wire (no jute or plastic twine will be utilized).
2. Install the bottom of the bundle into an excavated key trench that is at least 4 feet below bankfull elevation and 1-foot below the low-flow water table, and lay the bundle vertically up the bank. Ensure that the top of the bundle protrudes at least 1 foot above the constructed floodplain bench.
3. Bury bundle with unsorted alluvium and wash in by filling the excavator bucket with water.
4. Place toe rock on top of the buried bundle if called for in design specifications.
5. Install vertical bundles on 8-foot spacing, alternating with 45-degree bundles so there is one bundle every 4 feet.

### 45-Degree Bundles

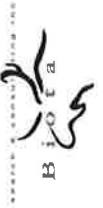
Bundles of dormant willow and dogwood cuttings will be installed at a 45-degree angle to the bank so the top of the bundle hangs out over the water. The preparation and installation procedure for the 45-degree bundles will be as follows:

1. Bundle 3 willow and/or dogwood cuttings together in the same orientation (tops up and butts on the ground). Bundles will be as uniform as possible, and the butts of the cuttings will be at the same level to ensure that no butts will be out of the water when installed. Tie bundles one foot from the top end and one foot from the butt end with pre-stretched cotton string, sisal rope, cord or non-galvanized tie wire (no jute or plastic twine will be utilized).
2. Place toe rock (if called for in design specifications) in key trench and continue placing rock up the bank to 1 foot above existing water level elevation.
3. Place track hoe bucket immediately above laid rock pointed down toward the base of the streambank at a 45-degree angle.
4. Push the bucket down at a 45-degree angle until the teeth reach an elevation that is at least 4 feet below bankfull elevation and 1-foot below the existing water level.
5. Stop pushing down and lift the bucket enough to create a small opening between the bucket and the substrate underneath it.
6. Push the bundle into the hole by hand until the butt end is seated on the bottom of the hole, and the bundle is laying on the rock rip rap. The butt end of the bundle must be 1 foot below the low-flow water table when installed.
7. Pull the bucket out of the hole dropping remaining soil/alluvium on the bundle.
8. Ensure that the top of the bundle protrudes at least 1 foot above the rock ensuring that a minimum of 3 or 4 axillary buds remain on the above-ground portion, and trim off any excess.
9. Continue laying rock up the bank until the design bankfull elevation is reached.
10. Install 45-degree bundles on

### Brush Trenches

Brush trenches will be constructed on the floodplain bench and oriented perpendicular to the flow. The preparation and construction procedure for the brush trenches will be as follows:

1. Trenches will be excavated to the design specification of 10 ft x 2 ft (bottom dimensions) and will be excavated to a depth of 6 feet.
2. Install 20 pre-soaked cuttings along with other live/dead branches into each trench, ensuring that the butts of the cuttings are on the bottom of the trench and into the low-flow water table.
3. Add a small amount of fill into the bottom of the trench while holding the cuttings to ensure they remain upright and will not fall over while backfilling.
4. Carefully backfill the trench with a 50/50 mix of topsoil and native alluvium. Alternate dumping buckets of topsoil/alluvium and buckets of water into the trench, or utilize a water pump to fully saturate the topsoil after the trench has been backfilled to alleviate air pockets and maximize soil-to-stem contact.
5. Ensure that the top of the live cuttings protrude at least 1 foot above the floodplain ensuring that a minimum of 3 or 4 axillary buds remain on the above-ground portion, and trim off any excess.
6. Trenches shall be arranged in a non-uniform pattern on the floodplain, with 1 trench constructed per 1,000 sf of floodplain area.



PO Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83202

### REVEGETATION DETAIL

Big Wood River Restoration Project,  
Broadford Fisherman's Access Area,  
Blaine County, Idaho

Date: 05/28/2019  
Description: Treatment Details  
Scale: N/A

Drawing:

**SHEET 18**



## Best Management Practices

### Notes

1. Every reasonable effort shall be made to conduct the activities shown in these plans in a manner that minimizes adverse impacts on water quality, fish and wildlife, and the natural environment.
2. All work shall be in compliance with permit conditions. It is the contractor's responsibility to have copies of all permits on the job site and to understand and comply with all permit conditions.
3. All activities that involve work adjacent to or within the wetted channel shall at all times, remain consistent with all applicable water quality standards, effluent limitation and standards of performance, prohibitions, pretreatment standards, and management practices established pursuant to the clean water act or pursuant to application state and local law.
4. If at any time, as a result of project activities, fish are observed in distress, a fish kill occurs, or water quality problems develop, operations shall cease and the environmental compliance lead shall be notified.
5. Construction staging and refueling areas to be a minimum of 150 ft from surface waters.

### Erosion, Sediment Control, and Water Management Notes

1. The contractor shall be responsible for implementing all temporary erosion control and dewatering measures. The erosion control and dewatering measures shall be in accordance with all federal, state, and local requirements. The contractor shall be responsible for the maintenance and performance of these measures throughout the duration of the project.
2. Completed dewatering of the log structure installation locations is not required; the contractor shall implement sufficient dewatering to accomplish the work.
3. Activities shall be completed while avoiding and minimizing adverse impacts to waters of the United States to the maximum extent practical through the use of practical alternatives. Alternatives that shall be considered include those that minimize the number and extent of in-water work and equipment crossings of wetted channels.
4. At no time shall sediment laden water be discharged or pumped directly into the Big Wood River. Water shall be discharged to an upland area approved by project proponents.
5. If high water level conditions that cause siltation or erosion are encountered during construction, work shall stop until the water level subsides.
6. All external grease and oil shall be pressure-washed off equipment prior to transport to the site.
7. The contractor is responsible to ensure that no petroleum products, hydraulic fluid, sediment, sediment laden water, chemicals, or any other toxic or deleterious materials are allowed to enter or leach into the subject river, proximate stream, or wetlands.
8. The contractor shall have an emergency spill kit onsite at all times.
9. Contractor to harvest sod where excavation occurs, and replace on disturbed areas as per direction of the project sponsor's representative.
10. Temporary erosion controls will be in place before any significant alteration of the site occurs, and shall be appropriately installed down slope of the project activity within the riparian buffer area until site rehabilitation is complete.
11. If there is a potential for eroded sediment to enter the stream, sediment barriers will be installed and maintained for the duration of project implementation.
12. Sediment will be removed from erosion controls once it has reached 1/3 of the exposed height of the control.
13. Once the site is stabilized after construction, temporary erosion control measures will be removed.



PO Box 8578, 140 E Broadway, Suite 22, Jackson, WY 83202

### IMPLEMENTATION DETAIL

Big Wood River Restoration Project,  
Fisherman's Access Area,  
Blaine County, Idaho

Date: 05/28/2019  
Description: Treatment Details  
Scale: N/A

Drawing:

**SHEET 19**

# City of Hailey

115 MAIN STREET SOUTH, SUITE H  
HAILEY, IDAHO 83333

(208) 788-4221  
FAX: (208) 788-2924

**RECEIVED**

**JUN 19 2019**

**DEPARTMENT OF  
WATER RESOURCES**

June 7, 2019

Idaho Water Resource Board  
322 East Front Street, Statehouse Mail  
Boise, ID 83720

Subject: IWRB Flood Management Grant Application

Dear Idaho Water Resource Board:

The City of Hailey is requesting 2019 IWRB Flood Management Grant funding for the Della View Subdivision Flood Mitigation Project. The total cost of the project is estimated to be \$104,134 and the City of Hailey is requesting \$50,000 and, with the help of the Blaine County Flood Control District, will match the remaining \$54,134. Please see the provided cost estimate for more details.

The City's scope of work involves improving flood mitigation infrastructure in the Della View neighborhood in southwest Hailey. The work consists of installing a floodwater conveyance ditch along War Eagle Dr., connecting to an existing ditch along War Eagle Drive. The goal of this project is to collect low-level floodwater and drain it to the south to lower elevation, City-owned lands back toward the Big Wood River.

Thank you for your consideration. This is an important project for the City and for Della View neighborhood residents. Please let me know if I can provide any additional information. If you have any questions or comments about the City's scope of work, please contact Brian Yeager, the City's Public Works Director. Brian can be reached at (208) 788-9830, ext. 24, or [brian.yeager@haileycityhall.org](mailto:brian.yeager@haileycityhall.org).

Sincerely,



Fritz Haemmerle  
Mayor



## IDAHO WATER RESOURCE BOARD

322 East Front Street, Statehouse Mail

Boise, Idaho 83720

Tel: (208) 287-4800

FAX: (208) 287-6700



### APPLICATION FOR FLOOD MANAGEMENT GRANT

Answer the following questions and provide the requested material as directed. All pertinent information must be provided. Additional information may be requested by the Idaho Water Resource Board (IWRB) depending on the scope of the project and amount of funding requested.

**Incomplete documents will be returned and no further action will be taken by IWRB staff. All paperwork must be submitted within twenty-eight (28) working days prior to the next IWRB meeting.**

Board meeting agendas can be found at: <https://idwr.idaho.gov/IWRB/meetings>

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#### **I. Overview:**

This form applies to the IWRB Flood Management Grant Program. The Flood Management Grant Program provides financial assistance, on a competitive statewide basis, to eligible entities interested in pursuing flood damaged stream channel repair, stream channel improvements, flood risk reduction, or flood prevention projects. Pursuing flood management improvement and repair projects can assist in maintaining flow capacities in major waterways, prevent bank and channel erosion, and reduce property damage during flood events.

The grant funding shall require a 50% funding match by the sponsor of the total project costs. In-kind services can account for up to 30% of the total project costs. Legal/Administrative in-kind services are limited to 5% of total project costs.

Funds will be distributed by sponsor submitting funding reimbursement requests, which shall include:

1. Cover letter formally requesting a funding reimbursement, description of project activities, dates of project activities, and contractor or supplier invoices. Funds shall be distributed within 15-days of receipt of reimbursement request.

Upon completion of the project, sponsor and/or consultant, shall submit a notice of completion to the IWRB, and that the improvements and/or repairs were constructed in substantial conformance with the approved plans and specifications.

#### **Prepare and attach a "Grant Document" to this application.**

The Grant Application Document requirements are outlined in the IWRB Flood Management Grant Program Guidelines. The guidelines can be found at:

<http://idwr.idaho.gov/IWRB/Programs/Financial>

You can also obtain a copy by contacting IWRB staff.



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## **II. General Information:**

### **A. Type of organization: (Check box)**

- ☐ Flood Control District  
☒ Municipality  
☐ County  
☐ Other

City of Hailey

Organization name

Brian Yeager, City Engineer

Name and title of Contact Person

115 Main St. S., Suite H

PO Box/Street Address

208-727-7614

Contact telephone number

Hailey, Blaine County, ID, 8333

City, County, State, Zip Code

brian.yeager@haileycityhall.org

e-mail address

82-6000201

Taxpayer ID#

Project location/ legal description War Eagle Drive- Della View Subdivision

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**B. Is your organization registered with the Idaho Secretary of State's office? Yes ☒ No ☐**

### **C. Purpose and project description for this grant application.**

- ☐ Stream Channel Repair  
☐ Stream Channel Improvement  
☒ Flood Risk Reduction  
☐ Flood Prevention  
☐ Other \_\_\_\_\_
- 

## **III. WATER PROJECT/ACTIVITY:**

### **A. Water Source and Name:**

- ☒ Surface ☐ Reservoir  
☐ Other \_\_\_\_\_

**B. Describe the Flood Management Project/Activity and the primary purpose of this grant application?**

Improvements to the system of floodwater conveyances along War Eagle Drive.

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**C. Does this project/activity address multiple objectives? If so explain.**

Yes, the project addresses multiple objectives. This project will: 1. Mitigate flood impact to public property, such as undercutting and/or erosion of roadways, 2. Mitigate flood impact to City park lands and park amenities, 3. Mitigate flood impact to private property, such as driveway access and landscape damage, 4. Mitigate duration of flood events, allowing homeowners to stay in their homes, 5. Reduce expense of annual City flood response activities (road closures, sandbags, personnel, etc.), 6. Reduce expense associated with repair of damages to public and private property, 7. Reduce the occurrence of questionable and/or unlawful private property flood mitigation activities and 8. Create momentum to implement complementary projects to restore floodplain function and increase resiliency to flood events.

**D. Will this flood management project/activity be implemented in a single year, or phased over multiple years?**

☒ 1-year      ☐ Multiple-years (Phased)

**E. Project start and completion dates:**

Funding Award	July 27, 2019
Final Design Commence	August 10, 2019
Final Design Complete	September 21, 2019
Bidding Complete	October 12, 2019
Construction Commence	October 31, 2019

**F. Project detailed cost estimate, including all labor and materials:**

See attached cost estimate.

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**G. Has your organization performed stream channel or stream bank repair and/or improvement projects in the past?**

Yes, in 2018 the City constructed a system of ditches and culverts around and within Heagle Park and War Eagle Drive to convey flood water back to the river. This project is an upstream extension of that system intended to further mitigate flooding along War Eagle Drive.

**H. Provide the required regulatory approval and permit documents for this project.**

City of Hailey Floodplain Development Permit.

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**IV. FINANCIAL INFORMATION:**

A. Does your organization have a regular assessment for a reserve or special needs fund?

Yes ☒ No ☐

B. Does your organization have prior experience in working with the Idaho Water Resource Board?

Yes ☒ No ☐

C. What other sources of funding have been explored to fund the project? (e.g. U.S. Army Corps of Engineers, NRCS, FEMA, Banks, Local Government, etc.)

Blaine County Flood Control District

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---

Amount of funds requested: \$50,000.00



*By signing this document you verify that all information provided is correct and the document is filled out to the best of your ability.*

Authorized signature& date:

*Pat Cleaver* 6/17/19



# Idaho Water Resource Board Flood Management Grant

## City of Hailey Grant Application Document

### 2.1 BACKGROUND INFORMATION

#### 2.1.1 Purpose

The proposed project is a flood mitigation infrastructure project in the Della View neighborhood in southwest Hailey. The infrastructure work consists of installing floodwater conveyance ditches along War Eagle Drive. These improvements would connect to a recently constructed conveyance ditch along War Eagle Drive. The goal of this infrastructure is to collect lower-level flood waters and drain it to the south along lower elevation lands back toward the Big Wood River.

The placement of the new infrastructure coincides with water flow patterns through the neighborhood. The lack of conveyance infrastructure causes floodwater to collect and impact private properties north and east of War Eagle Drive. This proposed conveyance ditch along War Eagle Dr. will more effectively collect floodwater coming out of the Draper Preserve, and then move it into the recently constructed conveyance ditches west of Heagle Park. This northwest section of War Eagle is susceptible to extended periods of floodwater that can severely erode the roadway edge of asphalt and driveway accesses. The project will better protect both public and private infrastructure from damages.



Please refer to the attached Concept Plan that shows the proposed infrastructure.

The Della View neighborhood is prone to spring run-off flooding from the Big Wood River. The severity and duration of flooding is determined by many variables, including volume of snowpack, spring temperature patterns, and spring rainfall patterns. In 2017, the neighborhood experienced the worst flooding in its history, causing nearly \$750,000 in private property insurance claims. The City incurred \$200,000 in expenses for flood response and clean-up. The 2017 flooding was so severe and prolonged, that the nature of the river has changed, and it now takes less water to impact the neighborhood than in the past. This spring, the neighborhood is once again experiencing flooding, even though the City had a light winter. The concerned residents in Della View would be pleased to see any steps taken that will begin to mitigate the flood risk. It is urgent that the City begin to implement flood mitigation projects, however small. The proposed project is an important step that builds upon previous flood control improvements and can be a building block and increase momentum toward future, larger projects (with multiple partners) that can focus on in channel work and restoring floodplain functionality.

The project budget is estimated at \$104,134. The City is requesting \$50,000 in grant funding from IWRB. The City's match is \$54,133 (\$50,000 cash; \$4,113 in kind).

### **2.1.2 Project Area Description**

Hailey is located in Blaine County, within the Wood River Valley, a narrow river corridor that runs north to south in the mountains of south central Idaho. The topography of the valley floor generally slopes to the south. The Big Wood River runs north to south down the valley, passing through Ketchum, Hailey and Bellevue, as well as through unincorporated county lands. For the purposes of this grant application, the Big Wood River is the waterway of concern. The project is located on City of Hailey right of way, all within a residential neighborhood. There are no bridges, irrigation structures, or facilities at the project location.

### **2.1.3 Previous Projects and Studies**

In April 2018, the Hailey City Council adopted the Hailey Greenway Master Plan (HGMP), a joint plan of the City of Hailey and the Wood River Land Trust. The plan addresses the greenway corridor adjacent to, and east of, the Big Wood River between the Bullion Street Bridge and Colorado Gulch Road. This 1.5 mile reach of the river encompasses the Della View neighborhood, generally at the center of the reach.

The *HGMP, Section 5.3, River Restoration and Floodplain Function*, includes a number of potential actions that can be taken to restore floodplain functionality and mitigate neighborhood flooding. The conveyance ditches proposed in this grant application are included in this section of the HGMP. The HGMP can be found on the City of Hailey's website at the following address: <https://www.haileycityhall.org/documents/2018-0423HGMPFINAL-hires.pdf>

In 2018 the City constructed several conveyance structures with the aid of grant monies to convey floodwaters downstream of this project back to the stream channel. Recent high flows in excess of 5.5 feet at the Hailey stream gauge on the Big Wood River showed that the

improvements are successfully decreasing overland flow and directing flood waters back to the river.

In the fall of 2017, the City of Hailey incurred engineering expenses to prepare two grant applications to the Federal Emergency Management Agency (FEMA), for an extensive, neighborhood-wide flood mitigation infrastructure project. The City's engineer (Galena Engineering) was responsible for concept-level engineering design and cost estimates for the proposed infrastructure. Therefore, the City is confident that the project proposed in this grant application will effectively mitigate low-level flooding in the Della View neighborhood.

Prior to submitting the FEMA grant applications, the City worked with Blaine County to update the All Hazard Mitigation Plan to include specific flood mitigation work in the Della View neighborhood. The amended plan was uploaded to the Idaho Office of Emergency Management and FEMA.

In July 2017, the U.S. Army Corps of Engineers prepared a Technical Assistance Report, which provides valuable background information and context for the proposed project. The Technical Assistance Report can be found on the City of Hailey's website at the following address:

<https://www.haileycityhall.org/documents/HaileyIDArmyCorpsReport07072017.pdf>

## **2.2 PROJECT SPONSOR**

The City of Hailey is a municipality, established in 1881. Municipal corporations are established and governed by Title 50 of Idaho Code.

Entrepreneur John Hailey purchased land between Bellevue and Ketchum in December 1880. The town was officially formed shortly thereafter. In the early years, mining was the main activity of the town. But once the mining boom was over, other activities began, most notably sheep grazing and other livestock. In the mid-1930s, the U.S. Forest Service built a large administrative site in Hailey. The scenic beauty of the area attracted many visitors, and better roads in the 1920s and 1930s increased tourist traffic. Although the creation of Sun Valley resort in 1936 had a more direct impact on Ketchum, Hailey felt the increase in numbers of visitors and potential residents. Tourism continues to play a major role in the economic health of Hailey and the region. The City of Hailey municipal government has played a key role throughout the years, including the development and maintenance of public infrastructure. The City now employs in excess of 50 full time employees.

The City's primary revenue sources include the following:

- General Government Taxes
- Franchise Fees
- State Sales, Highway and Liquor Taxes
- Leases and Contracts
- Water and Wastewater User Fees
- Fines, Fees and Permits
- Local Option Tax, Interest, Donations, Grants and Miscellaneous

The City is responsible for the following services and public infrastructure:

- Public Works, including streets, water system, wastewater system, parks, trails, public trees, and public buildings



- Emergency Services, including disaster response and recovery, and police and fire services
- Public Library
- Community Development, including building and planning services
- Clerk and Treasurer duties, including records and finance

#### **2.4.1.a PROJECT DESCRIPTION**

The Big Wood River is the waterway of concern in the proposed project. The work location lies to the east of, and is adjacent to, the Big Wood. As shown on the vicinity map, the project site is in the Della View neighborhood, in southwest Hailey.

Previous work consisted of installing a connected system of floodwater conveyance ditches along War Eagle Dr., Triumph Dr., and through Heagle Park. This project proposes to extend the ditch along the east side of War Eagle Drive. The ditch design varies depending on the location. The new ditch will use either compacted structural backfill, or a combination of two sizes of crushed rock. At driveway crossings and where the ditch crosses Della Vista Dr. at War Eagle, the City will install culverts. This project also include installing culverts across War Eagle Dr. to connect the War Eagle ditch to the recently constructed ditch adjacent to Heagle Park that connects to the river.

The ditch along War Eagle Dr. will convey floodwater to one of the two existing conveyance ditches through Heagle Park. The recently constructed ditches in the park terminate into unoccupied, lower elevation, City-owned lands to the south, conveying all floodwaters back towards the Big Wood River.

The proposed project is intended to mitigate lower-flow flooding, which is much more common in the neighborhood than large, disaster-level flood events as were experienced in 2017. These lower-flow events are now expected to occur annually. For example, during a low snow year, the Big Wood at this location overtopped its banks at 3.8 feet, causing flooding in the neighborhood. The historic flood stage at this location is 6 feet. The streets and neighborhood have experienced continuous flooding for more than a month in duration. Installing the proposed infrastructure has the following benefits:

- Mitigate flood impact to public property, such as undercutting and/or erosion of roadways
- Mitigate flood impact to City park lands and park amenities
- Mitigate flood impact to private property, such as driveway access and landscape damage
- Mitigate duration of flood events, allowing homeowners to stay in their homes
- Reduce expense of annual City flood response activities (road closures, sandbags, personnel, etc.)
- Reduce expense associated with repair of damages to public and private property
- Reduce the occurrence of questionable and/or unlawful private property flood mitigation activities
- Create momentum to implement complementary projects to restore floodplain function and increase resiliency to flood events

#### **2.4.1.b-e MAP, CONCEPTUAL PLAN/CROSS SECTION, FEATURES, ROW**

Please see the attached concept plan for a map of the entire project area showing the location of both the proposed work and previously completed work relative to other pertinent features.

The proposed trapezoidal ditch cross section for this project will have a 2' wide flat bottom with 2:1 side slopes. There will be 4-6" of compacted 2" minus aggregate across the ditch section to stabilize and minimize erosion. Driveway or roadway crossings are currently proposed as 21"x15" arch culverts.

Approximately 500 cubic yards of material will be removed from the floodplain for construction of the conveyance ditches, and they will disturb approximately 3,300 square yards of roadside area. Imported structural gravel will be used to line the ditches after initial shaping and will consist of uniformly graded fractured material sourced from local gravel pits. Subgrade and structural gravel will be compacted to 95% maximum laboratory density as defined by AASHTO T-99 to minimize future erosion.

All work will be performed along existing roadside or other previously disturbed areas during the dry season with no water present. Because of this, turbidity and other water quality issues will not be present, and compaction/stabilization can be achieved using conventional earthwork techniques. There are no other factors that require special consideration other than the use of low profile conveyance structures to prevent underground conflicts with existing utilities.

All project locations are owned by the City of Hailey. No right of way acquisition or easements are required to implement the project. A City of Hailey Flood Hazard Development Permit is the only permit required for this work, and is attached to this application.

## **PROJECT EXPERIENCE**

The City of Hailey Public Works Department routinely works with engineering teams to design, bid, and construct a wide variety of projects, including street construction, reconstruction and rehabilitation projects; grading and drainage projects; shoulder repair projects; water and wastewater system projects; and park development projects. In addition, the department oversees new subdivision development projects.

The City is responsible for maintenance and repair of culverts at Hiawatha Canal crossings throughout the city. The Hiawatha Canal terminates at its south end at Fox Acres Road. The canal that runs approximately three miles south from Fox Acres Road to the SH 75 signal at Woodside Boulevard, is owned, maintained and repaired by the City, including any required bank stabilization work.

Recently, the City installed flood mitigation infrastructure in the Della View neighborhood, comprised of an improved wastewater lift station access road, an improved paved access to the lift station road to reduce erosion at the entrance, and a removable flood protection barrier around the lift station itself. The City is currently designing and implementing both preventative measures and repairs in response to damages caused by sheet flooding in southeast Hailey in late winter 2018. The City also completed repair and rehabilitation, in coordination with the City's contract engineer (Galena Engineering), in the Della View neighborhood after the 2017 flooding.

The City has successfully completed one IWRB groundwater conservation grant, and is currently carrying out a second grant. Both groundwater conservation grants are for Water Smarty, the City's lawn replacement rebate program. The City participated in an IWRB Flood Management Grant with Blaine County. To date, all grant requirements have been met by the City.

The City of Hailey has the background and experience to effectively implement the proposed work.

## **PROJECT TEAM**

The City will work with its contracted engineer, Galena Engineering, to complete final design and bid the project for construction. Brian Yeager, P.E. / P.L.S., the City's Public Works Director, is the Project Manager for the proposed project. The City will adhere to all grant requirements, including monthly progress reports, final report, project documentation, and project certification. Key personnel includes:

- Brian Yeager, P.E. / P.L.S., Public Works Director and Project Manager
- Kelly Schwarz, Street Division Manager and Field Inspections
- Tracy Anderson, Project Support

### **2.4.2 Cost Estimate**

Please see the attached detailed budget spreadsheet for the estimated project cost.

### **2.4.3 Implementation Schedule**

The anticipated project implementation schedule is as follows:

Funding Award .....	July 27, 2019
Final Design Commence.....	August 10, 2019
Final Design Complete .....	September 21, 2019
Bidding Complete .....	October 12, 2019
Construction Commence .....	October 31, 2019

## **2.5 Financial Feasibility Analysis**

The total project cost is \$104,134; the Idaho Water Resource Board grant request is \$50,000. As shown on the attached budget spreadsheet, the City will contribute \$50,000 cash to the project and \$4,133 of in-kind services, for a total match of \$54,133, or 52.0% of the project cost.

## **2.6 Supporting Information**

Attached is a commitment letter and letter of support from the Blaine County Flood Control District. Also attached is a letter of approval for a City of Hailey Flood Plain Development Permit.





**PRELIMINARY**

# An Opinion of Probable Construction Cost for

## Della View Flood Improvements - 2019/2020

06/07/19

#	Item & Category Description	Unit	Grant Qnty	Unit Cost	Item Cost	Category Cost
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**Project Description:** This is a preliminary construction cost estimate for construction of a new roadside drainage ditch along the East side of War Eagle Drive that would commence on the south side of Della Vista Drive and then proceed northerly approximately 600 linear feet to a point opposite the Draper Preserve entrance, plus or minus, dependant on funding.

This new/proposed roadside drainage ditch project will tie into a pending roadside drainage ditch planned to be constructed this summer/fall which was previously funded by IWRB and Blaine County FCD. The pending ditch will commence at the south side of Della Vista Drive thence proceed southerly approximately 300' to the entrance of the existing dual 24" culverts (see attached preliminary design).

1	Remove and Dispose of Trees off site	L.S.	1	\$3,000.00	\$3,000.00	
2	Sawcut, Remove & Dispose Asphalt	SY	40	\$15.00	\$600.00	
3	Excavation & Disposal off site	CY	500	\$25.00	\$12,500.00	
4	Lower Existing Utilities as necessary (Estimate)	LS	1	\$4,860.00	\$4,860.00	
5	2" Minus Aggregate	CY	200	\$50.00	\$10,000.00	
6	21"x15" Pipe Arch CMP (RR Quality) OR Dual 18"	LF	200	\$165.00	\$33,000.00	
7	Install Culvert inlet aprons & bar rack	EA	6	\$500.00	\$3,000.00	
8	Lean Concrete Backfill for Trench Crossings	SY	30	\$85.00	\$2,550.00	
9	Topsoil and Grass Seed	SY	100	\$11.53	\$1,153.00	
10	¾" Aggregate	CY	12	\$100.00	\$1,200.00	
11	Asphalt Pavement	SY	80	\$85.23	\$6,818.40	
12	Traffic Control	LS	1	\$1,000.00	\$1,000.00	
					<b>Subtotal</b>	<b>\$79,681</b>

13	Mobilization		1	8.0%	\$6,375	
14	Design Engineering & Basemap Surveying		1	6.0%	\$4,781	
15	Construction Surveying		1	1.5%	\$1,195	
16	Construction Inspection: City Street Dept.		20	\$48.84	\$977	
17	Construction Inspection: City Engineer		40	\$61.03	\$2,441	
18	Administration: City Staff		20	\$35.77	\$715	
19	Construction Contingency		1	10.0%	\$7,968	
						<b>\$24,452</b>

<b>20</b>	<b>Total Opinion of Probable Construction Cost</b>					<b>\$104,134</b>
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City Match: Cash (Flood Control District Grant)

City Match: In Kind (rows 16-18 previously)

**Total Match**

**Percentage of Total Project**

**Total Grant Request**

\$50,000

\$4,133

**\$54,133**

**52.0%**

**\$50,000**



## MEMORANDUM

**TO:** Brian Yeager, City Engineer, City of Hailey

**FROM:** Rebecca F. Bundy, Certified Floodplain Manager  
Lisa Horowitz, Community Development Department Director

**RE:** Permit #19-006, Della View Subdivision Flood Mitigation Project

**DATE:** June 13, 2019

---

Brian Yeager, City Engineer, City of Hailey has recently submitted an application for flood hazard development permit approval of a conceptual design for a conveyance ditch on the east side of War Eagle Drive in the Della View neighborhood as part of a grant application to the Idaho Water Resource Board. The location is entirely located in the Special Flood Hazard Area (SFHA) of FIRM Panel 0664E, dated November 26, 2010.

The project proposes to extend an existing ditch along the east side of War Eagle Drive to serve properties further to the north. The ditch design varies depending on the location. The new ditch will use either compacted structural backfill, or a combination of two sizes of crushed rock. At driveway crossings and where the ditch crosses Della Vista Dr. at War Eagle, the City will install culverts. This project also includes installing culverts across War Eagle Dr. to connect the War Eagle ditch to the recently constructed ditch adjacent to Heagle Park that connects to the river.

The ditch along War Eagle Dr. will convey floodwater to one of the two existing conveyance ditches through Heagle Park. The recently constructed ditches in the park terminate into unoccupied, lower elevation, City-owned lands to the south, conveying all floodwaters back towards the Big Wood River.

The proposed project is intended to mitigate lower-flow flooding, which is much more common in the neighborhood than large, disaster-level flood events as were experienced in 2017. These lower-flow events are now expected to occur annually.

### SUBSTANTIAL IMPROVEMENT/DAMAGE DETERMINATION:

The proposed project is a drainage project and is not subject to substantial improvement/damage regulations.

This permit for flood hazard development permit for Permit #19-006, Della View Subdivision Flood Mitigation Project, located in the SFHA, has been **approved**, per evaluation of the applicable standards below, with the following conditions of approval:



1. The applicant shall submit detailed construction documents describing the proposed work for review and approval prior to commencement of any work.
2. All affected utilities shall be designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding to the flood protection elevation in effect at the time of original placement of those utilities; and
3. Any chemicals or other toxic materials that could cause contamination of surface waters or groundwater, or that could be injurious to public health, safety and welfare, shall be located at the flood protection elevation and stored in a manner that prevents their release in the event of a flood.

June 10, 2019

Idaho Water Resource Board  
322 East Front Street  
PO Box 83720  
Boise, ID 83720

Subject: Flood Management Grant Application

Dear Board:

We are in support of the City of Hailey's grant application to install drainage channels and culverts along streets in Della View Subdivision. The partnership between Hailey's public works staff, who engineered the project and will administer the grant, and Flood Control District No. 9, who is providing matching funds, is made fully possible by this grant. We appreciate your consideration of funds for this project, and plan to match the grant awarded by the Idaho Water Resource Board with a \$50,000 contribution.

Thank you so much for your consideration of these carefully engineered projects, which protect City infrastructure and homes within the 100-year flood plain within Hailey.

Respectfully,

A handwritten signature in black ink, appearing to read "David Bell". The signature is stylized with a large, looped "D" and a cursive "Bell".

David Bell  
President, Flood District No. 9

Idaho Water Resources Board  
322 E. Front St.  
Boise, ID  
83720

6/21/19

Dear Idaho Water Resources Board,

The Wood River Valley Irrigation District 45 and Triangle Irrigation District (jointly 'Diversion 45 districts') respectfully request \$59,050 for the Diversion 45 Flood Mitigation Project on the Big Wood River.

The Diversion 45 districts propose a Flood Mitigation Project located on the Big Wood River just up stream of the D45 diversion in the town of Bellevue. This project will alleviate erosion and flood damage to the streambank and supporting wood plank that protects the D45 headgate and the public Howard Preserve. Work is proposed to occur during November 2019. We have secured match funding from the Diversion 45 districts, Flood Control District No. 9, and Trout Unlimited. The attached contractor bid proposal highlights costs associated with this proposal.

This project is part of a new collaborative effort along the Big Wood River in Bellevue to implement treatments that will address ongoing flooding in a holistic manner. We are excited to work with this group of landowners, City representatives, non-profit organizations, and community members to improve practices along our river and its floodplain.

Respectfully,

A handwritten signature in black ink, appearing to read 'Justin Stevenson', written over a horizontal line.

Justin Stevenson  
D45 Manager



---

## **II. General Information:**

### **A. Type of organization: (Check box)**

- ☐ Flood Control District  
☐ Municipality  
☐ County  
☒ Other

Board of Controls Irrigation  
Organization name

Justin Stevenson  
Name and title of Contact Person

PO Box 736  
PO Box/Street Address

208-720-1409  
Contact telephone number

Bellevue, ID 83313  
City, County, State, Zip Code

justinflood75@hotmail.com  
e-mail address

47-5234823  
Taxpayer ID#

Project location/ legal description Immediately upstream of the Diversion 45 headgate structure  
off Big Wood River in Bellevue

B. Is your organization registered with the Idaho Secretary of State's office? Yes ☒ No ☐

### **C. Purpose and project description for this grant application.**

- ☐ Stream Channel Repair  
☐ Stream Channel Improvement  
☒ Flood Risk Reduction  
☒ Flood Prevention  
☐ Other \_\_\_\_\_

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## **III. WATER PROJECT/ACTIVITY:**

### **A. Water Source and Name: Big Wood River**

- ☒ Surface ☐ Reservoir  
☐ Other \_\_\_\_\_

**B. Describe the Flood Management Project/Activity and the primary purpose of this grant application?**

The Diversion 45 Flood Mitigation Project will reduce annual erosion and flood damage to 500 ft of streambank on the Big Wood River. This section of streambank is important to maintain irrigation water delivery and public safety in Bellevue.

**C. Does this project/activity address multiple objectives? If so explain.**

This project has been identified in a suite of projects designed to address ongoing alterations to the Big Wood River in Bellevue. Addressing water delivery and erosion around the Diversion 45 headgate is a high priority and will be the first of several projects implemented in this reach.

**D. Will this flood management project/activity be implemented in a single year, or phased over multiple years?**

☒ 1-year      ☐ Multiple-years (Phased)

**E. Project start and completion dates:**

This project is scheduled to start on July 30, 2019. Construction is scheduled for November, 2019.

**F. Project detailed cost estimate, including all labor and materials:**

The total cost is estimated at \$136,457. The request to IDWR is \$59,050 (43%) of total project costs.

**G. Has your organization performed stream channel or stream bank repair and/or improvement projects in the past?**

Diversion 45 maintains the existing streambank and performs instream work for irrigation water delivery annually. Partner Trout Unlimited has implemented stream channel work in the Big Wood River.

**H. Provide the required regulatory approval and permit documents for this project.**

If required, permits will be acquired from the Army Corps of Engineers, IDWR, and Blaine County

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**IV. FINANCIAL INFORMATION:**

A. Does your organization have a regular assessment for a reserve or special needs fund?

Yes ☒ No ☐

B. Does your organization have prior experience in working with the Idaho Water Resource Board?

Yes ☒ No ☐

C. What other sources of funding have been explored to fund the project? (e.g. U.S. Army Corps of Engineers, NRCS, FEMA, Banks, Local Government, etc.)

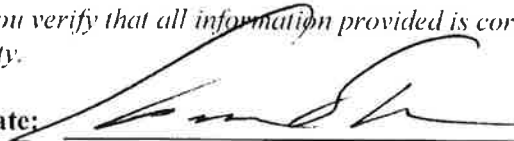
Match funding has been secured from Diversion 45 irrigation districts, Flood Control District No. 9, and Trout Unlimited.

---

**Amount of funds requested:** \$59,050

*By signing this document you verify that all information provided is correct and the document is filled out to the best of your ability.*

**Authorized signature & date:**

 6-20-19



## **2.1 Project Background Information**

### **2.1.1 Purpose**

The Diversion 45 Flood Mitigation Project will alleviate flood damage and the risk of flooding along the bank upstream of the diversion headgate structure. Diversion 45 is the largest agricultural irrigation diversion off the Big Wood River and irrigates up to 8,000 acres of land south of Bellevue. The headgate was originally constructed in the late 19<sup>th</sup> century and was rebuilt in the 1980s and is operated by a joint Board of Controls of the Wood River Valley Irrigation District 45 and Triangle Irrigation District ('Diversion 45 districts'). It is located on land owned by the City of Bellevue within the Howard Preserve, which is highly utilized by the public.

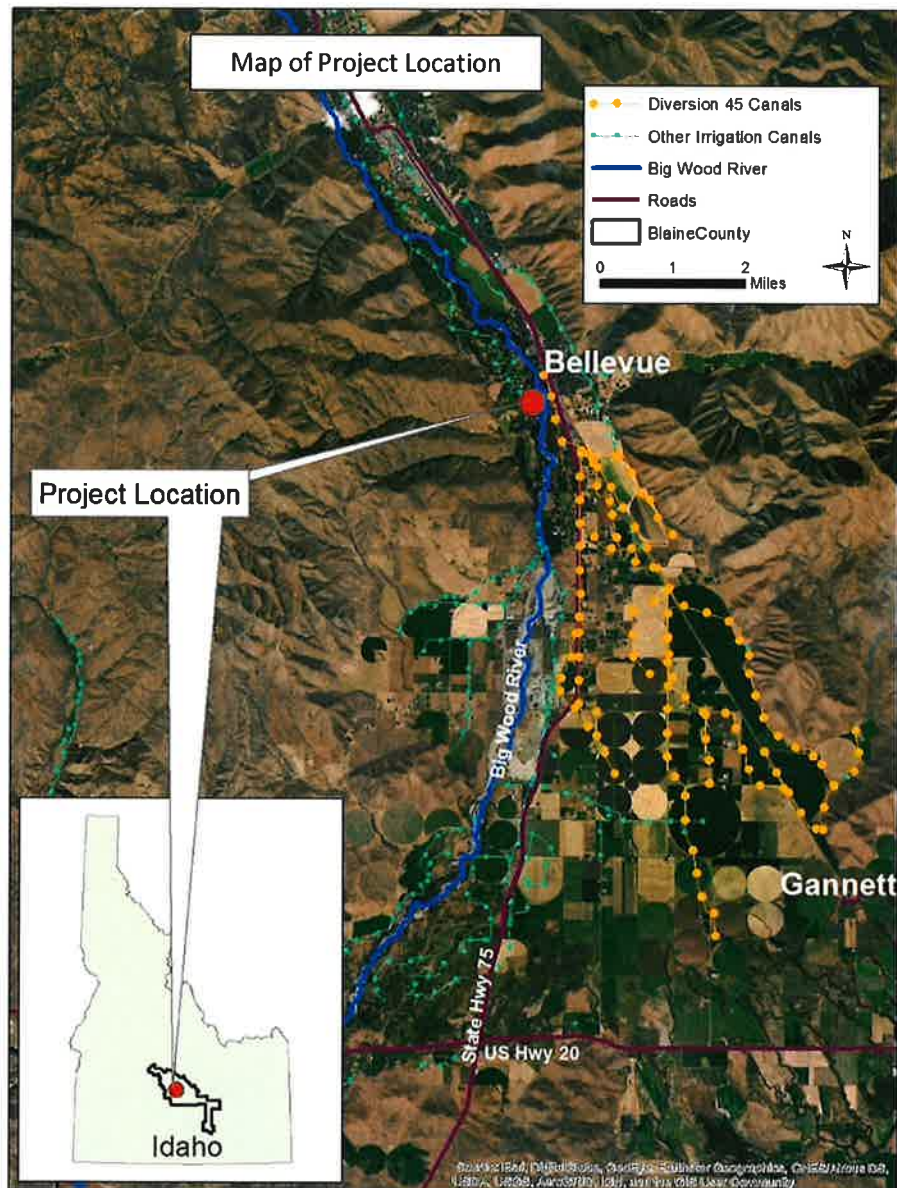
The bank upstream of the diversion was built in the 1960s and experiences annual erosion and extreme high velocities during flooding events. It is currently stabilized by wooden planks, which are exposed to water year-round. During high flow events and flooding, the planks degrade and will eventually fail. Maintaining this streambank is necessary to direct water towards the Diversion 45 headgate. There is a public trail on land owned by the City of Bellevue in the Howard Preserve adjacent to this streambank, as well as the City shop. In order to protect the headgate and public safety, Diversion 45 districts propose to stabilize 500 ft of streambank using treatments aligned with a reach-wide restoration design.

Over the last several decades, projects along the Big Wood River in Bellevue have affected downstream landowners, public trails, and river and floodplain function. These projects caused continual alteration of the river and adversity among neighbors. Within the last six months, a group of private property owners, City of Bellevue staff and councilors, Diversion 45 representatives, Friends of the Howard Preserve, Flood Control District No. 9 board members, and staff from Trout Unlimited and Wood River Land Trust collaboratively came together to fund a geomorphic assessment and design for a one-mile reach of Big Wood River south of Broadford Bridge in Bellevue. The goal is to create a suite of river treatments that are aligned with each other and the river's geomorphology to address ongoing flooding, erosion, and river and floodplain degradation. The group envisions constructing treatments as funds are acquired, and the Diversion 45 flood mitigation project will be the first implemented.

If the Diversion 45 streambank is not properly stabilized, bank erosion will continue to occur and the wooden planks will continue to degrade. Annual maintenance will be required to keep flows directed at the headgate and prevent bank loss. Areas adjacent to the headgate on the public Howard Preserve will also be threatened. The long-term treatments proposed aim to stabilize the streambank using rock toe and woody debris structures. As shown in the Bellevue Reach Design, instream boulder rib treatments are also proposed at Diversion 45, and these will be implemented in the future.

### 2.1.2 Project Area Description

- a. The project site is approximately 500 ft. of the Big Wood River in Blaine County, directly upstream of the Diversion 45 headgate in Bellevue.
- b. Maps





- c. Land use surrounding the project site is residential, industrial, and public.

### 2.1.3 Previous Projects and Studies

Biota Research and Consulting, Inc. 2016. Geomorphic Assessment Report, Big Wood River, Blaine County. Prepared for Trout Unlimited. online <https://woodriverlandtrust.org/bigwoodassessmentupdate/>

Pentzer, C. 2006. Big Wood River Watershed Total Maximum Daily Load (TMDL) Implementation Plan for Agriculture. Idaho Dept. of Environmental Quality. online <https://www.deq.idaho.gov/media/1117170/big-wood-river-ag-imp-plan-0214.pdf>

Rapp, C. F. 2006. Geomorphic Assessment of the Big Wood River. Prepared for Wood River Land Trust. online [http://www.co.blaine.id.us/vertical/sites/%7BBB2A7BCF-1E38-4DB2-AE8E-3A22829A1987%7D/uploads/Rapp\\_Geomorphic\\_Assessment\\_2006.pdf](http://www.co.blaine.id.us/vertical/sites/%7BBB2A7BCF-1E38-4DB2-AE8E-3A22829A1987%7D/uploads/Rapp_Geomorphic_Assessment_2006.pdf)



## **2.2 Project Sponsor**

- a. The project sponsor is the Board of Controls for the Wood River Valley Irrigation District 45 and the Triangle Irrigation District, established by state statute 43-1321. The Board of Controls was created in 2014, when the two separate irrigation districts were created.
- b. The Board of Controls was established in 2014 as the management authority over the mutually owned assets of two irrigation districts, Wood River Valley Irrigation District 45 and the Triangle Irrigation District. Prior to 2014, there was one irrigation district that split into the Wood River Valley Irrigation District 45 and the Triangle Irrigation District. There are approximately 120 different users with state adjudicated water rights.
- c. Revenues are collected through annual assessments from water right holders.
- d. The assets consist of the diversion structure (headgate) on the Big Wood River in Bellevue and approximately 25 miles of constructed canals. There are various smaller diversion and flow management constructs throughout the canals.

Diversion 45 watermaster, John Wright, will be implementing this project, with assistance from Keri York, Trout Unlimited Big Wood River Project Manager. Mr. Wright's duties as watermaster include maintaining the Diversion 45 headgate and delivery system, communicating with individual water users, presenting information to board members, participating in the Wood River Water Collaborative, and working on collaborative projects, such as this. Mr. Wright and Ms. York will secure construction bids, select a contractor, obtain all necessary permits and access agreements, monitor the project, and complete reports for permitting and funding agencies.

Trout Unlimited is a project partner and has experience in Idaho and nationwide completing restoration, flood mitigation, and irrigation projects. Trout Unlimited partners with farmers, ranchers and irrigation companies on pragmatic, voluntary, and market-driven solutions that benefit agricultural operations as well as fish and wildlife habitat. In Idaho, Trout Unlimited has successfully completed numerous projects in the Yankee Fork, Pahsimeroi, Lemhi, Blackfoot, and Upper Snake, and Wood River basins. In 2018, Trout Unlimited and Flood Control Dist. No. 9 received Idaho Water Resources Board grant funding for the Bypass Canal and Bannon Ditch Flood Mitigation Project.

Other affected stakeholders include private landowners near the Diversion headgate, City of Bellevue, Friends of the Howard Preserve, Flood Control District No. 9, and Wood River Land Trust. These stakeholders are part of the collaborative working group along the Big Wood River in Bellevue. Within the suite of projects identified in the recent assessment and design, Diversion 45 was identified as a high priority by the group.

## **2.4 Project Description**

### **2.4.1 Project Description**

#### **a. Project Description**

Diversion 45 proposes to implement rock toe, meander bend treatments, and Best Management Practices to alleviate bank erosion caused by the 2017 flood and other high flow events. By using information from previous studies, including the Big Wood River Geomorphic Assessment

Report, Biota Research and Consulting has completed a design that is aligned with the natural geomorphology of the Big Wood River in this location.

Within the one-mile reach of Big Wood River in Bellevue, rock toe is proposed in places where bank erosion potential is high due to water velocity and/or channel alignment. It is necessary to maintain water flow towards the headgate, and incorporating rock toe and bioengineering will provide bank stability. The treatment design and materials were developed using U.S. Army Corps of Engineers technical references and methodologies that incorporate channel geometry, channel slope, channel depth, flow, velocity, and radius of curvature.

The rock toe will consist of unconsolidated alluvium and may require an underlying geotextile filter depending on channel bank material. Rock toe will extend from the adjacent bankfull elevation down to the local scour depth 3.4 ft below the channel bed elevation. A horizontal to vertical slope of 2:1 with live woody vegetation bundles installed at a 4-5 ft spacing will be applied. The vegetation bundle elevations will alternate between bankfull elevation and 1 ft below bankfull.

Within the rock toe, four meander bend structures will be constructed to stabilize the streambank, increase habitat complexity, and enable the establishment and maturation of woody vegetation. These structures may accumulate additional natural wood throughout time and will reduce near-bank shear stress and erosion. Meander bend structures will be comprised of logs with root wads, broken logs, and boulders. Anchor logs will be keyed into with root wads protruding into the channel, and buried logs will be backfilled with native alluvium and capped with salvaged vegetation. Racking logs and slash will be incorporated to increase complexity, hydraulic roughness, and fish habitat.

Streambank vegetation has additional benefits of filtering nutrients from runoff and reducing instream temperatures. Stormwater and runoff from agricultural fields flows through riparian vegetation and infiltrates into groundwater or flows directly into surface water. Roots and stabilized soil capture Phosphorus and other nutrients, improving water quality. Woody trees and shrubs planted along streambanks cools instream temperatures, which can be elevated to levels of concern for trout species during late summer months.

Success will be measured by the reduction of streambank erosion and flood damage upstream of the Diversion 45 headgate. By designing instream treatments according to the river's geomorphology, the proposed solution will be long-term and will address flood mitigation as well as environmental issues. The incorporation meander bend structures and large woody debris will disperse velocity and lessen high flow impacts on the streambank. Sedimentation and other water quality indicators will continue to be monitored by the Department of Environmental Quality through their BURP program.

During construction, the project will be monitored onsite daily by the Diversion 45 watermaster, Trout Unlimited, and a contracted engineer or geomorphologist to ensure design specifications are followed. Prior to the project, photopoints will be established to provide qualitative

information documenting changes to structures, vegetation, and specific features over time. Baseline photographs and will identify existing conditions, and photographs will be taken after construction to monitor the project. Photographs and annual site visits by Diversion 45 will determine if any project maintenance is required. The Department of Environmental Quality will continue its water quality monitoring on the Big Wood River and provide information in its TMDL documents regarding reductions in sediment load and other parameters.

This project is aimed at mitigating impacts of high water events and alleviating future risk of flooding to irrigation infrastructure and public trails. The benefits include improved streambank stability and reduced erosion by implementing treatments that are part of a reach-wide approach. If this project does not occur, the river will exist in its current state and high flows and flooding will continue to erode the streambank, requiring ongoing maintenance by Diversion 45. Through collaboration between Diversion 45, Trout Unlimited, Flood Control District No. 9 and other stakeholders, this project will be the first in a suite of projects along the Big Wood River in Bellevue. Local contractors and consultants will be hired for engineering, construction, and sourcing materials wherever possible.

b. Map





c. Conceptual Plan/Cross Section

Please see attached Final Design Plan and Cross Sections. The instream rock ramps and boulder ribs will be implemented at a future date.

d. Conceptual Design and Repair Features

The conceptual design and plan uses repair features that will mitigate impacts of past flooding events and alleviate future flooding. Wood structures and rock toe will be installed to protect the streambank, direct flow towards the Diversion 45 headgate, and incorporate large woody debris for structural complexity and fish habitat.

e. Right-of-Way / Easement

Diversion 45 is permitted access to maintain irrigation water delivery, per state statutes.

2.4.2 Cost Estimate

Construction costs are based on a bid from Biota Research and Consulting (see attached Biota Cost Estimate). Additional project costs are included in the total budget below.

<b>Diversion 45 Flood Mitigation Project</b>	
<b>Subcontract Costs - Design</b>	<b>Total Cost</b>
- Field Surveys	\$6,000.00
- Final design report and figures	\$8,370.00
- Construction Drawings	\$5,200.00
<b>Subtotal</b>	<b>\$19,570.00</b>
<b>Subcontract Costs - Permitting</b>	
- Blaine County Stream Alteration Permit	\$4,320.00
-Joint Application (Corps and IDWR)	\$1,080.00
<b>Subtotal</b>	<b>\$5,400.00</b>
<b>Subcontract Costs - Installation</b>	
- Construction Admin - Staking	\$20,000.00
- Equipment Mobilization and Demobilization	\$5,000.00
- Bank Sloping/Contouring	\$3,550.00
- Wood Revetment Removal	\$2,500.00
- Rock Toe	\$50,310.00
- Meand Bend Structures	\$14,000.00
- Ballast Boulders	\$1,300.00
- Willow Bundles	\$2,420.00
- Site Cleanup and Seeding	\$5,000.00
<b>Subtotal</b>	<b>\$104,080.00</b>
<b>Project Management</b>	
- Project management (D45)	\$1,800.00
- Construction oversight (D45)	\$3,200.00
- Pre- and Post- Construction Photopoints (TU)	\$687.60
- Grant reporting, project coordination (TU)	\$1,719.00
<b>Subtotal</b>	<b>\$7,406.60</b>
<b>TOTAL</b>	<b>\$136,456.60</b>

#### 2.4.3 Implementation Schedule

<b>Task</b>	<b>Start Date</b>	<b>End Date</b>
Final Design	July 30, 2019	August 15, 2019
Permitting and Regulatory Review	August 15, 2019	November 15, 2019 or sooner
Pre-Construction Monitoring	October 15, 2019	October 30, 2019
Construction	November 15, 2019	November 30, 2019
Post-Construction Monitoring	December 30, 2019	Annually thereafter

#### 2.5 Financial Feasibility Analysis

The total cost for this project is estimated at \$136,457. The request to Idaho Water Resources Board is \$59,050 (43%). Match funding has been secured through Diversion 45 and Flood Control District No. 9. Diversion 45 and Trout Unlimited are also providing in-kind support for project management, construction oversight, monitoring, and reporting. Please see attached letters match funding sources.

<b>Funding Source</b>	<b>Amount</b>	<b>Status</b>
Idaho Water Resources Board	\$59,050	Pending
Flood Control District No. 9	\$50,000	Secured
Diversion 45 Cash	\$20,000	Secured
Diversion 45 In-Kind	\$5,000	Secured
Trout Unlimited In-Kind	\$2,407	Secured
<b>Total</b>	<b>\$136,457</b>	



June 11, 2019

Justin Stevenson  
Diversion 45  
PO Box 736  
Bellevue, ID 83313

Dear Mr. Stevenson:

Trout Unlimited supports the Diversion 45 Flood Mitigation Project and is committed to providing in-kind match in the amount of \$2,407. This in-kind match will provide project coordination support to Diversion 45, collect monitoring photopoints, and provide grant reports.

The Diversion 45 Flood Mitigation Project proposes to address ongoing bank erosion directly upstream of the headgate to protect irrigation water delivery and public safety. This project is critical to maintaining irrigation water delivery to the Diversion 45, which irrigates approximately 8,000 acres of agricultural land in the Bellevue triangle. Stabilizing the streambank upstream of the diversion also protects the structure and surrounding land from flooding and erosion. The diversion is within City of Bellevue property and the Howard Preserve, which is highly utilized by the public.

The Diversion 45 Flood Mitigation project is part of a suite of projects that will address flooding and river health within one mile downstream of the Broadford Bridge in Bellevue. Trout Unlimited is providing support for a collaborative group of partners interested in improving riparian habitat and river health on the Big Wood River in Bellevue. This project is aligned with other instream and floodplain projects, as part of a mile-long design recently commissioned.

The Diversion 45 Flood Mitigation Project will be one of the first implemented, as part of this collaborative effort that will build community support for river health.

Sincerely,

Keri York  
Big Wood River Project Manager





Flood Control District 9  
P.O Box 3181  
Hailey, ID 83333  
[bwflood9@gmail.com](mailto:bwflood9@gmail.com)

Dave Bell - Chair, Div. 1  
Elizabeth Zellers - Treasure, Div. 2  
Bryan Dilworth- Vice Chair, Div. 3

June 10, 2019

Justin Stevenson, Diversion 45 Manager  
BOC Irrigation  
PO Box 736  
Hailey, ID 83333

Dear Mr. Stevenson:

Flood Control District No. 9 supports the Diversion 45 Flood Mitigation project and is committing \$50,000 in match funding towards this effort.

The Diversion 45 Flood Mitigation project is the upper section of a suite of projects that will address flooding and river health within one mile downstream of the Broadford Bridge in Bellevue. A collaborative group of partners recently funded an assessment and design for this one-mile reach so that future river projects will be aligned together, rather than causing downstream issues. The group plans to implement portions of the design over the next few years.

The project, located just upstream of the Diversion 45 in Bellevue, is designed to address ongoing bank erosion from high water events. The treatments will stabilize the streambank with rock toe and large wood, adding a bioengineering component. This project is critical to maintaining irrigation water delivery to the Diversion 45, which irrigates approximately 8000 acres of agricultural land growing alfalfa, wheat, and some mighty fine barley in the Bellevue triangle. Stabilizing the streambank upstream of the diversion also protects the structure and surrounding land from flooding and erosion. The diversion is within City of Bellevue property and the Howard Preserve, which is highly utilized by the public.

Flood Control District No. 9 supports projects that address flooding and safety issues in the Big Wood and works with partners to fund and implement projects. Flood Control District No. 9 is financially committing \$50,000 in match funding for this project because it addresses flood mitigation, bank erosion, and public safety.

Sincerely,

Dave Bell, Chair  
Flood Control District No. 9

Idaho Water Resources Board  
322 E. Front St.  
Boise, ID  
83720

6/19/19

Dear Idaho Water Resources Board,

The Wood River Valley Irrigation District 45 and Triangle Irrigation District (jointly 'Diversion 45 districts') operate and manage 25 miles of canals and associated ditches which irrigate almost 8,000 acres of crop land south of Bellevue, Idaho. The district is comprised of 120 water users who pay an annual assessment to the district based on their individual water use.

The Diversion 45 districts propose a Flood Mitigation Project located on the Big Wood River just up stream of the D45 diversion in the town of Bellevue. This project would involve the removal of a wood plank wall at the river edge, which was constructed in the early 1960s. This wall is in poor condition, creates high velocity and is in need of replacement. It protects Howard preserve from flooding and also protects the D45 head gates from erosion and potential flooding.

D45 districts are committed to providing \$20,000 toward completing the project as proposed by a one-mile river assessment completed by Biota Research and Consulting, Inc. in June 2019. We would also be committing the D45 water master as project manager and would continue to pay his salary during this project. This is a progressive, long-term treatment proposed by Biota which will take place in a highly visible area.

Our hope is that it will be a model for future treatments on the Big Wood River. This Flood Mitigation Project could be a pilot project to launch other treatments in this stretch of river to address river health and habitat. This project is well aligned with the other treatments which were recommended by Biota in the recent study of a one-mile stretch of river below Broadford bridge in Bellevue.

Respectfully,

A handwritten signature in black ink, appearing to read 'Justin Stevenson', with a long horizontal flourish extending to the right.

Justin Stevenson  
D45 Manager

# Diversion 45 Flood Mitigation Project Photos

Diversion  
45  
Headgate



Downstream  
Extent of  
Project



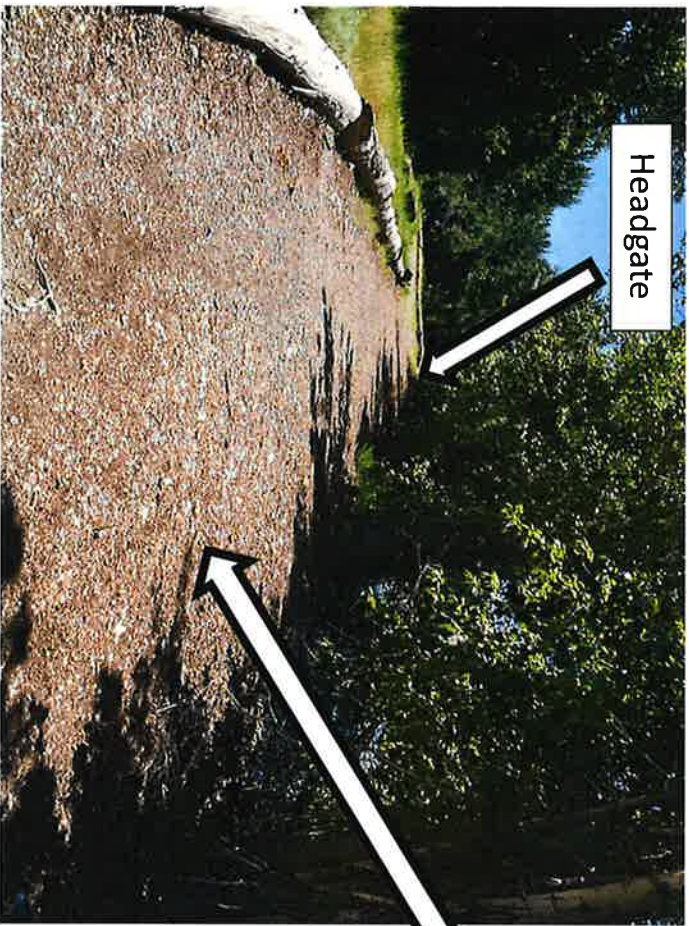


Degraded Wooden  
Planks



Eroding  
Streambank





Headgate

Adjacent  
Public Trail



Eroding  
Streambank

Project Implementation Costs- Highlighted rows reflect costs associated with streambank flood mitigation work

**Implementation Cost Estimate**  
**Bellevue Project Area - District 45 Diversion Area**  
**Blaine County, Idaho**



Saturday, June 01, 2019

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL COST
<b>FINAL DESIGN</b>				
Field surveys (channel cross sections for final design and permitting)	1	ea	\$6,000	\$6,000
Develop final design report and figures	62	hrs	\$135	\$8,370
Develop construction drawings and specifications	40	hrs	\$130	\$5,200
<b>SUBTOTAL</b>				\$19,570
<b>PERMITTING</b>				
Blaine County Stream Alteration Permit	32	hrs	\$135	\$4,320
Joint Application (Corps and IDWR)	8	hrs	\$135	\$1,080
FEMA CLOMR hydraulic modelling, drafting, submittal*	92	hrs	\$130	\$11,960
FEMA CLOMR application fee*	1	ea	\$7,000	\$7,000
<b>SUBTOTAL</b>				\$24,360
<b>MOBILIZATION</b>				
Equipment/Contractor Mobilization and Demobilization	1	ea	\$5,000	\$5,000
<b>SUBTOTAL</b>				\$5,000
<b>RIVER AND FLOODPLAIN RESTORATION</b>				
Bank Sloping/Contouring (cy)	710	cy	\$5	\$3,550
Rock Ramp Fill Material (cy)	1,303	cy	\$10	\$13,030
Rock Ramp Boulder Rib Structures	2	ea	\$39,000	\$78,000
Diversion Dam Modification	1	ea	\$10,000	\$10,000
Wood Revetment Removal	1	ea	\$2,500	\$2,500
Rock Toe (cy)	774	cy	\$65	\$50,310
Sediment Sluice Gate	1	ea	\$25,000	\$25,000
Meander Bend Structures (w/ harvested wood material)	4	ea	\$3,500	\$14,000
Ballast Boulders (2 to 3-ft diameter), delivered	20	cy	\$65	\$1,300
Willow Bundles (river bank treatment)	121	ea	\$20	\$2,420
Site Seeding and Clean-up	1	ea	\$5,000	\$5,000
<b>SUBTOTAL</b>				\$205,110
<b>CONSTRUCTION ADMINISTRATION</b>				
Construction Staking and Supervision	1	ea	\$36,920	<del>\$36,920</del>
<b>SUBTOTAL</b>				\$36,920
<b>PROJECT COST</b>				<del>\$280,060</del>

\$20,000

\$129,050

**NOTICES:**

Estimated costs do not include post-construction survey, engineering, application fees, and analysis to complete a LOMR, which may be required upon completion of project construction.

The information contained here was prepared in May 2019 and is based on information available at that time. Actual costs to complete project activities may vary depending on changing conditions, regulatory requirements, and the needs of the client.





Date: 05/29/2019  
Description: Design Drawings  
Scale 1 inch = 200 feet  
July 2017 Aerial Imagery

Drawing:

**SHEET 10**

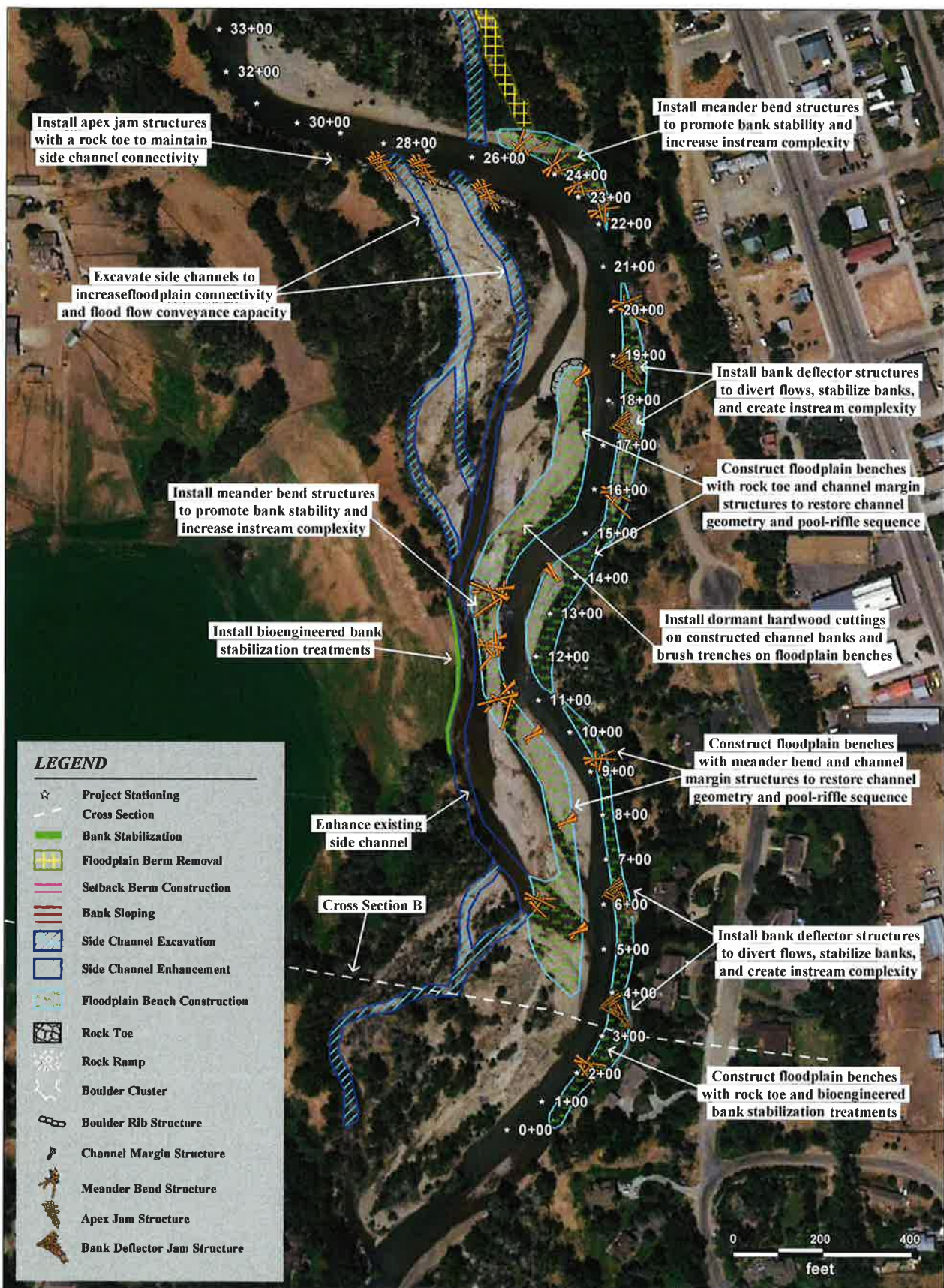
## Conceptual Site Plan - North

Big Wood River Restoration,  
Bellevue Project Area  
Blaine County, Idaho



PO Box 6578, 140 E Broadway, Suite 23, Jackson, WY 83002





Date: 05/29/2019  
 Description: Design Drawings  
 Scale 1 inch = 200 feet  
 July 2017 Aerial Imagery

Drawing:

**SHEET 12**

### Conceptual Site Plan - South

Big Wood River Restoration,  
 Bellevue Project Area  
 Blaine County, Idaho



PO Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83002



# 

Install rock ramp with boulder rib structures for grade control

Install meander bend structures to increase instream complexity

Install rock toe with bioengineering treatments to stabilize banks

Current Proposal

Future Implementation

Remove failing wood revetment and slope bank channel banks

District 45 Canal Headgate

Remove or modify concrete low-head dam structure

Install sediment sluice gate

Future Implementation

Install rock ramp with boulder rib structures for grade control

### 

- ☆ Project Stationing
- Cross Section
- Bank Stabilization
- Floodplain Berm Removal
- Setback Berm Construction
- Bank Sloping
- Side Channel Excavation
- Side Channel Enhancement
- Floodplain Bench Construction
- Rock Toe
- Rock Ramp
- Boulder Cluster
- Boulder Rib Structure
- Channel Margin Structure
- Meander Bend Structure
- Apex Jam Structure
- Bank Deflector Jam Structure

0 50 100  
feet



Date: 05/29/2019  
Description: Design Drawings  
Scale 1 inch = 50 feet  
July 2017 Aerial Imagery

Drawing:

**SHEET 13**

### 

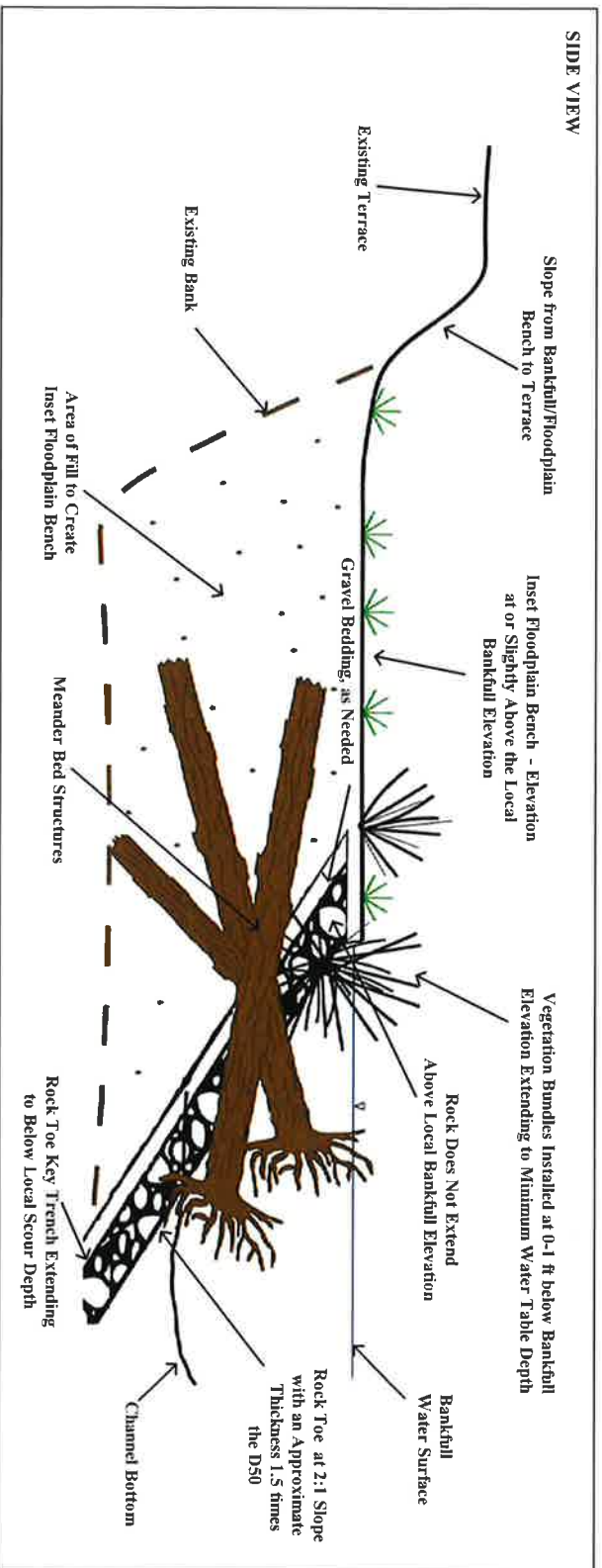
Big Wood River Restoration,  
Bellevue Project Area  
Blaine County, Idaho



PO Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83002



## ROCK TOE STRUCTURE DESIGN DETAILS



### Work Description

This work includes the creation of an inset bankfull floodplain bench and installation of a rock toe with meander bend structures and bioengineering techniques as shown on the typical design drawing. The intent of this structure is to provide bank stabilization to protect the inset floodplain bench while increasing habitat complexity, and providing fish cover.

### Construction Notes

Grade the inset floodplain bench to the local bankfull elevation specified in the construction stakeout points. Construct inset floodplain using native alluvium for fill. Compact fill material with an excavator bucket or similar force in a series of consecutive lifts. Place coarse native materials on the river side of the inset floodplain bench to increase bank stability.

Place dormant hardwood cutting vegetation bundles at an 4 ft spacing along the banks of the inset floodplain bench.

Construct a rock toe on the river side of the of the inset floodplain bench for bank protection. The revetment rock should have a median (D50) size of 24 inches and a maximum (D100) size of 36 inches with an appropriate gradation and approximate thickness of 50 inches. The rock toe should extend from just below the floodplain bench elevation to the local scour depth. The installed rock toe should have a horizontal to vertical slope of 2:1.

Install meander bend structures at designated locations following the construction notes included on the Meander Bend Structure design detail sheet.



PO Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83002

### CONCEPTUAL TREATMENT DETAIL

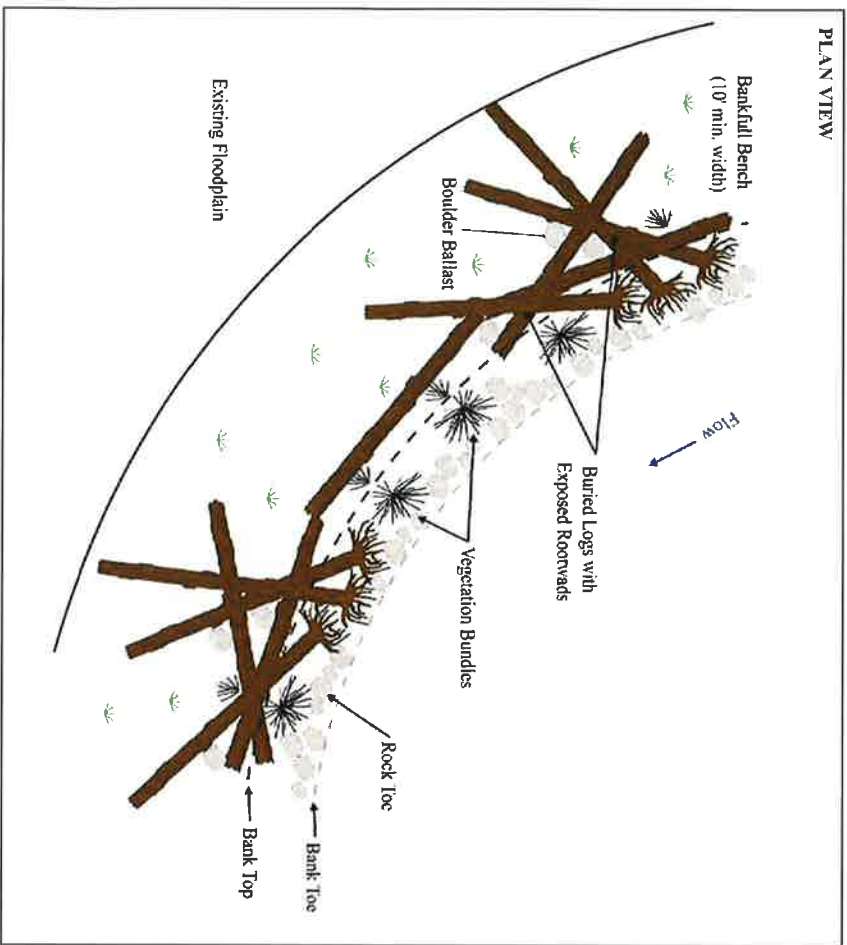
Big Wood River Restoration,  
Bellevue Project Area  
Blaine County, Idaho

Date: 05/29/2019  
Description: Treatment Details  
Scale: N/A

Drawing:

**SHEET 17**

# MEANDER BEND TREATMENT DESIGN DETAILS



## Work Description

This work includes the creation of an inset floodplain bench and installation of wood meander bend structures with bioengineering techniques as shown on the typical design drawing. The intent of this structure is to provide bank stabilization, increase habitat complexity, and provide fish cover.

## Construction Notes

Grade the inset floodplain bench to the local bankfull elevation specified in the construction stakeout points. Construct inset floodplain using native alluvium for fill. Compact fill material with an excavator bucket or similar force in a series of consecutive lifts. Place coarse native materials on the river side of the inset floodplain bench to increase bank stability. A rock toe comprised of native alluvium or imported boulders may be needed under high erosion potential conditions.

Place dormant hardwood cutting vegetation bundles at 4 ft spacing along the banks of the inset floodplain bench.

Revegetate floodplain bench with native herbaceous and woody vegetation and reclaim these areas with broadcast seeding with a native transitional seed mix.

Place channel margin structures as shown on the typical design drawing. Backfill the buried portion of the structure with a minimum depth of 1 ft and compact native fill material with an excavator bucket or similar force in a series of consecutive lifts. Place logs with root wads exposed within the bankfull channel along the channel banks. The orientation of logs should generally follow the typical design drawing for optimal function and stability but may require field adjustments to address site specific conditions during implementation. Place boulders for ballast downstream of structure logs. Place slash and small wood irregularly along the bank and root wads to provide structure and cover. The channel margin structure material quantity sizing is as follows:

- Logs with root wads greater than 18 in diameter and 30 ft length (6 each);
- Broken logs greater than 12 in diameter and 30 ft length (5 each);
- Ballast boulders greater than 24 in diameter (6 each);
- Rock toe boulders, as needed.

## CONCEPTUAL TREATMENT DETAIL

Big Wood River Restoration,  
Bellevue Project Area  
Blaine County, Idaho



PO Box 8578, 140 E Broadway, Suite 23, Jackson, WY 83002

Date: 05/29/2019  
Description: Treatment Details  
Scale: N/A

Drawing:

**SHEET 19**



Clearwater Soil and Water Conservation District  
12730 Highway 12, Suite C -- Orofino, Idaho 83544 -- Phone (208)476-5313

Idaho Water Resources Board  
322 E. Front St.  
Statehouse Mall  
Boise, ID 83720

June 20, 2019

RE: Application for Flood Management Grant: Gold Creek Culvert Replacement Project

To Whom it May Concern,

The Clearwater Soil & Water Conservation District has completed the application for Flood Management Grant funds in accordance with the 2019 program guidelines. The District appreciates the opportunity to submit a project proposal to this source of funds. The proposed project has been developed in partnership with PotlatchDeltic forest engineers. This project will replace an undersized and deteriorated stream crossing in danger of catastrophic failure with a new bridge on Gold Creek, tributary to Dworshak Reservoir (west side). Gold Creek is a Class 1 fisheries stream; the new structure will be fully passable to fish and other aquatic organisms. The project will protect important access to the Grandad bridge recreational area as well as to Federal, State, and Industrial timber producing lands. The project is shovel ready and will begin upon notice of funding award.

The District looks forward to working with the Idaho Water Resources Board on reducing the risk of major roadway failure and loss of access and the resulting sedimentation to Gold Creek and Dworshak Reservoir.

Please feel free to contact our office at 208-400-3008 or by email at [Clearwater.swcd@gmail.com](mailto:Clearwater.swcd@gmail.com).

Sincerely,

TERRY WHITE, Chairman  
Board of Supervisors  
Clearwater Soil & Water Conservation District





## IDAHO WATER RESOURCE BOARD

322 East Front Street, Statehouse Mail

Boise, Idaho 83720

Tel: (208) 287-4800

FAX: (208) 287-6700



### APPLICATION FOR FLOOD MANAGEMENT GRANT

Answer the following questions and provide the requested material as directed. All pertinent information must be provided. Additional information may be requested by the Idaho Water Resource Board (IWRB) depending on the scope of the project and amount of funding requested.

**Incomplete documents will be returned and no further action will be taken by IWRB staff. All paperwork must be submitted within twenty-eight (28) working days prior to the next IWRB meeting.**

Board meeting agendas can be found at: <https://idwr.idaho.gov/IWRB/meetings>

#### **I. Overview:**

This form applies to the *IWRB Flood Management Grant Program*. The Flood Management Grant Program provides financial assistance, on a competitive statewide basis, to eligible entities interested in pursuing flood damaged stream channel repair, stream channel improvements, flood risk reduction, or flood prevention projects. Pursuing flood management improvement and repair projects can assist in maintaining flow capacities in major waterways, prevent bank and channel erosion, and reduce property damage during flood events.

The grant funding shall require a 50% funding match by the sponsor of the total project costs. In-kind services can account for up to 30% of the total project costs. Legal/Administrative in-kind services are limited to 5% of total project costs.

Funds will be distributed by sponsor submitting funding reimbursement requests, which shall include:

1. Cover letter formally requesting a funding reimbursement, description of project activities, dates of project activities, and contractor or supplier invoices. Funds shall be distributed within 15-days of receipt of reimbursement request.

Upon completion of the project, sponsor and/or consultant, shall submit a notice of completion to the IWRB, and that the improvements and/or repairs were constructed in substantial conformance with the approved plans and specifications.

#### **Prepare and attach a "Grant Document" to this application.**

The Grant Application Document requirements are outlined in the IWRB Flood Management Grant Program Guidelines. The guidelines can be found at:

<http://idwr.idaho.gov/IWRB/Programs/Financial>

You can also obtain a copy by contacting IWRB staff.

---

## **II. General Information:**

### **A. Type of organization: (Check box)**

- ☐ Flood Control District  
☐ Municipality  
☐ County  
☒ Other

Clearwater Soil & Water Conservation District

Organization name

12730 Highway 12, Suite C

PO Box/Street Address

Orofino, Clearwater County, ID 83544

City, County, State, Zip Code

82-0294289

Taxpayer ID#

Terry White, Chairperson

Name and title of Contact Person

(208) - 400 - 3008

Contact telephone number

clearwater.swcd@gmail.com

e-mail address

Project location/ legal description Gold Creek Stream Crossing at Diamond Camp, Clearwater County, Idaho  
T 40 N, R 3 E, Section 21, NE corner of the NE corner

B. Is your organization registered with the Idaho Secretary of State's office? Yes ☐ No ☒

### **C. Purpose and project description for this grant application.**

- ☐ Stream Channel Repair  
☒ Stream Channel Improvement  
☒ Flood Risk Reduction  
☐ Flood Prevention  
☒ Other Stream crossing replacement for fish passage

---

## **III. WATER PROJECT/ACTIVITY:**

### **A. Water Source and Name:**

- ☒ Surface ☐ Reservoir  
☐ Other Gold Creek, tributary to Dworshak Reservoir (west side)

**B. Describe the Flood Management Project/Activity and the primary purpose of this grant application?**

This project would construct a bridge to replace a stream crossing that currently consists of two very undersized culverts at a large fill.

The primary purpose of the project is to reduce the risk of flood damage to a key secondary road that is heavily used for recreation and timber haul. In addition, the project would protect water quality and fisheries at a major crossing of Gold Creek, a class 1 fisheries stream.

**C. Does this project/activity address multiple objectives? If so explain.**

Yes, by reducing the risk of failure of this stream crossing and a large fill, the proposed project will protect access on a heavily used recreation and timber haul road as well as protect water quality and habitat for fish and other aquatic organisms in Gold Creek. The new bridge would pass water and debris as well as fish and other aquatic organisms. The project would prevent potentially tons of sediment from entering Dworshak Reservoir, helping to protect its long term capacity.

**D. Will this flood management project/activity be implemented in a single year, or phased over multiple years?**

☒ 1-year      ☐ Multiple-years (Phased)

**E. Project start and completion dates:**

The new bridge would be ordered as soon as the contract with IWRB was in place. The bridge will be delivered approximately 3 months after it is ordered. Installation of the bridge would start around July 1 and be completed by no later than September 1, 2020.

**F. Project detailed cost estimate, including all labor and materials:**

Bridge manufacture, earthwork and installation: \$132,525. Engineering supervision: \$10,000. Design: \$6,406.20.

Project In-kind from PotlatchDeltic: \$5500.00. Grant Administration/ monitoring (Clw SWCD): \$6,464.89

**G. Has your organization performed stream channel or stream bank repair and/or improvement projects in the past?**

Yes, the Clearwater SWCD has over twenty years of experience with stream channel restoration and improvement. Notably, last year we replaced 2 culverted stream crossings with bridges on Washington Creek. In addition, we replaced multiple culverts on Quartz Creek under an IWRB Flood grant.

**H. Provide the required regulatory approval and permit documents for this project.**

The proposed activities are regulated under the Idaho Forest Practices Act. Any additional required permitting will be acquired prior to project implementation next summer.



---

**IV. FINANCIAL INFORMATION:**

A. Does your organization have a regular assessment for a reserve or special needs fund?

Yes ☒ No ☐

B. Does your organization have prior experience in working with the Idaho Water Resource Board?

Yes ☒ No ☐

C. What other sources of funding have been explored to fund the project? (e.g. U.S. Army Corps of Engineers, NRCS, FEMA, Banks, Local Government, etc.)  
Funds from PotlatchDeltic have been committed as a match for this project.

---

---

Amount of funds requested: \$72,727.39

*By signing this document you verify that all information provided is correct and the document is filled out to the best of your ability.*

Authorized signature& date:

 6/20/19

# Gold Creek Culvert Replacement and Flood Mitigation Project

## Project Background Information

### *Purpose*

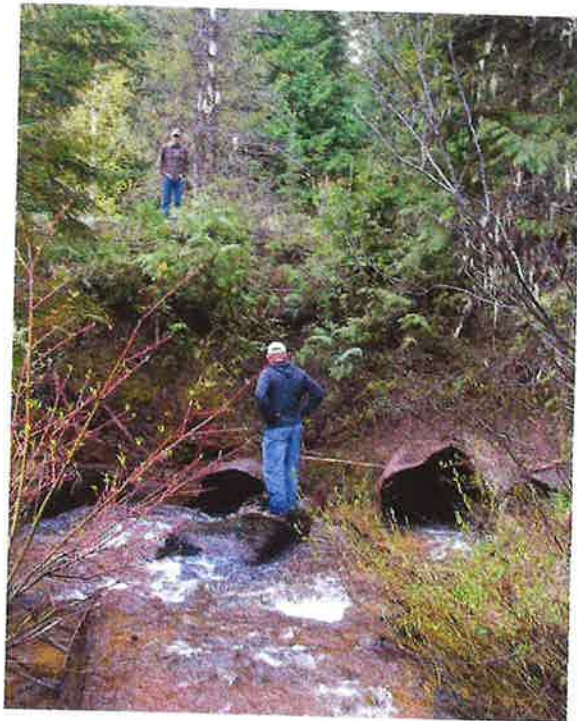
The proposed project will reduce the risk of failure and the impacts of flooding at Gold Creek on Road 1705, the Diamond Camp Road by replacing two undersized and deteriorating culverts at Gold Creek with a 50' long bridge. The Diamond Camp Road, a major secondary road in Clearwater County, provides access to Granddad Bridge and campground and is the only road that crosses the upper Dworshak Reservoir. The Diamond Camp Road provides access to private, state and federal lands managed for timber and year-round recreation. There are no readily available alternate routes.

The existing crossing at Gold creek is made up of two culverts: a 48" round and a 36" round, in a 19' deep fill. The crossing nearly failed last year when the flow backed up at the inlet to the top of the road. It is quite likely that the crossing will fail at some point in the near future. Failure will result in a substantial quantity of sediment entering Gold Creek as well as loss of access to federal, state and private land and recreational access to Granddad Bridge from Elk River. The new crossing would also allow for fish and other aquatic organism passage and protect instream habitat in Gold Creek.

The proposed project on-the-ground costs is \$ 132,525. PotlatchDeltic has pledged funds to cover fifty percent of the on-the-ground project costs, or \$ 66,262.50 in addition to covering their costs of design, oversight, and overhead.

Clearwater Soil and Water Conservation District would administer the grant, monitor construction and trouble shoot as necessary. The total grant

request is \$72, 727.39. This is a shovel ready project and, if awarded, the ID Water Resources Flood Management Grant funds would be immediately put towards project implementation.



Existing Culvert Inlets

### *Project Area*

The Gold Creek Culvert Replacement and Flood Mitigation Project is located within Clearwater County, Idaho. Clearwater County is located within north central Idaho and is a rural county with four incorporated communities: Orofino, Elk River, Pierce and Weippe.

## Clearwater Soil & Water Conservation District: Gold Creek Culvert Replacement and Flood Mitigation



The project area is located seven miles from Elk River and forty-seven miles from Orofino. The project is nineteen road miles from Grandad Bridge, boat ramp and campground. The roadway system within the project area is secondary gravel surfaced roads used to access forestlands for management and recreation. The project site is within PotlatchDeltic ownership.

Gold Creek is a tributary to Dworshak Reservoir in the Lower North Fork Clearwater subbasin. The project site is seven stream miles from Dworshak Reservoir. The only other road crossing on Gold Creek downstream of this crossing is a bridge that is 2.3 miles downstream. The watershed area above this crossing is 4 square miles nearly all of which is managed for timber resources. The mean elevation is 4080 feet and ranges from 5110 feet on the ridge to 3243 feet at the project site.

### *Previous Projects and Studies*

The Clearwater Soil and Water Conservation District has focused on efforts to improve and protect water quality in Clearwater County for over thirty years. Over the past twenty years, the District has completed a significant amount of work in Culvert replacement / bridge construction in partnership with federal, state, and private landowners. In 2003 and 2007, the District completed projects specific to the Lower North Fork Clearwater addressing watershed concerns identified in the Total Maximum Daily Load (TMDL) Implementation Plans. Funding for District projects has come from the US Environmental Protection Agency 319 Program, Pacific Coastal Salmon Recovery Funds, Idaho Agricultural Water Quality programs and others. In 2018, the District was the recipient of an IWRB Flood Management Grant to replace culverts in Quartz Creek, another tributary of the Lower North Fork Clearwater. Also in 2018, the District replaced two stream crossings with multiple at-risk culverts with bridges using a grant obtained through the EPA 319 program.

### **Project Sponsor**

The Clearwater Soil & Water Conservation District (District) was established in 1946 with the mission to: *Provide local leadership to educate and assist the public on the wise stewardship of soil, water, air, plants, and animal resources, and to promote strong conservation partnerships to find practical, economical solutions to natural resource problems and coordinate their implementation.*



## Clearwater Soil & Water Conservation District: Gold Creek Culvert Replacement and Flood Mitigation

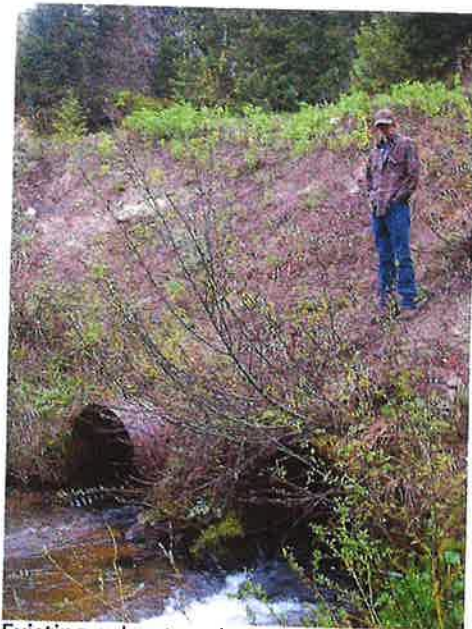
The District is a subdivision of government within the State of Idaho, it is governed by an elected Board of Supervisors who serve voluntarily. The District is funded by State and County appropriation, private sector contributions and project grants. Idaho Statute Title 22, Chapter 27 provides the framework for Conservation Districts and the allocation of funding. Attachment D provides documentation of the District's formation.

The District has been active in implementing water quality improvement projects in conjunction with the Snake River Basin Adjudication process, Pacific Coast Salmon Recovery and the Environmental Protection Agency 319 program. Additionally, the District has secured funding to provide local natural resource education in partnership with state and federal agencies and local school districts.

### Project Description

The proposed project would replace the undersized and deteriorated crossing on Gold Creek on the Diamond Camp road with a 50' long by 20' wide steel bridge that would pass all flows as well as fish and debris in Gold Creek. It would protect access on the Diamond Camp Road, an important recreation and timber haul road. It would protect access to federal, state and private lands including Grandad Bridge, the only bridge that crosses the Upper Dworshak Reservoir. See attachment C for Letters of support for this project from the local communities. It would also protect water quality and habitat on approximately seven miles of Class I fisheries stream. The project would prevent potentially tons of sediment from entering Dworshak Reservoir. Other culvert structures that would provide fish passage were considered but were determined to be unfeasible or more expensive.

The current stream crossing at this site is severely undersized. The Idaho Forest Practices Act standard is to size for a 50 year flood (2% chance in any one year). The capacity of the current stream crossing, which consists of a 48" round culvert and a 36" round culvert, is less than the five year peak flood.



Existing culvert outlets

According to the US Geologic Services Stream Stats Report (<https://streamstats.usgs.gov/ss>), the upper Gold Creek drainage averages 49.3 inches of annual precipitation. Idaho StreamStats predicts that a peak flow of 127 cfs has a probability occurring every five years (Q5). Using the federal highway nomograph for corrugated steel pipe with inlet control, a headwater depth/diameter of 1:1, the current culverts will only handle approximately 110 cfs. In other words, these culverts have a greater 20% chance of flowing full in any one year. Because the fill is so deep, there is no clear sign of the flow overtopping the road. However, it is evident that the flow has ponded at this site. Ponding that nearly overtopped the road was observed during runoff in 2018. This presents a high risk of the fill saturating and catastrophically failing.

The nomograph can also be used to show that the road comes close to overtopping at 250 cfs which is the Q50 (the fifty year

## Clearwater Soil & Water Conservation District: Gold Creek Culvert Replacement and Flood Mitigation

flood) of Gold Creek. This is a very risky situation as road fills are not designed hold back and sustain the force (head) of water against them. The fill is essentially acting as a dam at peak flows supporting the force of up to 18 or more feet of water against it. Road fills are not designed to act as dams and are subject to failure under such conditions.

This site is also subject to trapping debris at the culvert inlets, adding an additional risk factor. Sites with multiple culverts that are undersized are quite subject to being blocked by debris, further reducing the capacity to pass flow. This means that the stream probably backwaters and the road fill acts as a dam at lower flows than the Q5. It also means that the road could overtop at less than a Q50.

Catastrophic failure of this fill would affect the stream as well as the road. Access to the Grandad Bridge recreational area and other recreation sites and federal, state and private timber would be compromised. In addition, Gold Creek is a class 1 (fisheries) stream. Failure of this stream crossing would affect fisheries and water quality in the stream. The new bridge would protect access, water quality, and habitat and would be fully passable by fish and other aquatic organisms.

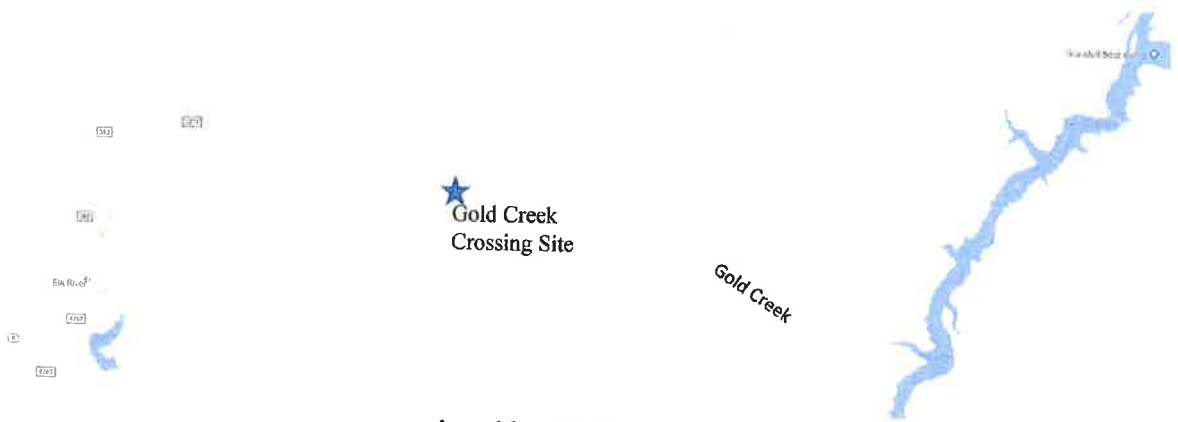
The proposed project has been developed in partnership with PotlatchDeltic, a private industrial forestland owner/management firm with landholdings accessed by the Diamond Camp Road. In order to protect access and maintain water quality, PotlatchDeltic would provide fifty percent of the implementation costs. PotlatchDeltic will assume maintenance responsibilities for this bridge through the course of its life unless those responsibilities are assumed by someone else.

### *Proposed Scope of Work*

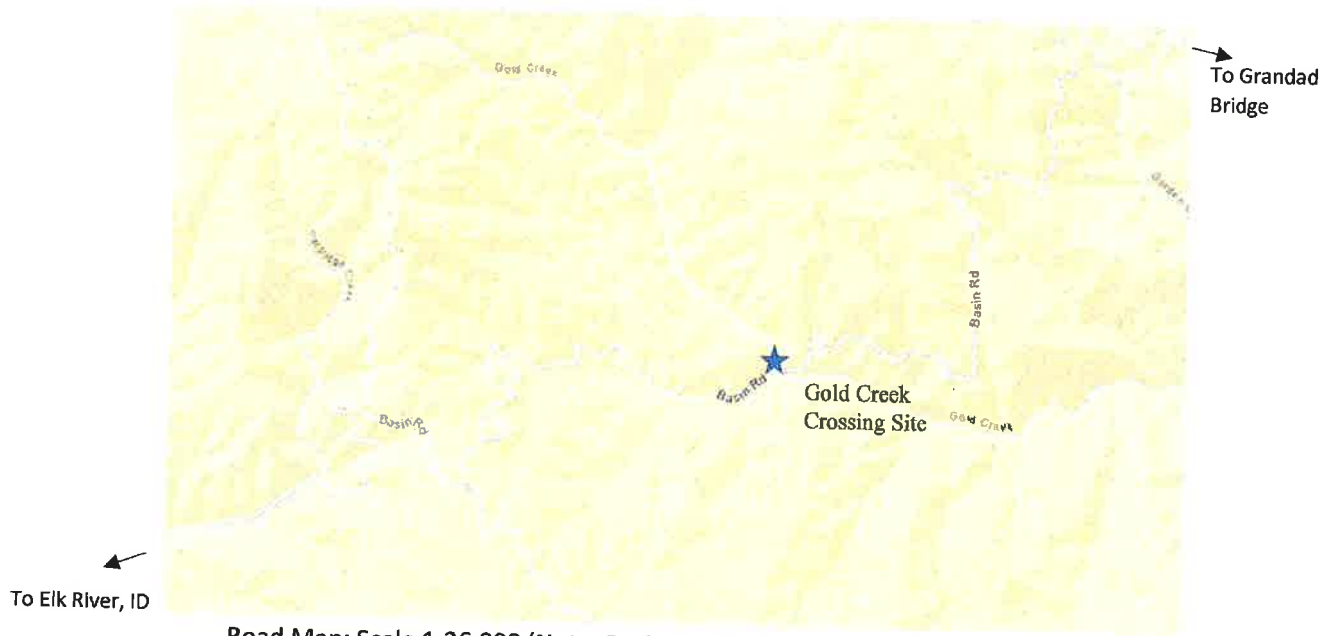
The project will replace the existing stream crossing on Gold Creek on the Diamond Camp Road with a bridge. An engineering design and cost estimate has been completed by PotlatchDeltic. PotlatchDeltic will obtain the required permits or exemptions through agreements with Idaho Department of Lands and others. Upon confirmation of funding, the bridge would be ordered from the bridge manufacturer. There is a three month lead time for bridge delivery. Construction would begin on-site at low water in 2020, starting on or about July 15, 2020 and last for approximately 3 weeks. The road would be closed during construction. The construction work will be administered by PotlatchDeltic and will include but not be limited to: clearing and grubbing, erosion control measures, structural excavation, removing and disposing of existing culverts, furnishing and installing welded wire abutments and concrete bridge sills, installing bridge, riprap, and roadway surfacing, and all other incidental items necessary to complete the project in accordance with the plans and specifications. Cultural-historic resource monitoring will take place to document the excavation and all disturbed areas will be seeded to reduce site disturbance erosion.

# Clearwater Soil & Water Conservation District: Gold Creek Culvert Replacement and Flood Mitigation

## Project Maps



Area Map: Scale 1:72,000



Road Map: Scale 1:36,000 (Note: Basin Road a.k.a. Diamond Camp Road)



Watershed Area Map





Clearwater Soil & Water Conservation District: Gold Creek Culvert Replacement and Flood Mitigation

**Project Cost Estimate**

Activity	PotlatchDeltic	IWRB	TOTAL
Project design	\$ 6,406.20		\$ 6406.20
Bridge Construction	\$ 66,262.50	\$ 66,262.50	\$ 132,525.00
Engineering Supervision	\$ 10,000.00		\$ 10,000.00
Seeding/Erosion Control	\$ 500.00		\$ 500.00
In-kind expenses: Permitting, Project oversight and overhead, Cultural	\$ 5,000.00		\$ 5000.00
Administration/Reporting (CLW SWCD)		\$ 4502.39	\$ 4502.39
Monitoring (CLW SWCD)		\$ 1962.50	\$ 1962.50
TOTAL PROJECT	\$ 88,168.70	\$ 72,727.39	\$ 160,896.09
	55%	45%	

*Implementation Schedule*

Project components include: Design, Permitting, Materials Procurement, Construction, Monitoring and Reporting.

The Design and Permitting will be conducted by PotlatchDeltic and follow the ID Department of Lands Forest Practices Act- Stream Channel Alteration Compliance procedure. Preliminary design is complete and it is estimated that final project design and permitting will be complete within thirty days post award.

Upon execution of a contract between IWRB and Clearwater SWCD for grant funding, the bridge would be ordered from the manufacturer. Manufacture of the bridge will take three months. Construction will begin in the summer of 2020 during low water. PotlatchDeltic will arrange for delivery of the bridge and other construction materials as well as bridge installation. The project is expected to be complete before August 15, 2020. Clearwater SWCD will administer the grant, monitor implementation, and submit a final report on the project to the Idaho Water Resources Board. Construction monitoring, close out and reporting are expected to be complete within a year of award.

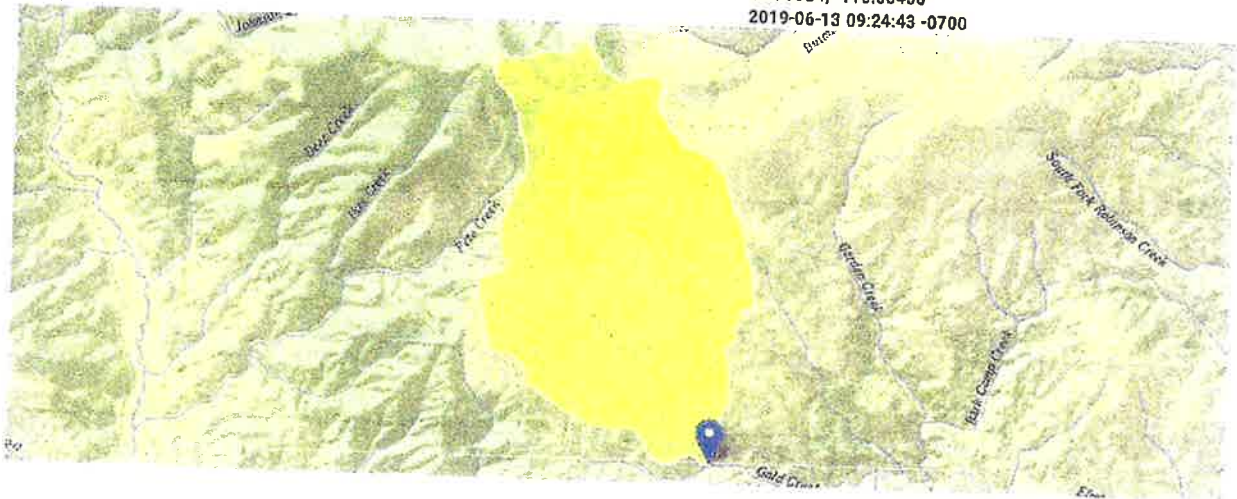
**Financial Feasibility**

The Gold Creek Culvert Replacement and Flood Mitigation project will provide better than a 1:1 private sector funding to Idaho Water Resource Board funding. PotlatchDeltic will provide 50% of construction costs. Potlatch will provide in-kind funding for project oversight and overhead as well as design and permitting. The resultant match is approximately 55% private funds and 45% IWRB funds. See Total Project Costs Table above and Attachment B: PotlatchDeltic pledge of project support. The total project cost is **\$160,896.09**. The amount requested of IWRB is **\$72,727.39**.

# Attachment A: StreamStats Report: Gold Creek at Diamond Camp

Region ID:  
Workspace ID:  
Clicked Point (Latitude, Longitude):  
Time:

ID  
ID20190613162424959000  
46.79984, -116.08450  
2019-06-13 09:24:43 -0700



## Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	3.99	square miles
PRECPRIS10	Basin average mean annual precipitation for 1981 to 2010 from PRISM	49.3	inches
FOREST	Percentage of area covered by forest	88	percent

## General Disclaimers

Parameter values have been edited, computed flows may not apply.

## Peak-Flow Statistics Parameters

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	3.99	square miles	1.11	107000
PRECPRIS10	Mean Annual Precip PRISM 1981 2010	49.3	inches	21.3	66.8

## Peak-Flow Statistics Flow Report

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	PIu	SEp
1.25 Year Peak Flood	50.5	ft <sup>3</sup> /s	32	79.7	66.7
1.5 Year Peak Flood	62.6	ft <sup>3</sup> /s	39.3	99.9	65.3
2 Year Peak Flood	78.8	ft <sup>3</sup> /s	49.5	126	65
2.33 Year Peak Flood	89.2	ft <sup>3</sup> /s	55.1	144	64.5
5 Year Peak Flood	127	ft <sup>3</sup> /s	76.9	211	66.7
10 Year Peak Flood	160	ft <sup>3</sup> /s	94.3	271	69.4
25 Year Peak Flood	205	ft <sup>3</sup> /s	118	358	72.9
50 Year Peak Flood	242	ft <sup>3</sup> /s	134	436	75.8



Attachment B. PotlatchDeltic Pledge of Support



June 6, 2019

Terry White, Chairman  
Clearwater Soil & Water Conservation District  
12730 Hwy 12, Suite C  
Orofino, ID 83544

RE: ID Water Resource Flood Management Grant Fund 2019: Gold Creek Culvert Replacement

Dear Chairman White,

PotlatchDeltic is pleased to provide support towards the Clearwater Soil & Water Conservation District (CSWCD) application for funding to replace a large culvert crossing in the Gold Creek watershed. The crossing nearly failed last year when the flow backed up at the inlet to the top of the road. It is quite likely that the crossing will fail at some point in the near future. Failure will result in a substantial quantity of sediment entering Gold Creek as well as loss of access to PotlatchDeltic land and recreational access to Grandad Bridge from Elk River.

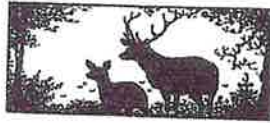
We appreciate the willingness of the CSWCD to seek funding to address this watershed issue. The PotlatchDeltic Palouse District pledges one hundred thirty-two thousand, five hundred twenty-five dollars (\$132,525.00) towards the Gold Creek culvert replacement project if approved for grant funding. It is our understanding that if approved, grant funding will reimburse us for half of the cost (\$66,262.50). It is through partnerships like the one we have with the CSWCD that enable us to continue to provide for proactive practices that ensure long-term sustainability of our forest resources and the rural economies where our forest lands are located. We applaud the CSWCD application to the ID Water Resources Flood Management Grant fund to reduce the risk of flooding in the Gold Creek watershed.

Sincerely,

A handwritten signature in black ink that reads "Wayne Lynn". The signature is written in a cursive, flowing style.

Wayne Lynn  
Road Construction Supervisor  
PotlatchDeltic

Attachment C. Letters of Support



City of Elk River  
P.O. Box "H"  
112 S. Second Street  
Elk River, Idaho 83827

Phone (208) 826-3209  
Fax (208) 826-3209  
Email: [cityer@turbonet.com](mailto:cityer@turbonet.com)  
Website: [www.cityelkriver.org](http://www.cityelkriver.org)

June 6, 2019

To: Clearwater Soil & Water Conservation District

RE: Application for Gold Creek Bridge

The City of Elk River appreciates the Soil Conservation district willingness to work with PotlatchDeltic to replace the existing ineffective culverts on Gold Creek near the former Diamond Camp. Granddad Road, Clearwater County, ID. This route is heavily used by recreationists to access Granddad Bridge recreation sites, for off road fun runs as well as commercial log hauling. Recreation and natural resources management are strong factors of the Clearwater County and Elk River, Idaho economy. Replacement of the culverts with a bridge will insure long term access along this important roadway.

This road is highly valued by the City as it is a route that is heavily traveled by those recreating out of Elk River and those working in the woods. It is also vital for access in the protection of our forest for those fighting wild fires in the area.

Sincerely,



Dave Brown  
Mayor

**PONDEROSA  
SUPERVISORY AREA**  
3130 Highway 3  
Deary ID 83823  
Phone (208) 877-1121  
Fax (208) 877-1122



DUSTIN T. MILLER, DIRECTOR  
EQUAL OPPORTUNITY EMPLOYER

**STATE BOARD OF LAND COMMISSIONERS**

Brad Little, Governor  
Lawrence E. Denney, Secretary of State  
Lawrence G. Wasden, Attorney General  
Brandon Woolf, State Controller  
Sherri Ybarra, Sup't of Public Instruction

6/5/2019

Clearwater Soil and Water Conservation District  
12730 Hwy. 12, Ste. C  
Orofino, ID 83544

Dear Clearwater Soil and Water Conservation District,

The Ponderosa Area of the Idaho Department of Lands wishes to express our support for the proposed bridge installation on the Granddad Bridge Road in the Gold Creek drainage. As you are aware, the proposed bridge will replace two aging culverts that are in need of replacement to maintain the integrity of the running surface and ensure safe passage for commercial and recreational traffic.

Failure to upgrade the Gold Creek crossing increases the risk of catastrophic road failure. In addition to the degradation of water quality in Gold Creek that would result from such an event, the resulting road closure would have a significant negative impact on both recreational and commercial activities in Clearwater County.

The Granddad Bridge Road provides the Ponderosa Area critical access necessary to manage State Endowment lands east of the Gold Creek drainage. In addition to providing access for natural resource management activities, the Granddad Bridge Road provides access for fire suppression and recreational opportunities that are critical for the economies of the surrounding communities in both Clearwater and eastern Latah Counties.

The Ponderosa Area appreciates your willingness to work with PotlatchDeltic Corporation in addressing the long-term needs of both the natural resource management and recreational communities.

Thank you for your consideration,

Derrick Reeves  
Acting Resource Supervisor (South)  
Ponderosa Area





## Clearwater County AMBULANCE

MISSION: TO SAVE & SERVE

1195 Riverside Ave.  
P.O. Box 1347  
Orofino, Idaho 83544

P: 208.476.3771 F: 208.476.3155

*To whom it may concern;*

*Clearwater County Ambulance Service (CCAS) appreciates the Soil Conservation's district willingness to work with PotlatchDeltic to replace the existing ineffective culverts on Gold Creek near the former Diamond Camp, Granddad Road, Clearwater County, ID.*

*This route is heavily used, not only by recreationists and commercial logging companies to access Granddad Bridge recreation sites, trails and work sites, but also is a main thoroughfare for the Elk River, ID based ambulance to access areas where injuries may happen.*

*Recreation and natural resource management are strong factors of the Clearwater County and Elk River, Idaho economy and with those, comes the need for reliable ambulance service. Replacement of the failing culverts with a bridge will ensure long term access along this important roadway and allow a dependable route for emergency response.*

*On behalf of CCAS and CCAS Director, Darby Zick, I ask for your consideration in this matter and appreciate your time. If you have any questions, you can reach me at the numbers below, or can contact Darby at 208-476-3771.*

Tena Williams  
City of Elk River, Council President  
Elk River Fire Department, Safety Officer #1615  
Clearwater County Ambulance #763  
Ph: 208-826-3209 (city)  
208-826-3200 (fire/EMS)

**Save & Serve**



# P.L.A.Y. Public Land Access Year-Round

P.l.a.y.  
P.O. Box 191  
Orofino, ID 83544

June 18, 2019

To: Clearwater Soil & Water Conservation District

RE: Application for Gold Creek Bridge

Dear Ladies and Gentlemen of the Soil & Water Conservation District,

The Public Land Access Year-Round members and board, also known as P.L.A.Y. would like to extend our gratitude and appreciation to the Soil Conservation District for their willingness to work with PotlatchDeltic to replace the existing ineffective culverts on Gold Creek near the former Diamond Camp on Granddad Road in Clearwater County, ID. This route is not only historic, it is also heavily used by recreationists to access Granddad Bridge recreation sites, trails, roads and should be preserved for future recreation as well as Natural Resource Management and Fire Protection. Granddad Bridge area is the perfect location to go ATV riding, snowmobiling, backpacking, biking, bird watching, boating, canoeing, climbing, fishing, fly fishing, hiking, horseback riding hunting and swimming, which are a few of the things that makes our area a great place to live and recreate in Clearwater County and Elk River. These activities also bring commerce to our small town businesses which preserves and boosts the economy of the area. Replacing the culverts with a bridge will insure long term access for Recreation as well as Natural Resource Management and Fire Protection. All efforts should be made to preserve this important roadway and continue to allow many generations to enjoy, which is what our group is all about. P.L.A.Y. would like to say thank you to the Soil and Conservation District for your commitment in this matter and are pleased to support you in this endeavor.

Sincerely,

Alex Irby  
President of P.L.A.Y.

**Annie Connor**

---

**From:** clearwater.swcd@gmail.com  
**Sent:** Thursday, June 20, 2019 11:36 AM  
**To:** 'Anne Connor'  
**Subject:** FW: Failing Culverts at Gold Creek

**From:** Kami Nibler <kami.nibler@gmail.com>  
**Sent:** Thursday, June 20, 2019 10:03 AM  
**To:** clearwater.swcd@gmail.com  
**Subject:** Failing Culverts at Gold Creek

I'm writing to express my support on the project to replace the failing culverts at Gold Creek. We have many visitors throughout the year who recreate in Elk River. They enjoy the trails all around us. If we were to lose the trails due to roads being washed out, it could be a detriment to our little town. There are several businesses that rely on our visitors to recreate around us and spend money in town.

Thank you for your consideration in this matter.

Sincerely,  
Kami Nibler, Owner  
Tom's Tavern, LLC



Attachment D: Clearwater Soil & Water Conservation formation

RESOLUTION

WHEREAS, The Clearwater Soil Conservation District was organized for the purpose of conserving the soil and water resources, and for the control of erosion, through an organized effort, and

WHEREAS, the reduced yields, due to a depleted fertility, indicate a definite need for soil conservation and a land management program, and

WHEREAS, the Supervisors, as governing body of the Clearwater Soil Conservation District, want to direct their efforts toward the prevention of further soil and water losses while there is yet time, now

THEREFORE, BE IT RESOLVED, that, we, the District Supervisors of Clearwater Soil Conservation District, hereby adopt the Clearwater Soil Conservation District Program as an outline of our problems and objectives for prevention of soil erosion and for water conservation within the District.

ADOPTED: on the 11th day of October, 1946:

Supervisors of Clearwater Soil Conservation District

Frank V. Larson  
Frank Larson

Ike Dumlak  
Ike Dumlak

Roy Larson  
Roy Larson

Harold Powell  
Harold Powell

Edward S. Smith  
Edward S. Smith

October 11, 1946  
Date



## IDAHO SOIL & WATER CONSERVATION DISTRICT

June 19, 2019

Rick Collingwood, P.E.  
Idaho Department of Water Resources  
322 E. Front Street  
Boise, Idaho 83702

Dear Mr. Collingwood:

The Idaho Soil & Water Conservation District respectfully submits the enclosed IWRB Flood Management Grant Program application. The name of this project will be referred to as the Deer Creek Flood Mitigation Project.

The purpose of the funding for the Deer Creek Flood Mitigation Project is to repair flood damages and re-size two additional culverts to repair access to Pittsburg Landing on the Salmon River caused by the spring 2019 flooding in Deer Creek. Additionally, the anadromous fish passage in Deer Creek will be re-established. The Deer Creek Highway District will once again partner with the Idaho SWCD to repair and replace the culverts within their District.

To assist the Deer Creek Highway District, the Idaho SWCD is requesting \$159,436 from the Idaho Department of Water Resources. The 50% match requirement will be met with funds from Deer Creek Highway District for their portion of the costs involved in repairing and replacing the 4 culverts. Match will also come from technical and engineering time associated with this specific project.

We would like to submit this application for your review. Please contact the District if you have any questions.

Sincerely,

Elaine Sonnen  
Chairman, Idaho SWCD



## IDAHO WATER RESOURCE BOARD

322 East Front Street, Statehouse Mail

Boise, Idaho 83720

Tel: (208) 287-4800

FAX: (208) 287-6700



### APPLICATION FOR FLOOD MANAGEMENT GRANT

Answer the following questions and provide the requested material as directed. All pertinent information must be provided. Additional information may be requested by the Idaho Water Resource Board (IWRB) depending on the scope of the project and amount of funding requested.

**Incomplete documents will be returned and no further action will be taken by IWRB staff. All paperwork must be submitted within twenty-eight (28) working days prior to the next IWRB meeting.**

Board meeting agendas can be found at: <https://idwr.idaho.gov/IWRB/meetings>

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#### **I. Overview:**

This form applies to the *IWRB Flood Management Grant Program*. The Flood Management Grant Program provides financial assistance, on a competitive statewide basis, to eligible entities interested in pursuing flood damaged stream channel repair, stream channel improvements, flood risk reduction, or flood prevention projects. Pursuing flood management improvement and repair projects can assist in maintaining flow capacities in major waterways, prevent bank and channel erosion, and reduce property damage during flood events.

The grant funding shall require a 50% funding match by the sponsor of the total project costs. In-kind services can account for up to 30% of the total project costs. Legal/Administrative in-kind services are limited to 5% of total project costs.

Funds will be distributed by sponsor submitting funding reimbursement requests, which shall include:

1. Cover letter formally requesting a funding reimbursement, description of project activities, dates of project activities, and contractor or supplier invoices. Funds shall be distributed within 15-days of receipt of reimbursement request.

Upon completion of the project, sponsor and/or consultant, shall submit a notice of completion to the IWRB, and that the improvements and/or repairs were constructed in substantial conformance with the approved plans and specifications.

#### **Prepare and attach a "Grant Document" to this application.**

The Grant Application Document requirements are outlined in the IWRB Flood Management Grant Program Guidelines. The guidelines can be found at:

<http://idwr.idaho.gov/IWRB/Programs/Financial>

You can also obtain a copy by contacting IWRB staff.



---

## **II. General Information:**

### **A. Type of organization: (Check box)**

- ☐ Flood Control District  
☐ Municipality  
☐ County  
☒ Other

Idaho Soil and Water Conservation District

Organization name

102 South Hall Street

PO Box/Street Address

Grangeville, ID 83530

City, County, State, Zip Code

82-0297671

Taxpayer ID#

Stefanie Hays / District Manager

Name and title of Contact Person

208-983-1046x3027

Contact telephone number

Stefanie.Hays@id.nacdnet.net

e-mail address

Project location/ legal description Culvert 1 & 2: -116.359517 45.686087;

Culvert 3 & 4: -116.369648 45.684847

B. Is your organization registered with the Idaho Secretary of State's office? Yes ☒ No ☐

### **C. Purpose and project description for this grant application.**

- ☐ Stream Channel Repair  
☐ Stream Channel Improvement  
☒ Flood Risk Reduction  
☐ Flood Prevention  
☐ Other \_\_\_\_\_

---

## **III. WATER PROJECT/ACTIVITY:**

### **A. Water Source and Name:**

- ☒ Surface ☐ Reservoir  
☐ Other \_\_\_\_\_

**B. Describe the Flood Management Project/Activity and the primary purpose of this grant application?**

The primary purpose is to repair flood damages and re-size two additional culverts to repair flood damages to Deer Creek road from the spring 2019 flooding.

**C. Does this project/activity address multiple objectives? If so explain.**

This project does address multiple objectives. In addition to flood repairs that will repair damage to Deer Creek road, access will be repaired to Pittsburg Landing on the Salmon River, and anadromous fish passage will be re-established.

**D. Will this flood management project/activity be implemented in a single year, or phased over multiple years?**

☒ 1-year ☐ Multiple-years (Phased)

**E. Project start and completion dates:**

The project will start in July 2019 and end in June 2020.

**F. Project detailed cost estimate, including all labor and materials:**

Funding request \$159,436. Match - cash: \$136,200; Match - In-kind: 23800.

Costs detailed in narrative.

**G. Has your organization performed stream channel or stream bank repair and/or improvement projects in the past?**

Yes, the ISWCD has performed culvert replacement, stream channel and bank repair work in the past in Deer Creek.

**H. Provide the required regulatory approval and permit documents for this project.**

The 404 permits were received for the 2017 project. The permits will be obtained for this project in July 2019.

---

**IV. FINANCIAL INFORMATION:**

**A.** Does your organization have a regular assessment for a reserve or special needs fund?

Yes ☐ No ☒

**B.** Does your organization have prior experience in working with the Idaho Water Resource Board?

Yes ☐ No ☒

**C.** What other sources of funding have been explored to fund the project? (e.g. U.S. Army Corps of Engineers, NRCS, FEMA, Banks, Local Government, etc.)

Local Highway funds

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**Amount of funds requested:** \$159,436

*By signing this document you verify that all information provided is correct and the document is filled out to the best of your ability.*

**Authorized signature & date:**

 6/19/19



## **IWRB Flood Management Grant Funding – Deer Creek**

### **2.1 Project Background Information**

#### **2.1.1 Purpose**

The purpose of the funding for the Deer Creek Flood Mitigation Project is to repair flood damages and re-size two additional culverts to repair access to Pittsburg Landing on the Salmon River side caused by the spring 2019 flooding in Deer Creek. Additionally, the anadromous fish passage in Deer Creek will be re-established. The spring 2019 flooding in Deer Creek was estimated at a 100-year flow event (NOAA). Two of the recently replaced open bottom arch culverts for the Deer Creek fish passage project were undermined causing substantial damage to the road. These culverts need to be re-positioned with larger rock under the footers to prevent flood waters from undermining the footers again in the future. Both undermined culverts have an adjacent culvert that contributed to the issues during the flooding. These culverts will also be replaced with properly sized and installed open bottom arch culverts. Estimated cost being requested for the project is \$159,436. The funding will address fish passage, water quality, and road repair issues that were created from the spring 2019 flood event in Deer Creek on 4 culverts.

#### **2.1.2 Project Area Description**

Deer Creek is a fourth order stream flowing into the Salmon River at river mile 57.4 in Idaho County. It encompasses approximately 10,567 acres (BLM 2000). Elevations range from 1,200 feet at the mouth to 5,400 feet at the headwaters. Topography is primarily very steep canyons with forested headwaters. Land uses include agricultural, rangeland and forest lands. Much of the agriculture is livestock grazing and hay land. The areas adjacent to the work sites is privately owned, with the county having maintenance responsibility for the roadway. Soils are moderately deep to very deep, well drained soils.

The nearest town is White Bird, Idaho, approximately 8 miles north of the project site. The project sites are along Deer Creek Road, which is the sole access to the popular Pittsburg Landing. On average there are about 75 people per day utilizing Deer Creek Road during the recreation season.

Figure 1: Location Deer Creek Flood Mitigation Sites

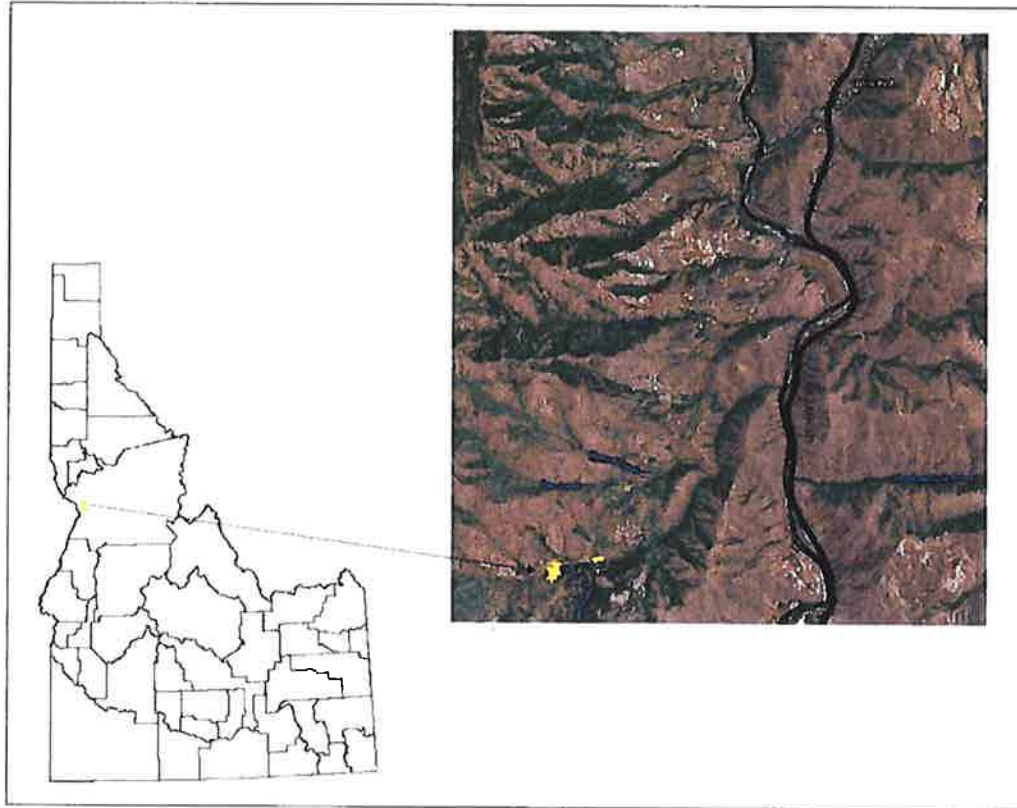


Figure 2: Location Deer Creek Flood Mitigation Sites along Deer Creek Road



### 2.1.3 Previous Work

The Deer Creek Fish Passage Project sponsored by the Idaho Soil & Water Conservation District (ISWCD) was completed in 2017. It replaced five culverts with fish passing open bottom arch culverts to improve the fish passage in Deer Creek. The project added an approximate 1.5 miles of steelhead spawning and rearing habitat.

Katherine Thompson is the Fisheries Biologist for the Nez Perce- Clearwater National Forest. Katherine provided the following description of the drainage and its importance to steelhead: There is at least 1.5 miles of steelhead spawning and rearing habitat upstream of the culverts. Although the stream is small, it is perennial and maintains low stream temperatures and robust flows even during the hottest months. It is also very productive, currently supporting a redband trout population with individuals that attain relatively large sizes (e.g. 12" and greater). Following the Poe Cabin Fire in 2007, increased water flow combined with recruitment of large wood has created complex habitat and new spawning areas. I believe if steelhead were provided access, it would contribute significantly to production of wild smolts in the Lower Salmon subbasin. I have personally observed what I consider to be a high number of adult A-run steelhead attempting to move upstream in Deer Creek, and I believe they are attracted to this watershed because of its inherent productivity and strong groundwater influence, which maintains stable temperatures and stream flows.

Private landowners have been making upgrades to their cattle operations over the past 10 years as well, to improve habitat in the stream, partnering with NRCS and the ISWCD to attain funding. Projects have included riparian fencing, development of off-channel watering areas, hardening of stream access points to reduce trampling, and moving winter feeding operations away from riparian areas to benches nowhere near streams. Providing steelhead access would complement these actions very well and help reinforce that changes and investments made by landowners to improve stream habitat have resulted in significant benefits to anadromous fish.

### 2.2 Sponsor

The Idaho Soil & Water Conservation District (ISWCD) was officially organized in 1954 to provide voluntary land and water conservation, and technical and financial assistance to landowners and the lands uses within the ISWCD boundary. The ISWCD serves all of Idaho County.

*The mission of the ISWCD: To focus available technical, financial and educational resources and coordinate them so they meet the needs of the local land user for conservation of soil, water and related resources.*

The District is a subdivision of government within the State of Idaho. It is governed by an elected Board of five Supervisors who serve voluntarily. The ISWCD is funded by State and County appropriations, private sector contributions and project grants. Idaho Statute Title 22, Chapter 27 (**Appendix B**) provides framework for Conservation Districts and the allocation of funding.



The ISWCD has been active in implementing water quality improvement projects in conjunction with the Snake River Basin Adjudication process, Pacific Coast Salmon Recover, the Environmental Protection Agency 319 program, the US Forest Service through Idaho Department of Lands and US Fish and Wildlife Service. The Idaho SWCD has also secured funding to provide local natural resource education in partnership with state and federal agencies and works with local school districts to provide education to students.

## 2.4 Project Description

### 2.4.1 Project Description

Deer Creek is a fourth order stream flowing into the Salmon River at river mile 57.4 in Idaho County. It encompasses approximately 10,567 acres (BLM 2000). Elevations range from 1,200 feet at the mouth to 5,400 feet at the headwaters. The nearest town is White Bird, Idaho, approximately 8 miles north of the project site. The project sites are along Deer Creek Road, which is the sole access to the popular Pittsburg Landing on the Snake River.

The spring 2019 flooding in Deer Creek was estimated at a 100-year flow event (NOAA). The goal is to replace and re-position four culverts along Deer Creek Road to benefit the roadway to Pittsburg Landing, address fish passage, and water quality issues that were created from the spring 2019 flood event in Deer Creek.

Figure 2: Location Deer Creek Flood Mitigation Sites along Deer Creek Road



C, d) Conceptual Plan/Cross Section & Hydrology –Appendix A: Shows the Conceptual design, Stream Stat data and calculations for the work sites.

e) Right-of-Way / Easement – The project sites are within the Deer Creek Road department right-of-way. The road department is one of the partners on the project.

#### 2.4.2 Cost Estimate

Category	Details	Total Amount	Request	Match	Non-Match
Planning (SWC):	80 hrs @ \$45	\$ 3,600.00			\$ 3,600.00
Engineering (SWC):	120 hrs @ \$52	\$ 6,240.00			\$ 6,240.00
Administration (ISWCD):	100 hrs @ \$26.36	\$ 2,636.00	\$ 2,636.00		
Construction:					
	Culvert 1 3- 20' sections @ \$6,000	\$ 18,000.00	\$ 18,000.00		
	Culvert 2 4- 20' sections @ \$6,000	\$ 24,000.00	\$ 24,000.00		
	Culvert 3 3-20' sections @ \$6,000	\$ 18,000.00	\$ 18,000.00		
	Culvert 4 3- 20' sections @ \$6,000	\$ 18,000.00	\$ 18,000.00		
	Sills 44 @ \$1,200	\$ 52,800.00	\$ 46,800.00	\$ 6,000.00	
	Headwalls 8 @ \$4,000	\$ 32,000.00	\$ 32,000.00		
	Rock 1500 cy @ \$10	\$ 15,000.00		\$ 15,000.00	
	Labor 480 hrs @ \$15.00	\$ 7,200.00		\$ 7,200.00	
	Equipment 900 hrs @ \$120	\$ 108,000.00		\$ 108,000.00	
Regulatory/Permitting (Deer Creek Hwy):	24 hrs @ \$15	\$ 360.00		\$ 360.00	
Construction Inspection (SWC):	24 hrs @ \$52	\$ 1,248.00			\$ 1,248.00
Contingency (8%):		\$ 23,440.00		\$ 23,440.00	
TOTAL:		\$ 330,524.00	\$ 159,436.00	\$ 160,000.00	\$ 11,088.00

Cash match	\$ 136,200.00	43%
InKind match	\$ 23,800.00	7%
		50%

Planning, Engineering and Construction Inspections are being completed by the Idaho Soil and Water Conservation Commission employees (SWC). Administration will be done by the project sponsor, Idaho Soil and Water Conservation District (ISWCD). Deer Creek Highway department will provide the rock, labor and equipment for the project as cash match for the project. They will also purchase several of the sills to increase the cash match. The highway department will apply for the permits needed as in-kind match. There is an 8% contingency built in to the project in case construction costs change dramatically.

#### 2.4.3 Implementation Schedule

Finalize planning and engineering for permitting – July 2019

Permitting – August 2019

Order culverts, sills etc – September 2019

Begin Implementation – October 2019

Construction Inspections – October/November 2019

Project Monitoring -- November 2019 to June 2020

Final Report and Invoicing -- June 2020

## 2.5 Financial Feasibility Analysis

Funding Request: \$159,436

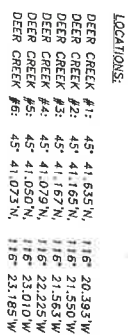
Match Sources: Deer Creek Highway Department



## Appendix A: Engineering, Stream Stats, Hydrology and Conceptual designs

Note: Engineering was verified for all ~~six~~<sup>5</sup> of the original culvert replacements by the engineer. The conservation district has chose to only replace the damaged ones from the 2019 flooding. In the engineering that is culverts 2, 3, 4. With an additional culvert replacement on the main road just below culvert 4, which will utilize the same stream stats and design sheet as culvert 4.

INDEX  
SHEET 1 OF 2 - COVER SHEET, INDEX  
SHEET 2 OF 2 - CULVERT DETAILS  
CALCULATION SHEET

[illegible]







Clearwater Soil and Water Conservation District

12730 Highway 12, Suite C – Orofino, Idaho 83544 – Phone (208)476-5313

Idaho Water Resources Board  
322 E. Front St.  
Statehouse Mall  
Boise, ID 83720

June 20, 2019

RE: Application for Flood Management Grant: Shanghai Road Culvert Replacements Project

To Whom it May Concern,

The Clearwater Soil & Water Conservation District has completed the application for Flood Management Grant funds in accordance with the 2019 program guidelines. The District appreciates the opportunity to submit a project proposal to this source of funds. The proposed project has been developed in partnership with PotlatchDeltic forest engineers. This project will repair significant drainage issues that have been identified in the Canal Creek and Shanghai Creek drainages, tributaries to Orofino Creek. Both streams are Class 1 fisheries streams and Canal creek is the primary source of drinking water for the community of Pierce, Idaho. The project will protect important access to the recreational areas as well as to Federal, State, and Industrial timber producing lands. The project is shovel ready and will begin upon notice of funding award. Although the total grant request is \$190,492.37, the project could be scaled back if only partial funding is available. If less money is available through the grant, the partial funding would be used to complete as much of the project as possible. The match percentage would be approximately the same.

The District looks forward to working with the Idaho Water Resources Board on reducing the risk of major roadway failure and loss of access and the resulting sedimentation to Canal and Shanghai Creeks.

Please feel free to contact our office at 208-400-3008 or by email at [Clearwater.swcd@gmail.com](mailto:Clearwater.swcd@gmail.com).

Sincerely,

 for:

TERRY WHITE, Chairman

Board of Supervisors

Clearwater Soil & Water Conservation District



## IDAHO WATER RESOURCE BOARD

322 East Front Street, Statehouse Mail

Boise, Idaho 83720

Tel: (208) 287-4800

FAX: (208) 287-6700



### APPLICATION FOR FLOOD MANAGEMENT GRANT

Answer the following questions and provide the requested material as directed. All pertinent information must be provided. Additional information may be requested by the Idaho Water Resource Board (IWRB) depending on the scope of the project and amount of funding requested.

**Incomplete documents will be returned and no further action will be taken by IWRB staff. All paperwork must be submitted within twenty-eight (28) working days prior to the next IWRB meeting.**

Board meeting agendas can be found at: <https://idwr.idaho.gov/IWRB/meetings>

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#### **I. Overview:**

This form applies to the IWRB Flood Management Grant Program. The Flood Management Grant Program provides financial assistance, on a competitive statewide basis, to eligible entities interested in pursuing flood damaged stream channel repair, stream channel improvements, flood risk reduction, or flood prevention projects. Pursuing flood management improvement and repair projects can assist in maintaining flow capacities in major waterways, prevent bank and channel erosion, and reduce property damage during flood events.

The grant funding shall require a 50% funding match by the sponsor of the total project costs. In-kind services can account for up to 30% of the total project costs. Legal/Administrative in-kind services are limited to 5% of total project costs.

Funds will be distributed by sponsor submitting funding reimbursement requests, which shall include:

1. Cover letter formally requesting a funding reimbursement, description of project activities, dates of project activities, and contractor or supplier invoices. Funds shall be distributed within 15-days of receipt of reimbursement request.

Upon completion of the project, sponsor and/or consultant, shall submit a notice of completion to the IWRB, and that the improvements and/or repairs were constructed in substantial conformance with the approved plans and specifications.

#### **Prepare and attach a "Grant Document" to this application.**

The Grant Application Document requirements are outlined in the IWRB Flood Management Grant Program Guidelines. The guidelines can be found at:

<http://idwr.idaho.gov/IWRB/Programs/Financial>

You can also obtain a copy by contacting IWRB staff.

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## **II. General Information:**

### **A. Type of organization: (Check box)**

- ☐ Flood Control District  
☐ Municipality  
☐ County  
☒ Other

Clearwater Soil & Water Conservation District

Organization name

12730 Highway 12, Suite C

PO Box/Street Address

Orofino, Clearwater County, ID 83544

City, County, State, Zip Code

82-0294289

Taxpayer ID#

Terry White, Chairperson

Name and title of Contact Person

(208) - 400 - 3008

Contact telephone number

clearwater.swcd@gmail.com

e-mail address

Project location/ legal description Shanghai Rd (East Fork Canal and Shanghai Cr) Clearwater County, ID

T 37 N, R 6 E, Sections 17, 18, 19, & 30 and T 37 N, R 5 E, Sections 25 & 36

B. Is your organization registered with the Idaho Secretary of State's office? Yes ☐ No ☒

### **C. Purpose and project description for this grant application.**

- ☐ Stream Channel Repair  
☒ Stream Channel Improvement  
☒ Flood Risk Reduction  
☒ Flood Prevention  
☒ Other Stream crossing replacement for fish passage

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## **III. WATER PROJECT/ACTIVITY:**

### **A. Water Source and Name:**

- ☒ Surface ☐ Reservoir  
☐ Other Canal Creek and Shanghai Creek, tributaries to Orofino creek



**B. Describe the Flood Management Project/Activity and the primary purpose of this grant application?**

This project would replace undersized and unsuitable culverts in within the Canal Creek and Shanghai Creek watersheds including 5 failing culverts on Class 1 Fisheries Streams. The primary purpose of the project is to reduce the risk of flood damage to a key secondary road that is heavily used for recreation and timber haul. In addition, the project would protect water quality in these 2 streams.

**C. Does this project/activity address multiple objectives? If so explain.**

Yes, the proposed project will reduce the risk of flood damage to roadway surfaces, providing stability to a heavily used road that provides access to industrial, state, and federal forest lands as well as recreational access. In addition, project will improve water quality in Canal Creek which is the primary source of drinking water for Pierce, Idaho. The project will improve fish habitat and fish passage in both Canal and Shanghai Creeks.

**D. Will this flood management project/activity be implemented in a single year, or phased over multiple years?**

☒ 1-year ☐ Multiple-years (Phased)

**E. Project start and completion dates:**

The culverts would be ordered as soon as the contract with IWRB was in place. Culvert work could begin immediately with possible shutdown for winter weather. Road aggregate would be placed in 2020. The project would be completed within a year.

**F. Project detailed cost estimate, including all labor and materials:**

Culverts: \$45,856.32; Labor: \$70,000; Road rock: \$218,080.04; Seeding \$2500; Construction supervision: \$30,961.48.

Project indirect (PotlatchDeltic): \$18,369.73; Grant Administration and monitoring (Clw SWCD): \$6,7983.53

**G. Has your organization performed stream channel or stream bank repair and/or improvement projects in the past?**

Yes, the Clearwater SWCD has over twenty years of experience with stream channel restoration and improvement. Notably, last year we implemented a very similar project to this one, replacing multiple culverts on Quartz Creek under an IWRB Flood grant.

**H. Provide the required regulatory approval and permit documents for this project.**

The proposed activities are regulated under the Idaho Forest Practices Act. Any additional required permitting will be acquired prior to project implementation.

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#### **IV. FINANCIAL INFORMATION:**

A. Does your organization have a regular assessment for a reserve or special needs fund?

Yes ☒ No ☐

B. Does your organization have prior experience in working with the Idaho Water Resource Board?

Yes ☒ No ☐

C. What other sources of funding have been explored to fund the project? (e.g. U.S. Army Corps of Engineers, NRCS, FEMA, Banks, Local Government, etc.)

Funds from PotlatchDeltic have been committed as a match for this project.

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Amount of funds requested: \$190,492.37

*By signing this document you verify that all information provided is correct and the document is filled out to the best of your ability.*

Authorized signature& date:

*Michael H. Hoffman* 6-25-19

# Shanghai Road Culvert Replacements and Flood Management Project

## Project Background Information

### *Purpose*

The proposed project will reduce the risk of road and culvert failure and the impacts of flooding on the Shanghai Road from Peirce, ID to Shanghai Saddle. A total of 5 culverts on class 1 fisheries streams and 33 smaller culverts are proposed for replacement. The larger culverts are all vastly undersized and present annual problems with flooding along this major secondary road in Clearwater County. The smaller culverts are rusted out, buried, and failing, leading to flooding issues. The Shanghai Road provides access to private, state and federal lands in the Orogrande Creek area and the North Fork of the Clearwater River. These lands are managed for timber and year-round recreation. The Shanghai Road provides for an alternative route for traffic when the Peirce-Superior Road 250, a designated federal lands access roadway and a collector roadway, is closed due to slides or for major maintenance.

Replacing these culverts will protect access on the Shanghai Road. In addition, most of the crossings to be replaced are in the Canal Creek watershed which is the primary source for drinking water for Peirce, Idaho. This project would protect water quality and fish passage in both Canal Creek and Shanghai Creek.

The proposed project on-the-ground costs is \$367,397.48. PotlatchDeltic has pledged funds to cover approximately fifty percent of the on-the-ground project costs, or \$ 183,699 in addition to covering their costs of design, and overhead. Clearwater Soil and Water Conservation District would administer the grant, monitor construction and trouble shoot as necessary. The total project cost is \$392,561.10; the total grant request is \$190,492.37. This is a shovel ready project and, if awarded, the ID Water Resources Flood Management Grant funds would be immediately put towards project implementation.



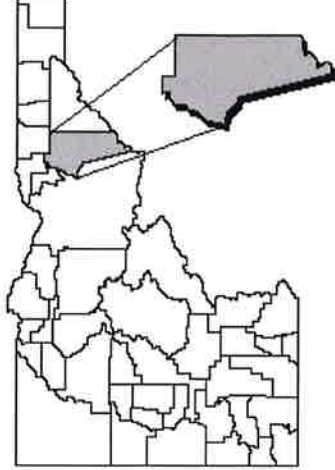
Existing Culvert Inlet on East Fork Canal Creek

### *Project Area*

The Shanghai Culvert Replacement and Flood Mitigation Project is located within Clearwater County, Idaho. Clearwater County is located within north central Idaho and is a rural county with four incorporated communities: Orofino, Elk River, Pierce and Weippe.



## Clearwater Soil & Water Conservation District: Shanghai Culvert Replacement and Flood Mitigation



The project area is along the Shanghai Road and begins just outside of Pierce, Idaho and runs northeast to Shanghai saddle, a distance of approximately 6.25 miles. The beginning of the project is thirty-seven miles from Orofino. The Shanghai Road is a secondary gravel surfaced road used to access forestlands for management and recreation. The project site is within PotlatchDeltic ownership. No additional easement are required.

The project is within the Orofino Creek watershed. Streams improved by the project include Canal and Shanghai Creeks. The project area watersheds are managed for timber resources by PotlatchDeltic and the Idaho Department of Lands. Canal Creek is the primary source for drinking water for Peirce, Idaho. The project elevation ranges from 3150 feet at Pierce to 5180 feet at Shanghai Saddle.

### *Previous Projects and Studies*

The Clearwater Soil and Water Conservation District has focused on efforts to improve and protect water quality in Clearwater County for over thirty years. Over the past twenty years, the District has completed a significant amount of work in Culvert replacement / bridge construction in partnership with federal, state, and private landowners. Past projects in the Orofino Creek watershed include the Whiskey Creek Restoration Grant (2013) through the Pacific Coast Salmon Recovery Fund that focused on improving water quality on agricultural lands and the upcoming Rhodes Creek Road Rehabilitation Project (2020) funded through US Environmental Protection Agency (EPA) / IDEQ's 319 grant program that will be completed in 2020. Funding for District projects has come from the 319 Program, Pacific Coastal Salmon Recovery Funds, Natural Resources Conservation Service Programs, Idaho Agricultural Water Quality programs and others. In 2018, the District was the recipient of an IWRB Flood Management Grant to replace culverts in Quartz Creek, another tributary of the Lower North Fork Clearwater. Also in 2018, the District replaced two stream crossings with multiple at-risk culverts with bridges using a grant obtained through the EPA 319 program.



### **Project Sponsor**

The Clearwater Soil & Water Conservation District (District) was established in 1946 with the mission to: *Provide local leadership to educate and assist the public on the wise stewardship of soil, water, air,*

*plants, and animal resources, and to promote strong conservation partnerships to find practical, economical solutions to natural resource problems and coordinate their implementation.*

The District is a subdivision of government within the State of Idaho, it is governed by an elected Board of Supervisors who serve voluntarily. The District is funded by State and County appropriation, private sector contributions and project grants. Idaho Statute Title 22, Chapter 27 provides the framework for Conservation Districts and the allocation of funding. Attachment D provides documentation of the District's formation.

The District has been active in implementing water quality improvement projects in conjunction with the Snake River Basin Adjudication process, Pacific Coast Salmon Recovery and the Environmental Protection Agency 319 program. Additionally, the District has secured funding to provide local natural resource education in partnership with state and federal agencies and local school districts.

### **Project Description**

This project would upgrade stream crossings, drainage, and surfacing on the Shanghai Road. Currently, the Shanghai Road experiences annual flooding, including water over the roadway, as a result of peak flows due to spring run-off and summer torrential rain storms. In addition to being undersized, most of the culverts are rotted out and in very poor condition. Beavers have blocked many of the stream crossing structures. Annual and peak flood events frequently overwhelm the existing culvert network and water runs over and down the roadway causing surface damage and sediment delivery downstream (See attachment C, Pictures)

### ***Proposed Scope of Work***

The proposed project will replace five severely deteriorated and undersized culverts in Class 1 fisheries streams. All of these culverts show signs of overtopping annually and analysis shows that current culvert configurations will not pass more than the two to five year flow event. In addition, all of these culverts have collected debris and beavers have been actively blocking them, requiring annual maintenance to keep the road open. These stream crossings will be replaced with adequately sized pipe arches that will allow fish passage. In addition, studies and past observations have shown that beaver are much less likely to block culverts that are adequately sized.

The project will also add or replace twenty-seven 18" culverts for drainage relief or in small ephemeral waterways and six 24" to 30" culverts in small class 2 perennial (non-fish-bearing) streams. Surfacing will be replaced on the entire road after the culvert replacement is complete. The project will include on-site cultural-historic resource monitoring and seeding to reduce site disturbance erosion. This is a shovel ready project and if awarded the ID Water Resources Flood Management Grant funds would be immediately put towards project implementation.

The proposed project has been developed in partnership with PotlatchDeltic, a private industrial forestland owner/management firm with landholdings accessed by the Shanghai Road. In order to protect access and maintain water quality, PotlatchDeltic will provide fifty percent of the implementation costs in addition to their In-kind costs. The total project cost is \$392,561.10. The grant request is for \$190,492.37 or 49% of the total.

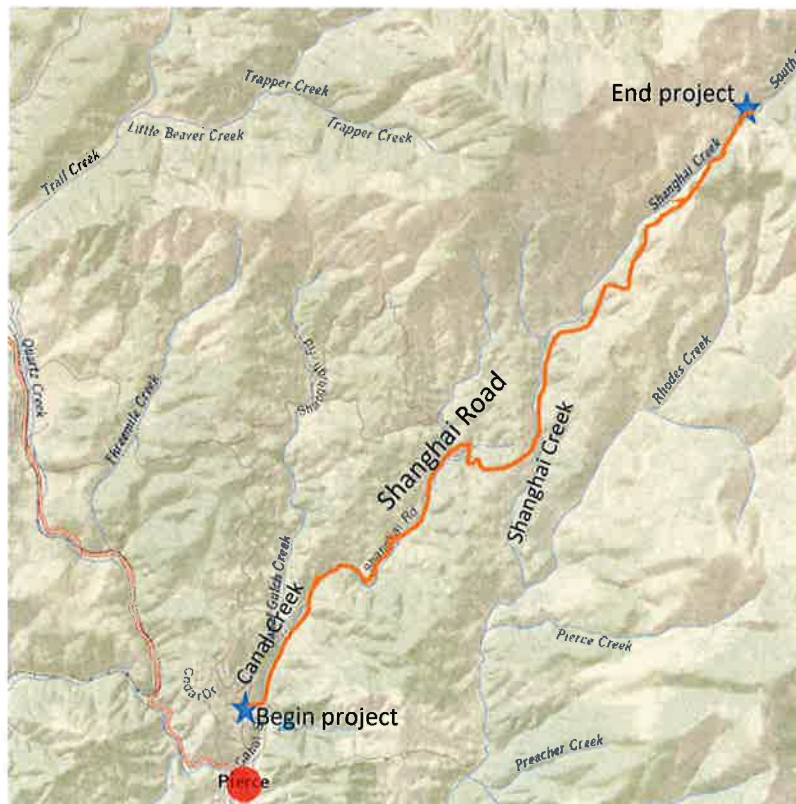
## Clearwater Soil & Water Conservation District: Shanghai Culvert Replacement and Flood Mitigation

### *Culvert Replacement Schedule*

culvert size	Count	Length	Notes
18"	27	1172	Relief pipes or small ephemeral waterways
24"	5	196	class 2 perennial streams
30"	1	40	class 2 perennial streams
81"x59"	1	40	Canal Creek- replaces 2 36" deteriorated culverts; beaver issues
73"x55"	1	48	Canal Creek; replaces a 36" undersized and deteriorated culvert
73"x55"	1	40	Canal Creek; replaces a 36" undersized and deteriorated culvert
73"x55"	1	40	Canal Creek; replaces a 60" deteriorated culvert with beaver issues
95"x67"	1	80	Shanghai Creek; replaces 2 36" undersized culverts; poor condition; beavers; over 12' of fill

Upon confirmation of funding, the culverts would be ordered from the manufacturer. Culvert installation would begin immediately following and last for 4 to 6 weeks with a possible shut down for winter weather. Surface replacement on the road would occur the following summer. The construction will be administered by PotlatchDeltic and will include but not be limited to: clearing and grubbing, erosion control measures, structural excavation, removing and disposing of existing culverts, furnishing and installing new culverts and placing roadway surfacing, and all other incidental items necessary to complete the project in accordance with the plans and specifications. Cultural-historic resource monitoring will take place to document the excavation and all disturbed areas will be seeded to reduce site disturbance erosion.

### *Project Map*





### *Conceptual Design*

The proposed project was identified by on the ground staff and visits to the site and observations of the road and stream crossings at both high and low flows. In addition, a design plan and cost estimate has been prepared in preparation for seeking funding to assist with project implementation. The USGS Stream Characteristics online tool <https://streamstats.usgs.gov/ss/> has been used to determine site specific stream flows (see Attachment A) .

### *Easement/Right of Way*

The proposed project lies within PotlatchDeltic landholdings. All project activities will take place within existing PotlatchDeltic landholdings/rights of way.

### **Construction Cost Estimate**

#### Total Project Costs

Shanghai Culverts - IWRB Flood Management Grant Subcontract and Match			
Item	Match	Reimbursement	Total
Culverts	\$22,928.16	\$ 22,928.16	\$ 45,856.32
Labor	\$35,000.00	\$ 35,000.00	\$ 70,000.00
rock	\$109,040.02	\$109,040.02	\$218,080.04
seeding	\$1,250.00	\$ 1,250.00	\$ 2,500.00
on-site supervision	\$15,480.82	\$ 15,480.66	\$ 30,961.48
In-Kind inc overhead, indirect, design, cultural (5%)	\$18,369.73		\$18,369.73
Administration (CLW SWCD)		\$ 2,877.53	\$ 2,877.53
Monitoring (CLW SWCD)		\$ 3,916.00	\$ 3,916.00
<b>TOTAL project costs</b>	<b>\$202,068.73</b>	<b>\$ 190,492.37</b>	<b>\$ 392,561.10</b>

### *Implementation Schedule*

Project components include: Design, Permitting, Materials Procurement, Construction, Monitoring and Reporting.

The Design and Permitting will be conducted by Potlatch-Deltic and follow the ID Department of Lands Forest Practices Act- Stream Channel Alteration Compliance procedure. Preliminary design and permitting are complete and it is estimated that final project design and permitting will be complete immediately following award.

## Clearwater Soil & Water Conservation District: Shanghai Culvert Replacement and Flood Mitigation

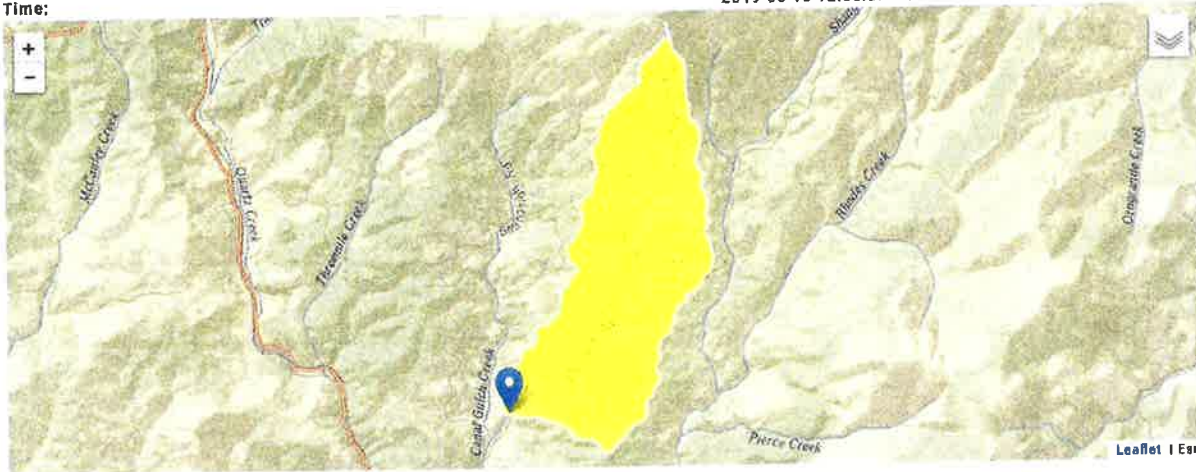
The culverts will be ordered upon execution of a contract between IWRB and Clearwater SWCD for grant funding. Construction will begin immediately following. Culverts will be installed fall of 2019 with possible continuation in spring/summer of 2020 depending on fall weather. Aggregate surfacing will be placed in the summer of 2020. The project will be complete before August 1, 2020. Clearwater SWCD will administer the grant, monitor implementation, and submit a final report on the project to the Idaho Water Resources Board. Construction monitoring, close out and reporting are expected to be complete within a year of award.

### Financial Feasibility

The Shanghai Road Culvert Replacement and Flood Mitigation project will provide better than a 1:1 private sector funding to Idaho Water Resource Board funding. PotlatchDeltic will provide 50% of construction costs. Potlatch will provide in-kind funding for project oversight and overhead as well as design and permitting. The resultant match is approximately 51% private funds and 49% IWRB funds. See Total Project Costs Table above and Attachment B: PotlatchDeltic pledge of project support. The total project cost is **\$392,561.10**. The amount requested of IWRB is **\$190,492.37**

Region ID:  
Workspace ID:  
Clicked Point (Latitude, Longitude):  
Time:

ID  
ID20190613195537342000  
46.50888, -115.79023  
2019-06-13 12:55:57 -0700



Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.26	square mles	5.36	13400
PRECPRIS10	Mean Annual Precip PRISM 1981 2010	47	inches	18.7	46.8
LC11FOREST	LC11FOREST	51.8	percent	2.35	94.4

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Statistic	Value	Unit
1.25 Year Peak Flood	33.6	ft^3/s
1.5 Year Peak Flood	42.7	ft^3/s
2 Year Peak Flood	52.8	ft^3/s
2 33 Year Peak Flood	57.1	ft^3/s
5 Year Peak Flood	82.5	ft^3/s
10 Year Peak Flood	103	ft^3/s
25 Year Peak Flood	135	ft^3/s
50 Year Peak Flood	155	ft^3/s
100 Year Peak Flood	182	ft^3/s
200 Year Peak Flood	208	ft^3/s
500 Year Peak Flood	243	ft^3/s

Use 81" x 57" pipe arch

Wood, M.S., Fowness, R.L., Skinner, K.D., and Veilleux, A.G., 2016, Estimating peak-flow frequency statistics for selected gaged and ungaged sites in naturally flowing streams and rivers in Idaho: U.S. Geological Survey Scientific Investigations Report 2016-5083, 56 p.

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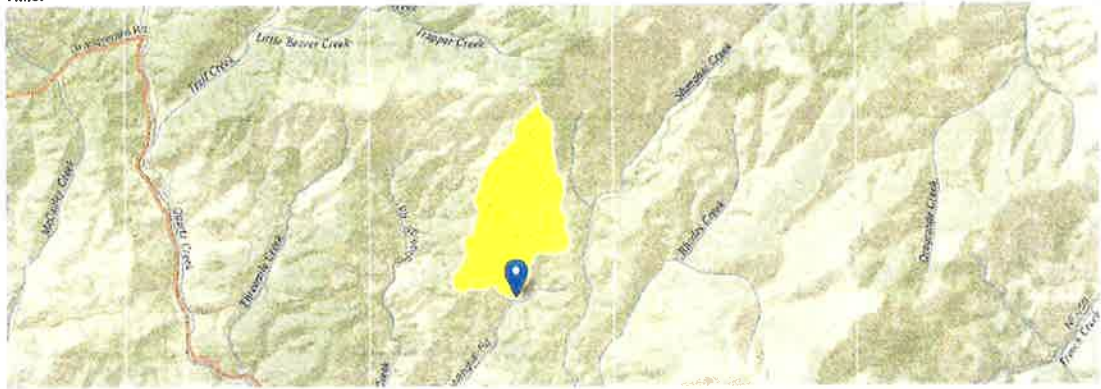
USGS Product Names Disclaimer: Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.



EF Canal #2 StreamStats Report

Region ID:  
Workspace ID:  
Clicked Point (Latitude, Longitude):  
Time:

ID  
ID20190613194516265000  
46.52362, -115.76944  
2019-06-13 12:45:33 -0700



Peak-Flow Statistics Parameters[Peak Flow Region 4 2016 5083]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.96	square miles	5.36	13400
PRECPRI10	Mean Annual Precip PRISM 1981 2010	48.2	inches	18.7	46.8
LC11FOREST	LC11FOREST	23.4	percent	2.35	94.4

Peak-Flow Statistics Disclaimers[Peak Flow Region 4 2016 5083]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errorsOne or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Peak-Flow Statistics Flow Report[Peak Flow Region 4 2016 5083]

Statistic	Value	Unit
1.25 Year Peak Flood	21.3	ft^3/s
1.5 Year Peak Flood	28.4	ft^3/s
2 Year Peak Flood	36.9	ft^3/s
2.33 Year Peak Flood	40.6	ft^3/s
5 Year Peak Flood	63.2	ft^3/s
10 Year Peak Flood	83.1	ft^3/s
25 Year Peak Flood	115	ft^3/s
50 Year Peak Flood	136	ft^3/s
100 Year Peak Flood	163	ft^3/s
200 Year Peak Flood	192	ft^3/s
500 Year Peak Flood	231	ft^3/s

use 73" x 55" pipe arch  
(bevelled) for #2,3,4

Peak-Flow Statistics Citations

Wood, M.S., Fosness, R.L., Skinner, K.D., and Velleux, A.G.,2016, Estimating peak-flow frequency statistics for selected gaged and ungaged sites in naturally flowing streams and rivers in Idaho: U.S. Geological Survey Scientific Investigations Report 2016-5083, 56 p. (<http://dx.doi.org/10.3133/sir20165083>)

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USGS Product Names Disclaimer: Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Application Version: 4.3.1

# Shanghai Creek StreamStats Report

Region ID:  
Workspace ID:  
Clicked Point (Latitude, Longitude):  
Time:

ID  
ID20190613202903108000  
46.52602, -115.75637  
2019-06-13 13:29:21 -0700



## Peak-Flow Statistics Parameters

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.51	square miles	5.36	13400
PRECPRIS10	Mean Annual Precip PRISM 1981 2010	51.9	Inches	18.7	46.8
LC11FOREST	LC11FOREST	23	percent	2.35	94.4

## Peak-Flow Statistics Disclaimers

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

## Peak-Flow Statistics Flow Report

Statistic	Value	Unit
1.25 Year Peak Flood	67.6	ft <sup>3</sup> /s
1.5 Year Peak Flood	88.7	ft <sup>3</sup> /s
2 Year Peak Flood	113	ft <sup>3</sup> /s
2.33 Year Peak Flood	124	ft <sup>3</sup> /s
5 Year Peak Flood	187	ft <sup>3</sup> /s
10 Year Peak Flood	240	ft <sup>3</sup> /s
25 Year Peak Flood	322	ft <sup>3</sup> /s
50 Year Peak Flood	373	ft <sup>3</sup> /s
100 Year Peak Flood	440	ft <sup>3</sup> /s
200 Year Peak Flood	507	ft <sup>3</sup> /s
500 Year Peak Flood	598	ft <sup>3</sup> /s

Use 95" X 67" arch

## Peak-Flow Statistics Citations

Wood, M.S., Fossness, R.L., Skinner, K.D., and Veilleux, A.G., 2016, Estimating peak-flow frequency statistics for selected gaged and ungaged sites in naturally flowing streams and rivers in Idaho: U.S. Geological Survey Scientific Investigations Report 2016-5083, 56 p.

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## Attachment B. PotlatchDeltic Pledge of Support



Terry White, Chairman  
Clearwater Soil & Water Conservation District  
12730 Hwy 12, Suite C  
Orofino, ID 83544

RE: ID Water Resource Flood Management Grant Fund 2019: Canal Creek Culvert Replacement

Dear Chairman White,

The PotlatchDeltic Headquarters Forest Management Team is pleased to provide support towards the Clearwater Soil & Water Conservation District (CSWCD) application for funding to replace several undersized culverts in the Canal Creek watershed. Each year the runoff of Canal Creek overwhelms the existing culvert system and roadways are negatively impacted by surface water. The affected roadway system provides access to private industrial, state and federal forestlands as well as to year round recreation sites. The Canal Creek watershed is a tributary of Orofino Creek and the Clearwater River.

The land management activities of PotlatchDeltic Forests are directly impacted by these undersized/failing culverts. We appreciate the willingness of the CSWCD to seek funding to address this watershed issue. The PotlatchDeltic Headquarters Management Unit pledges one hundred eighty-three thousand, six hundred ninety-nine dollars (\$183,699) towards the Canal Creek culvert replacement project. It is through partnerships like the one we have with the CSWCD that enable us to continue to provide for proactive practices that ensure long-term sustainability of our forest resources and the rural economies where our forest lands are located. We applaud the CSWCD application to the ID Water Resources Flood Management Grant fund to reduce the risk of flooding in the Canal Creek watershed.

Sincerely,

A handwritten signature in blue ink, appearing to read "J. King", written over a horizontal line.

Jacob King  
Road Construction Supervisor  
PotlatchDeltic





July 3, 2019

Clearwater Soil and Conservation District

RE: Application for Shanghai Road Culvert Replacements  
and Flood Management Project

The City of Pierce appreciates the Soil Conservation District's willingness to work with PotlatchDeltic to replace the existing ineffective culverts on Shanghai Road. This is a heavily used recreational route as well as commercial log hauling. Recreation and natural resource management are strong factors of Clearwater County and The City of Pierce Idaho economy. Replacement of the culverts will insure long term access along this highly traveled roadway, and prevent the washing of roadway materials into nearby streams.

The condition of these culverts is vital to maintaining the Shanghai/Canal watershed.

Sincerely,

A handwritten signature in black ink that reads "Vianna Marshall". The signature is fluid and cursive, with the first name "Vianna" and last name "Marshall" clearly distinguishable.

Vianna Marshall, City Clerk

404 South Main Street-P.O. Box 356  
Pierce, Idaho 83546  
Phone 208.464.2222 Fax 208.464.2207

## Attachment C. Pictures



First Crossing on Canal Creek, inlet.  
2 36" culverts with beaver/trash racks  
Replace with 81" X 59" pipe arch



Second Crossing on Canal Creek, inlet.  
36" culvert; replace with 73" X 55" pipe arch



Third Crossing on Canal Creek, inlet.  
36" culvert; replace with 73" X 55" pipe arch





Flooding along Canal Creek due to undersized culverts, after water has receded. At higher flows, the water is over the road.

Fourth Crossing on Canal Creek.  
60" culvert; replace with 73" X 55" pipe arch

Inlet

Outlet



Crossing on Shanghai Creek, inlet.  
2 36" culverts with beaver/trash racks  
Replace with 95" x 67" pipe arch





RESOLUTION

WHEREAS, The Clearwater Soil Conservation District was organized for the purpose of conserving the soil and water resources, and for the control of erosion, through an organized effort, and

WHEREAS, the reduced yields, due to a depleted fertility, indicate a definite need for soil conservation and a land management program, and

WHEREAS, the Supervisors, as governing body of the Clearwater Soil Conservation District, want to direct their efforts toward the prevention of further soil and water losses while there is yet time, now

THEREFORE, BE IT RESOLVED, that, we, the District Supervisors of Clearwater Soil Conservation District, hereby adopt the Clearwater Soil Conservation District Program as an outline of our problems and objectives for prevention of soil erosion and for water conservation within the District.

ADOPTED: on the 14th day of October, 1946:

Supervisors of Clearwater Soil Conservation District

Frank Larson  
Frank Larson

Ike Dunlap  
Ike Dunlap

Ray Larson  
Ray Larson

Harold Powell  
Harold Powell

Charles Swoboda  
Charles Swoboda

October 14, 1946  
1946



## IDAHO SOIL & WATER CONSERVATION DISTRICT

July 8, 2019

Rick Collingwood, P.E.  
Idaho Department of Water Resources  
322 E. Front Street  
Boise, Idaho 83702

Dear Mr. Collingwood:

The Idaho Soil & Water Conservation District respectfully submits the enclosed IWRB Flood Management Grant Program application. The name of this project will be referred to as the IWRB Flood Management Grant – Lower Threemile Creek.

The IWRB Flood Management Grant – Lower Threemile Creek. This project will focus on repairing April 2019 flooding degradation of protective streamside berm to reduce private property damage from high water (flood) overflow in Three Mile Creek. Improve stream channel and reduce infiltration to the South Fork of the Clearwater River by reduction/removal of excessive material/debris deposited in the normal stream channel during April 2019 flood events – which redirected water flow southward from the primary stream channel.

To assist the landowner, the Idaho SWCD is requesting \$21,619.50 from the Idaho Department of Water Resources. The 50% match requirement will be met with funds from the private landowner. Match will also come from technical and engineering time associated with this specific project.

We would like to submit this application for your review. Please contact the District if you have any questions.

Sincerely,

Elaine Sonnen  
Chairman, Idaho SWCD



**IDAHO WATER RESOURCE BOARD**

322 East Front Street, Statehouse Mail

Boise, Idaho 83720

Tel: (208) 287-4800

FAX: (208) 287-6700



**APPLICATION FOR FLOOD MANAGEMENT GRANT**

Answer the following questions and provide the requested material as directed. All pertinent information must be provided. Additional information may be requested by the Idaho Water Resource Board (IWRB) depending on the scope of the project and amount of funding requested.

**Incomplete documents will be returned and no further action will be taken by IWRB staff. All paperwork must be submitted within twenty-eight (28) working days prior to the next IWRB meeting.**

Board meeting agendas can be found at: <https://idwr.idaho.gov/IWRB/meetings>

---

**I. Overview:**

This form applies to the IWRB Flood Management Grant Program. The Flood Management Grant Program provides financial assistance, on a competitive statewide basis, to eligible entities interested in pursuing flood damaged stream channel repair, stream channel improvements, flood risk reduction, or flood prevention projects. Pursuing flood management improvement and repair projects can assist in maintaining flow capacities in major waterways, prevent bank and channel erosion, and reduce property damage during flood events.

The grant funding shall require a 50% funding match by the sponsor of the total project costs. In-kind services can account for up to 30% of the total project costs. Legal/Administrative in-kind services are limited to 5% of total project costs.

Funds will be distributed by sponsor submitting funding reimbursement requests, which shall include:

1. Cover letter formally requesting a funding reimbursement, description of project activities, dates of project activities, and contractor or supplier invoices. Funds shall be distributed within 15-days of receipt of reimbursement request.

Upon completion of the project, sponsor and/or consultant, shall submit a notice of completion to the IWRB, and that the improvements and/or repairs were constructed in substantial conformance with the approved plans and specifications.

**Prepare and attach a "Grant Document" to this application.**

The Grant Application Document requirements are outlined in the IWRB Flood Management Grant Program Guidelines. The guidelines can be found at:

<http://idwr.idaho.gov/IWRB/Programs/Financial>

You can also obtain a copy by contacting IWRB staff.



---

## **II. General Information:**

### **A. Type of organization: (Check box)**

- ☐ Flood Control District  
☐ Municipality  
☐ County  
☒ Other

Idaho Soil and Water Conservation District

Organization name

102 South Hall Street

PO Box/Street Address

Grangeville, Idaho 83530

City, County, State, Zip Code

82-0297671

Taxpayer ID#

Stefanie Hays

Name and title of Contact Person

208-983-1046x3027

Contact telephone number

Stefanie.Hays@id.nacdnet.net

e-mail address

Project location/ legal description 2202 Lukes Gulch Road, Stites, ID 83552  
SW ¼ SE ¼ of SEC. 5, TWP. 31N, RGE. 4E, B.M., Idaho County.

B. Is your organization registered with the Idaho Secretary of State's office? Yes ☒ No ☐

### **C. Purpose and project description for this grant application.**

- ☒ Stream Channel Repair  
☐ Stream Channel Improvement  
☐ Flood Risk Reduction  
☐ Flood Prevention  
☐ Other \_\_\_\_\_

---

## **III. WATER PROJECT/ACTIVITY:**

### **A. Water Source and Name:**

- ☒ Surface ☐ Reservoir  
☐ Other \_\_\_\_\_

**B. Describe the Flood Management Project/Activity and the primary purpose of this grant application?**

Repair April 2019 flooding degradation of streamside berm for protection of private property and improve Stream channel by reduction of excessive course debris deposited during flood event, which will redirect water flow in Three Mile Creek to its ordinary channel.

**C. Does this project/activity address multiple objectives? If so explain.**

This project addresses the course debris that was deposited in Three Mile Creek and the following breaching of the private berm. It will repair the stream channel and serve to reduce flooding of private property.

**D. Will this flood management project/activity be implemented in a single year, or phased over multiple years?**

☒ 1-year      ☐ Multiple-years (Phased)

**E. Project start and completion dates:**

August 2019 to January 2020

**F. Project detailed cost estimate, including all labor and materials:**

Total Project costs is \$119,185.50. Requested funds are: \$28,759.50.

Match, cash: \$83,968; Match In-Kind: \$6,458. Detailed in Narrative.

**G. Has your organization performed stream channel or stream bank repair and/or improvement projects in the past?**

Yes, the contractor that has been chosen has worked with stream channel and bank repair in the past on numerous occasions.

**H. Provide the required regulatory approval and permit documents for this project.**

The 404 permitting is in progress currently. A copy of the permitting will be submitted upon approval.

---

**IV. FINANCIAL INFORMATION:**

**A.** Does your organization have a regular assessment for a reserve or special needs fund?

Yes ☐ No ☒

**B.** Does your organization have prior experience in working with the Idaho Water Resource Board?

Yes ☐ No ☒

**C.** What other sources of funding have been explored to fund the project? (e.g. U.S. Army Corps of Engineers, NRCS, FEMA, Banks, Local Government, etc.)  
Landowner Funds

---

---

**Amount of funds requested:** \$28,759

*By signing this document you verify that all information provided is correct and the document is filled out to the best of your ability.*

**Authorized signature & date:**

 6/19/19



## **IWRB Flood Management Grant – Lower Threemile Creek**

### **Primary Purpose**

Repair April 2019 flooding degradation of protective streamside berm to reduce private property damage from high water (flood) overflow in Three Mile Creek. Improve stream channel and reduce infiltration to the South Fork of the Clearwater River by reduction/removal of excessive material/debris deposited in the normal stream channel during April 2019 flood events – which redirected water flow southward from the primary stream channel. Gravel/rock/stone removal project will restore water flows to the primary stream channel. The Project request is for \$21,619.50. The planning and engineering are match along with the private landowner donations. The county will have FEMA funds to make the repairs to the bridge by October 2020 (if they are successful) that will further augment this project.

### **Project Area Location Description**

Three Mile Creek originates four miles south of Grangeville, Idaho, Idaho County, Idaho, and flows north for approximately 16 miles to its confluence with the South Fork of the Clearwater River at river mile 7.6. The watershed is approximately 24,966 acres in size, with 99% of the land privately owned, and the lower 5 miles flowing within the Nez Perce Tribal Reservation boundary. The City of Grangeville wastewater treatment plant is the dominant point source, and dry land farming, forestry, livestock grazing, and urban development are the dominant nonpoint sources in the watershed. Three Mile Creek flows through a relatively undeveloped, steep-sloped canyon for eight miles before entering the South Fork. (Source: *Three Mile Creek Beneficial Use Assessment*, February 2008, Idaho Department of Environmental Quality, Lewiston Regional Office)

Figure 1: Threemile Creek Project Location

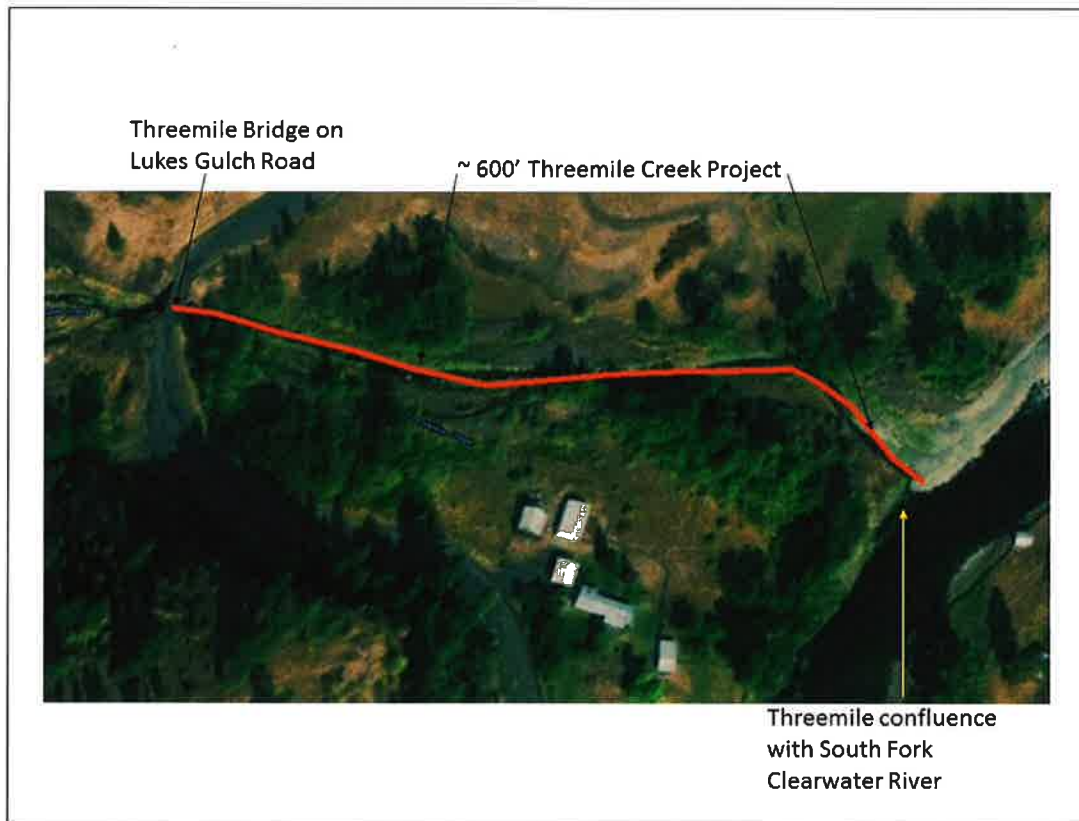


Location: 2202 Lukes Gulch Road, Stites, ID 83552  
SW ¼ SE ¼ of SEC. 5, TWP. 31N, RGE. 4E, B.M., Idaho County.  
GPS coordinates: Latitude 46°3.052'N, Longitude 115°58.909'W

The project site is within the west-to-east section of Three Mile Creek reaching from the Idaho County bridge on Luke's Gulch Road to confluence with the South Fork of the Clearwater River. This section of the Creek is located on privately owned land - which includes a primary residence, outbuildings, fencing, and farm ground. Also, adjacent to the north bank of the stream is privately owned farm ground.

The project site is easily accessed via S.H. 13 to the City of Stites; turning west on Bridge Street to cross the South Fork of the Clearwater River; turning south onto Lukes Gulch Road; and traveling 3.0 miles from Stites to 2202 Lukes Gulch Road.

Figure 2: Site Location for Threemile Creek Project



### Previous Projects and Studies

The U.S. Fish and Wildlife Service in conjunction with the Idaho Soil and Water Conservation District (ISWCD) just completed an analysis of stream stabilization for Threemile Creek identifying 34 key areas where work could be completed to stabilize Threemile Creek. Previously, the ISWCD had a Section 319 grant to work with private agriculture landowners to implement best management practices reducing sediment inputs to Threemile Creek. The project was in response to the Threemile Creek Total Maximum Daily Load (TMDL) document and the Threemile Creek Ag Implementation Plan. In preparation for the Implementation Plan there was a team that did Stream Visual Assessment Protocol

(SVAP) on Threemile Creek that identified key reaches that were delivering sediment. These reaches were targeted with the 319 projects.

### **Project Sponsor**

The Idaho Soil & Water Conservation District (ISWCD) was officially organized in 1954 to provide voluntary land and water conservation, and technical and financial assistance to landowners and the lands uses within the ISWCD boundary. The ISWCD serves all of Idaho County.

The mission of the ISWCD: *To focus available technical, financial and educational resources and coordinate them so they meet the needs of the local land user for conservation of soil, water and related resources.*

The District is a subdivision of government within the State of Idaho. It is governed by an elected Board of five Supervisors who serve voluntarily. The ISWCD is funded by State and County appropriation, private sector contributions and project grants. Idaho Statute Title 22, Chapter 27 (**Appendix B**) provides framework for Conservation Districts and the allocation of funding.

The ISWCD has been active in implementing water quality improvement projects in conjunction with the Snake River Basin Adjudication process, Pacific Coast Salmon Recovery Fund, the Environmental Protection Agency 319 program, the US Forest Service through Idaho Department of Lands and US Fish and Wildlife Service. The ISWCD has also secured funding to provide local natural resource education in partnership with state and federal agencies and works with local school districts to provide education to students.

### **Project Description**

During the month of April 2019, Idaho County received excessive amounts of rainfall and snow melt which resulted in substantial high water flood volume in streams and rivers in the Clearwater River drainage. The National Oceanic and Atmospheric Administration (NOAA) Northwest River Forecast Center gage, #STII 1 South Fork Clearwater River at Stites, Idaho (3 miles from the project site), measured the river stage at 10.79 feet on April 9<sup>th</sup>, 2019. The previous high water recorded record stage was 10.3 feet in June 1964. Three Mile Creek, which empties into the South Fork of the Clearwater River on the project site, experienced excessive high water (flood) flow volume accumulated from its watershed on April 9<sup>th</sup> and April 20<sup>th</sup>, 2019.

The portion of Three Mile Creek on the project site property significantly overflowed its normal high water mark level, severely degraded the south protective berm, and flooded the private property farm ground south and east of the Creek. Once the flood water level receded, the private farm ground was left covered in gravel/stone/rock up to two feet in depth. Restoration will include the excavation of the flood-blocked stream channel, re-sloping and stabilization of an estimated 500-600 feet of damaged protective pushup berm on the south side bank of Three Mile Creek, and the stream channel rerouted to its usual north side.



Figure 2: Site Location for Threemile Creek Project



This flood hazard mitigation project will diminish conditions which impede the stream flow during high water flood events, repair and increase the future effectiveness of an existing protective berm, return the stream flow back to its normal channel location in the stream bed, and lessen the risk of flooding damage to the site's privately owned property.

Success of the project will be measured by outcomes during a future flood event.

**Conceptual Plans, Stream Stat data, photos are in Appendix A.**

### Cost Estimate

Category	Details	Total Amount	Request	Match
Planning (Private consultant):	30 hrs @ \$45	\$ 1,350.00		\$ 1,350.00
Engineering (Private consultant):	100 hrs @ \$52	\$ 5,200.00		\$ 5,200.00
Administration (ISWCD):	52 hrs @ \$26.34	\$ 1,369.50	\$ 1,369.50	
Construction:				
Threemile Creek Work/Dike rebuild:	contractor estimate	\$ 27,390.00	\$ 20,250.00	\$ 7,140.00
Threemile Project Pre-work:	contractor estimate	\$ 6,000.00		\$ 6,000.00
Regulatory/Permitting (Private Landowner):	20 hrs @ \$15	\$ 300.00		\$ 300.00
Construction Inspection (Private consultant):	32 hrs @ \$52	\$ 1,664.00		\$ 1,664.00
TOTAL:		\$ 43,273.50	\$ 21,619.50	\$ 21,654.00

Cash match \$ 13,140.00

InKind match \$ 8,514.00

The pre-work is work needed for access to the creek, rock and debris removal from the flooding. The private landowner has agreed to pay for these costs.

### **Implementation Schedule**

Stream channel excavation activities are best conducted in July – September 2019 as appropriate during dry weather and low water stream flow conditions. An experienced, excavation contractor will provide appropriate equipment, guidance, and expertise to effect removal and relocation of accumulated debris material from the stream channel. Moreover, the removed material from the stream channel will be used to fortify the property owner's protective berm/dike located on the south channel side. The protective berm was breached during the April 2019 flood events. This flood damage repair excavation and hazard mitigation project can help prevent or reduce future flood damage to the stream channel, protective berms, and neighboring farm ground. Best management practices will be applied to mitigate for high water flows.

Permitting for the project is in progress currently. After work is complete the final report with pictures will be compiled and submitted.

### **Financial Feasibility Analysis**

Request: \$21,619.50

Match: Private Consultant, Private Landowner (In-Kind) \$8,514

Private Landowner donation to project (cash) \$13,140

## **Appendix A: Engineering concept, photos, stream stat data**



Ruth Mohr  
2202 Lukes Gulch Road  
PO Box 236  
Stites, ID 83552



June 17, 2019

Idaho Water Resource Board (IWRB)  
322 East Front Street, Statehouse Mail  
Boise, Idaho 83720

Re: Support of Application for Flood Management Grant

To Whom It May Concern:

I fully support the IWRB flood management grant application from Idaho Soil and Water Conservation District, Grangeville, Idaho, related to repair of damage sustained by Three Mile Creek (Idaho County, Idaho) during April 2019 flood events.

A portion of Three Mile Creek flows through my property to converge with the South Fork of the Clearwater River near Stites, Idaho. In April 2019, Three Mile Creek twice exceeded historic high water flows, filling the creek channel with solid material and debris which diverted stream flow, causing part of a protective berm to fail, and resulting in extensive flooding to my property.

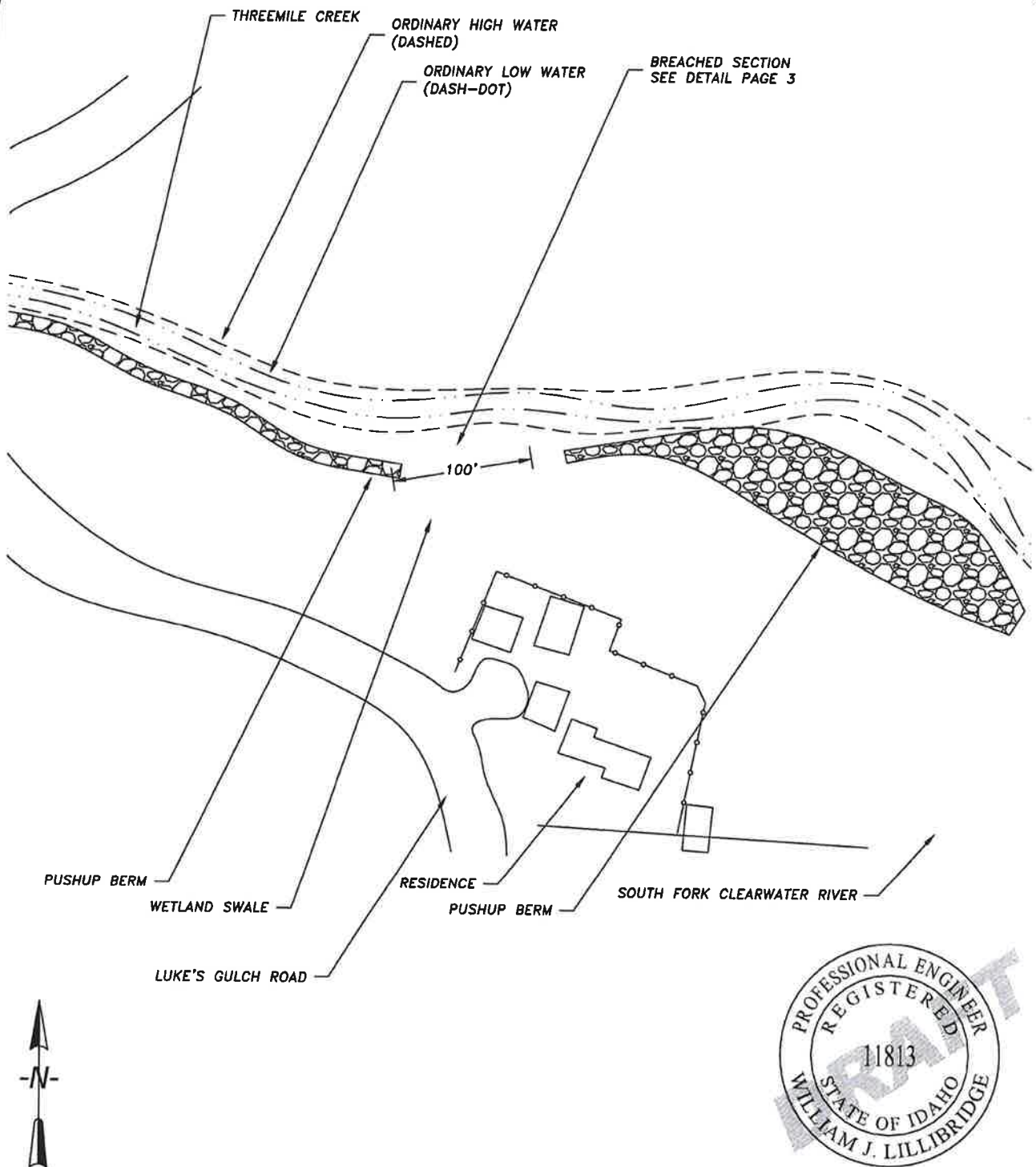
I am in support of the project and eager to assist restoration of Three Mile Creek, and the berm. I will allow access and do whatever I can to help with the project. I am currently working on the permitting process.

Thank you for your consideration of the grant application. Please do not hesitate to contact me.

Sincerely,

*Ruth Mohr*

Ruth Mohr  
208-926-7203  
rmohr1234@gmail.com



## IDAHO SOIL AND WATER CONSERVATION COMMISSION

322 E. FRONT ST., SUITE 560 -- BOISE, ID 83720 -- (208) 332-1790



RUTH MOHR BERM - SITE PLAN MAP

STITES, ID - IDAHO COUNTY

JOB #: 650

LEGAL DESCRIPTION: SWSE SECTION 5, TOWNSHIP 31N RANGE 4E

DESIGNED BY: WJL

GPS COORDINATES: 46° 3.052'N 115° 58.909'W

DRAWN BY: WJL

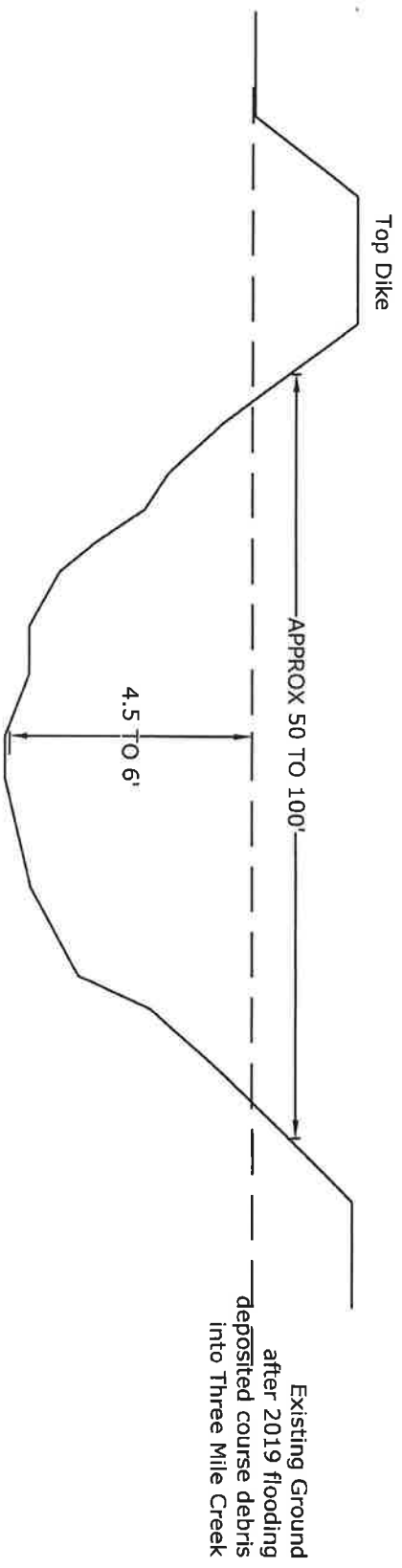
DATE: 04/18/2019

FILE NAME: MOHR, RUTH.DWG

SCALE: 1" = 100'

SHEET: 2 OF 3

**CROSS SECTION**  
**NOT TO SCALE**



THREE MILE CREEK  
CROSS SECTION

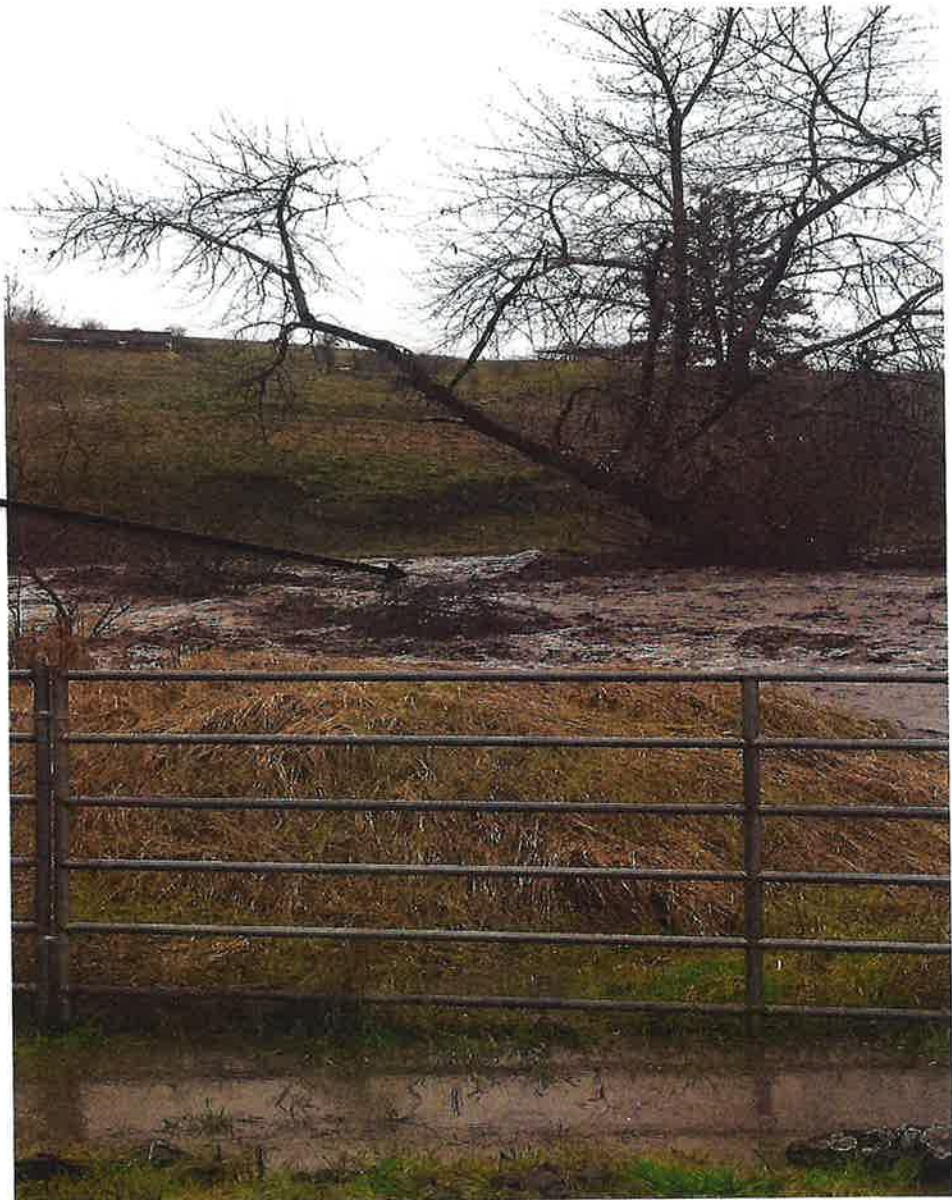


Three Mile Creek:  
Facing north  
showing damaged  
berm & flooded  
farm ground during  
flood event, April 9,  
2019



Three  
Mile  
Creek  
Stream  
Channel

Three Mile Creek:  
Facing north  
showing damaged  
berm & flooded  
farm ground during  
flood event, April 9,  
2019





Northeast view after Three Mile Creek flood waters receded, 05-01-19, showing creek material displacement covering resident's farm ground.

**TURNERS INC  
158 LUKES GULCH  
GRANGEVILLE, ID 83530  
507-0090 - Paul's cell**

May 29, 2019

Ruth Mohr

Dear Ms. Mohr:

Below is our bid cost to:

1. Clean creek bottom out and rebuild dike approximately 500-600 feet long by 100 feet wide in places with approximately 4 ½' deep average with a belly in it (see drawing).
2. Stream channel to be moved to north side where it was originally.
3. Water to be diverted to the north side while cleaning out creek channel for minimal water disturbance.

Bid cost is \$27,390.00.

Please feel free to contact me if you have questions. Thank you.

Respectfully Submitted,



Paul Turner  
President





Office of the Board of County Commissioners

Cassia County, Idaho

1459 Overland Ave., Room 210  
Burley, Idaho 83318

C O U R T H O U S E  
[www.cassiacyounty.org](http://www.cassiacyounty.org)

Main: 208-878-7302

Fax: 208-878-3510

Leonard M. Beck, *Chair*  
*Commissioner Dist. 1*  
[lbeck@cassiacyounty.org](mailto:lbeck@cassiacyounty.org)

Robert "Bob" Kunau  
*Commissioner Dist. 2*  
[bob.kunau@cassiacyounty.org](mailto:bob.kunau@cassiacyounty.org)

Kent R. Searle  
*Commissioner, Dist. 3*  
[ksearle@cassiacyounty.org](mailto:ksearle@cassiacyounty.org)

June 21, 2019

Idaho Department of Water Resources  
Idaho Water Resource Board

RE: Flood Management Grant Funding

Program Dear Board Members:

The Board of Cassia County Commissioners during the past two years have been involved in the review of the Elba Square Bridge. Deterioration and damage has been noted. It has been determined that the bridge is in need of replacement. The bridge has severely damaged head walls, and erosion. This Bridge is located over Cassia Creek which is a major drainage for Mount Independence area. This channel is a major irrigation and watering artery to farms and ranches and provides water in areas where flood irrigation is utilized. Cassia Creek crosses the main artery of 2000 South which is also direct access to the National Forest and scenic Mount Independence recreational area.

The County is seeking this grant, and coupled with County resources and assistance from the Raft River Flood District, the County can repair the damaged and eroding Elba Square bridge structure in the Elba area with an Aluminum Box Culvert Bridge which will improve the Cassia Creek stream channel, as well as reduce sediment and further erosion problems which will restore the stream to its natural order, providing stability and longevity to the replaced bridge structure. The replacement will also greatly enhance public safety in the community.

In that context of joint cooperation and best use of resources, please accept our application for this grant funding.

Board of Commissioners for Cassia County, Idaho

By:

A handwritten signature in black ink that reads "Leonard M. Beck".

Leonard Beck, Chair

**Cassia County Road and Bridge, Cassia County, Idaho**

**Grant  
Application  
For  
IDWRB Flood Management Grant Funding Program**



Cassia County Road and Bridge  
Sam Adams, Supervisor

1459 Overland Ave., Burley, ID 83318  
[sadams@cassiacounty.org](mailto:sadams@cassiacounty.org)  
208-312-1173

## **Cassia County Proposed Elba Bridge Replacement**

### **NARRATIVE**

#### **EFFECTIVENESS OF PROJECT**

##### **2.1.1 Purpose**

Located on the historical Cassia Creek, is the Elba Bridge and the area for our project, and which is of vital concern, is at the .59 Miles West on 2000 South from the Elba-Almo Intersection. The current structure is concrete footings (constructed in the mid-70's) and has a wood deck which said deck was replaced in 2000.

The years of water flowing under this bridge has eroded and damaged the concrete structure, causing major structural damage because of this exposure. And the banks underneath the bridge have deteriorated and the stream channel, flow has been extremely affected.

Repairs will be implemented to totally replace the existing concrete bridge and repair the stream channel, as well as reduce sediment and further erosion problems by using rip rap as well as armoring the banks to its natural order with reimplementation of willows and rock thereby providing stability and longevity to the existing bridge structure.

##### **2.1.2 Narrative**

The Cassia Creek Drainage begins from Mt. Independence and winds its way northward through the Elba valley located in Cassia County, Idaho and continues on to the Raft River Drainage which collects all of the minor tributaries throughout the adjoining valleys.

A map showing location of the above area is attached to show the location of roadways, bridges, irrigation structures and the proposed the project site.

General characteristics of the project area include several ranches, hundreds of acres of farm ground, school bus route access, community access for residents in this area, emergency access services, as well as National Forest access.

##### **2.1.3 Previous Projects and Studies**

On the Raft River we replaced an identical bridge in the same year approximately 5 miles away on the EY Road. Approximately ten miles from proposed project, the Narrows Bridge was completed and replaced, including the installation of four eight foot culverts. Also, Cassia County Road and Bridge has done channel and head wall work on the Reid Springs Bridge in cooperation with IDWRB, Raft River Flood District, Army Corp of Engineers, and Idaho Department of Water Resources.

#### **2.2 Project Sponsor**

Cassia County Idaho is a political subdivision of the State of Idaho since February 1879. Cassia County is largely of agriculture influence that depends on both water for irrigation and roads for access to lands which benefit and serve the agricultural economy of the area and the citizens of this County.

#### 2.4.1 Project Description

a. We are proposing to replace the Elba Bridge which is located .597 Miles West on 2000 South from the Elba Almo Road intersection, Elba, Cassia County, Idaho and doing the following work:

- Excavate and haul way debris, fines and sediment to clear the years of build up and erosion.
- By replacing the existing bridge it will create a better channel, more effective water flow, and stabilize stream banks.

b. A Map of the entire project area showing the location of the proposed bridge replacement is attached.

c. Drawings are attached that show the current status and views of the proposed project as well as the finished project.

d. The drawings show proposed implementation of the best management practices for installation of the bridge and bank stabilization along the bridge, as well as erosion prevention, excavation and grading, and other factors.

e. The 2000 South area is west of the Elba LDS Church, and the Property owner to the south Thomas Ottley and property owner to the north is Ruel Barker. The property owners have been notified. All bridge work will be done within the road right-of-way.

#### 2.4.2 Cost Estimate

Cost Estimate of Proposed Project	Total:	<b>87,750.00</b>
IDWRB 50%		43,875.00
404 Permit		4,000.00
Construction County Share & Raft River Flood District		17,550.00
Legal Administrative Services / In Kind Services		26,325.00

Please review attachment from Steve Yearsly, Engineer, regarding breakdown of costs.

#### OBJECTIVES AND BENEFITS OF THE PROJECT

The proposed project is tentatively scheduled to begin August 1, 2020 the completion date is scheduled for September 1, 2020.

July 31 <sup>st</sup>	Receive Grant Money from IDWR
July 31 <sup>st</sup> , 2019	Start process for 404 Permit, Engineers Plan, Hydraulic Report if needed
Aug. 3 – Aug. 4, 2020	Have in hand at jobsite required permits, plans.
Aug. 4, 2020	Move equipment into place, including excavator, loader, trucks, etc.
Aug. 10, 2020	Work begins. Excavate Banks, remove debris from stream channel Haul off loose dirt and sediment to keep jobsite clean as possible,
Aug. 11, 2020	
	Remove bridge deck, concrete structure, sediment, and debris from underneath the bridge,
Aug. 12, 2020	Compact Banks, and stream channel using vibratory compactor.
Aug. 12, 2020	Install concrete, and aluminum box culvert.
Aug. 12 – 31, 2020	Clean up any rock, dirt, etc. Leaving job site clean and presentable



IDWRB, Army Corp of Engineers, Idaho Department of Water Resources, Cassia County Commissioners, and the General public.

Amount Requested of Proposed Project Cost:

<b>Cost Estimate of Proposed Project</b>	<b>Total:</b>	<b>87,750.00</b>
IDWRB 50%		43,875.00
404 Permit		4,000.00
Construction County Share & Raft River Flood District Share		17,550.00
Legal Administrative Services (5%) / In Kind Services (30%)		26,325.00

Please review attachment from Steve Yearsly, Engineer, regarding breakdown of costs.

**Financing Sources:**

- From IDWRB: 50%
- Cassia County 10%
- Raft River Flood District 10%
- In Kind Services (County) 30%

**2.6**

- a. Cover Letter from Cassia Commissioners attached.

**Narrative Responding to Grant Program Criteria.**

**Effectiveness of Project:**

The urgency of this project is the bridge needs replaced. Deterioration of the banks as well as the bridge itself and the channel walls. Work needs to be done to abate further damage to the integrity of the stream channel prior to the next winter setting in and while the stream is low and water has receded from the channel.

The work is to clean out all the debris, fines and sediment that built up around the concrete structure to install an aluminum box culvert, which is ideal for small bridge replacements. Fast and easy low cost installation, suitable for rehabilitation. Most economical solution. 35-45 Year life-span.

The stream banks will be improved from the culvert reinforcement, it will be a 31.5 foot Bridge, which will protect from erosion and future damage. Engineered design will help make this a model project.

We will also obtain the 404 permits as required, as well as conducting engineering studies as necessary, along with conducting the work to complete this project to Cassia County and State Standards.

**Readiness of Project:**

The lead sponsor will be Cassia County, through its County Road and Bridge Department. The County is supported by the Raft River Flood District. The Raft River Flood District is helping to match the cost share as well as providing some in-kind resources.

The land owner(s) surrounding the project are in favor and support the project, and granting access to do the work that is necessary to repair and rehabilitate the proposed project located within the 2000 South road right-of-way.

The project will begin on August 1, 2020 and will be completed by September 1, 2020.

**Organization Capacity and Past Projects:** The County Road and Bridge Department has been involved, in past projects, with CMAQ, controlled management of air quality; with LHTAC grant funding on gravel crushing projects; with the Narrows Bridge replacement project (in cooperation with the Raft River Flood Control District, which was a complete bridge removal including acquiring all the required permits from State and Army Corp. of Engineers; and, the Elba Square project which consisted of replacing culverts and live stream channel improvement to allow water flow while maintaining road integrity, this required permits from State and Army Corp. of Engineers.

**Implementation of Proposed Project:**

10%	Cassia County
10%	Raft River Flood District
30%	In-kind Services (County)
50%	IDWRB

Consulting Staff and Sponsor includes:

- Flood District
- Engineer
- Road Supervisor and Staff

Sam Adams, Cassia County Road & Bridge Supervisor – Resume Included

Steven Yearsley, P.E. Forsgren Associates – Resume Included

Karissa Hardy, Local Highway Technical Assistance Council – Resume Included

# Elba Square Bridge

— CassiaPublicRoads

1 inch = 0.02 miles



31

32

113°34'18.298"W, 42°14'27.456"N

E 2000 S

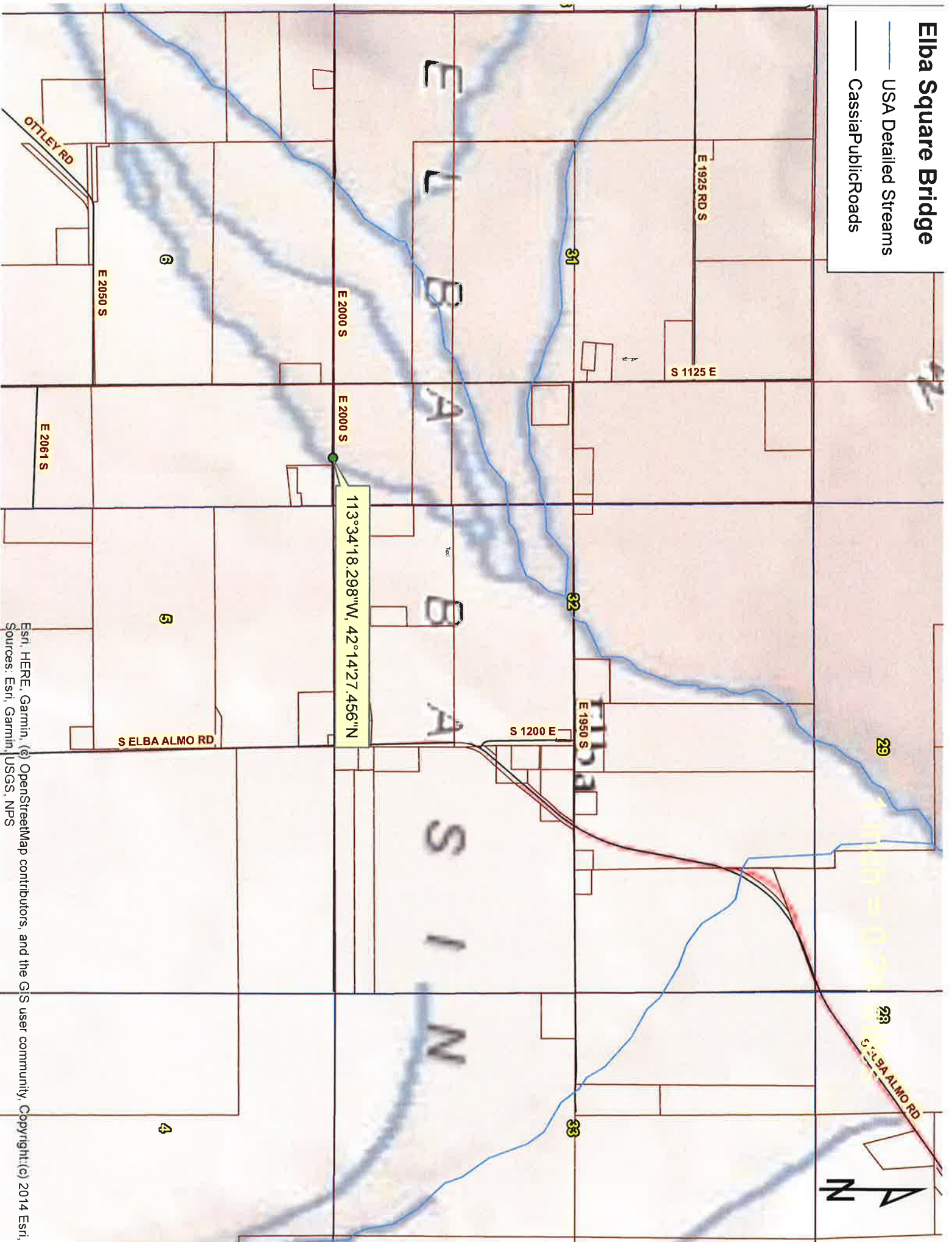
6

5



# Elba Square Bridge

- USA Detailed Streams
- Cassia Public Roads





# Elba Square Bridge

Cassia Public Roads

Cassia County FIRM



1 inch = 0.16 miles

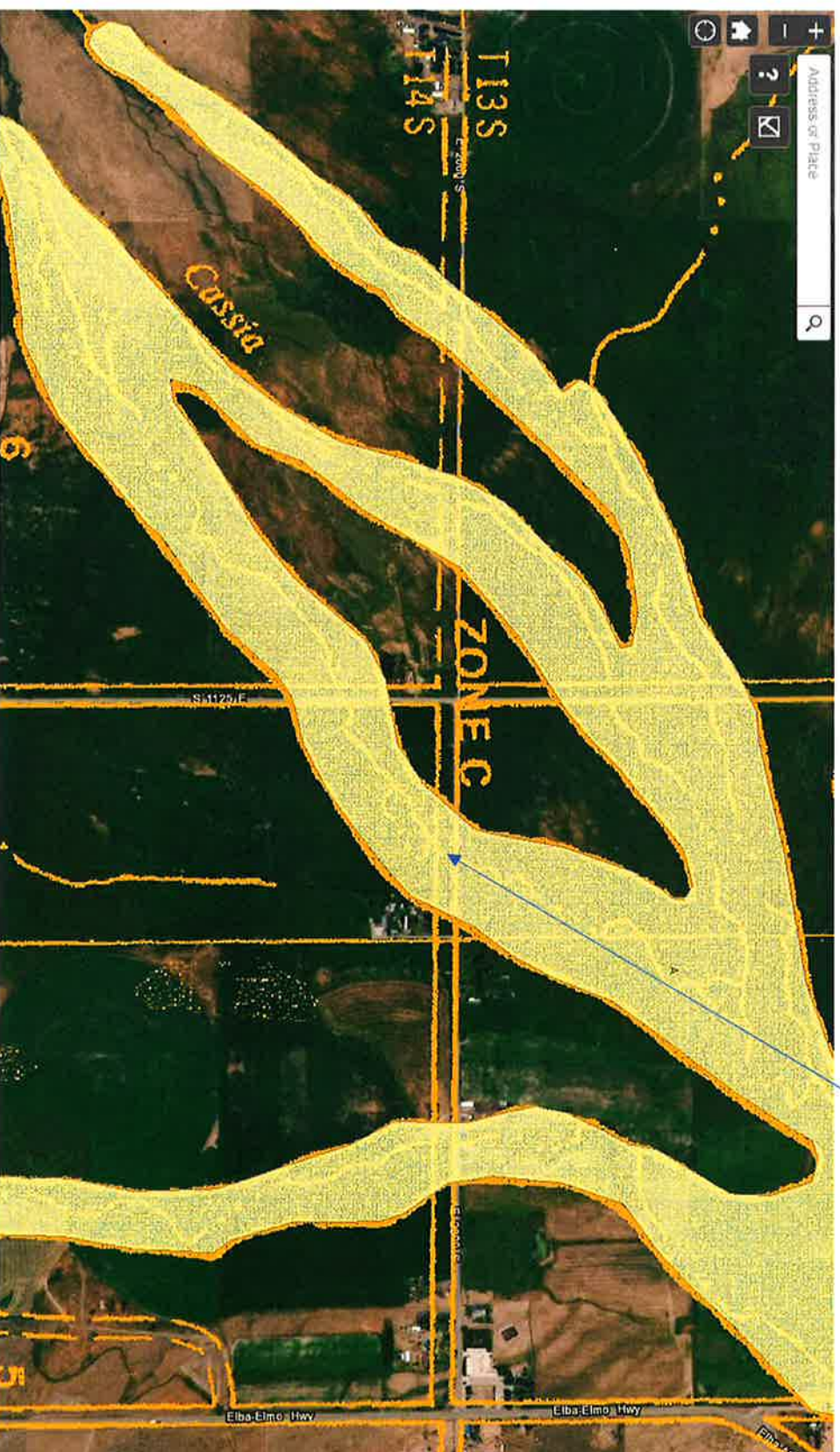
113°34'18.298"W, 42°14'27.456"N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

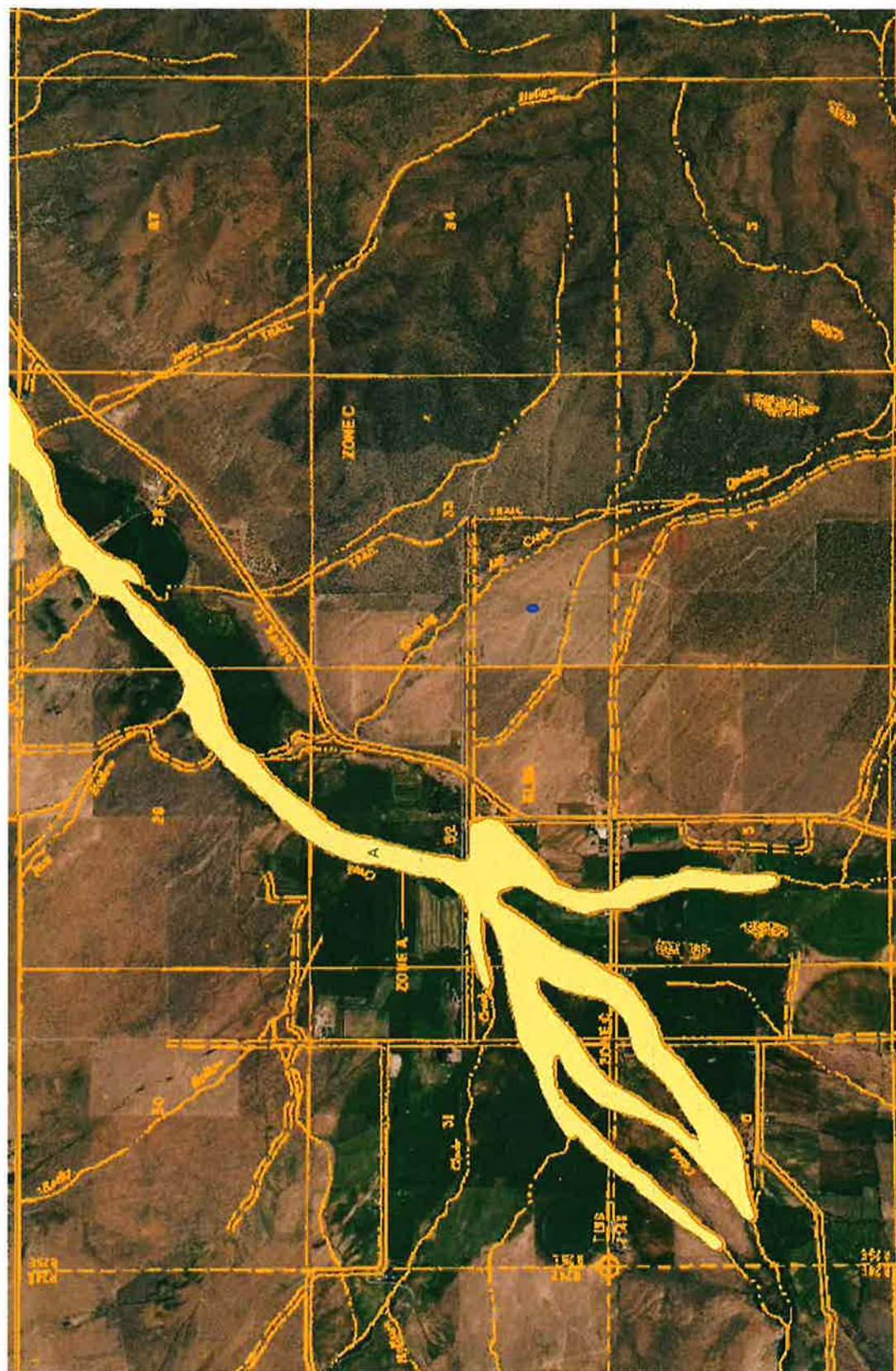


<https://dwr.maps.arcgis.com/apps/webappviewer/index.html?id=c8b7dc8190a147d19455bdc92b81410a>

## Elba Square Bridge









## IDAHO WATER RESOURCE BOARD

322 East Front Street, Statehouse Mail

Boise, Idaho 83720

Tel: (208) 287-4800

FAX: (208) 287-6700



### APPLICATION FOR FLOOD MANAGEMENT GRANT

Answer the following questions and provide the requested material as directed. All pertinent information must be provided. Additional information may be requested by the Idaho Water Resource Board (IWRB) depending on the scope of the project and amount of funding requested.

**Incomplete documents will be returned and no further action will be taken by IWRB staff. All paperwork must be submitted within twenty-eight (28) working days prior to the next IWRB meeting.**

Board meeting agendas can be found at: <https://idwr.idaho.gov/IWRB/meetings>

---

#### **I. Overview:**

This form applies to the IWRB Flood Management Grant Program. The Flood Management Grant Program provides financial assistance, on a competitive statewide basis, to eligible entities interested in pursuing flood damaged stream channel repair, stream channel improvements, flood risk reduction, or flood prevention projects. Pursuing flood management improvement and repair projects can assist in maintaining flow capacities in major waterways, prevent bank and channel erosion, and reduce property damage during flood events.

The grant funding shall require a 50% funding match by the sponsor of the total project costs. In-kind services can account for up to 30% of the total project costs. Legal/Administrative in-kind services are limited to 5% of total project costs.

Funds will be distributed by sponsor submitting funding reimbursement requests, which shall include:

1. Cover letter formally requesting a funding reimbursement, description of project activities, dates of project activities, and contractor or supplier invoices. Funds shall be distributed within 15-days of receipt of reimbursement request.

Upon completion of the project, sponsor and/or consultant, shall submit a notice of completion to the IWRB, and that the improvements and/or repairs were constructed in substantial conformance with the approved plans and specifications.

#### **Prepare and attach a "Grant Document" to this application.**

The Grant Application Document requirements are outlined in the IWRB Flood Management Grant Program Guidelines. The guidelines can be found at:

<http://idwr.idaho.gov/IWRB/Programs/Financial>

You can also obtain a copy by contacting IWRB staff.



---

## **II. General Information:**

### **A. Type of organization: (Check box)**

- ☐ Flood Control District  
☒ Municipality  
☐ County  
☐ Other

Cassia County Road & Bridge

Organization name

1459 Overland Ave

PO Box/Street Address

Burley, ID 83318

City, County, State, Zip Code

82-6000292

Taxpayer ID#

Sam Adams, Road Supervisor

Name and title of Contact Person

208-312-1173

Contact telephone number

sadams@cassiacounty.org

e-mail address

Project location/ legal description 113°34'18.298"W, 42°14'27.456"N approx.  
.597 Miles west on 2000 South from the Elba Almo Road.

**B. Is your organization registered with the Idaho Secretary of State's office? Yes ☐ No ☒**

### **C. Purpose and project description for this grant application.**

- ☒ Stream Channel Repair  
☒ Stream Channel Improvement  
☒ Flood Risk Reduction  
☒ Flood Prevention  
☒ Other Replace Eroded and damaged Bridge

---

## **III. WATER PROJECT/ACTIVITY:**

### **A. Water Source and Name:**

- ☒ Surface ☐ Reservoir  
☒ Other Cassia Creek

**B. Describe the Flood Management Project/Activity and the primary purpose of this grant application?**

Replace existing 14' x 8' Bridge with 40-50 year old footings with a new 12' x 31.5'

aluminum box culvert, sufficient to road needs, 100 car ADT, farm to market,

forest access, school bus routes, recreational area access, etc., as well as public safety.

**C. Does this project/activity address multiple objectives? If so explain.**

Yes, provides better drainage and less erosion and sedimentation. Also helps with

possible road damage as well, better bridge for existing community.

**D. Will this flood management project/activity be implemented in a single year, or phased over multiple years?**

☒ 1-year

☐ Multiple-years (Phased)

**E. Project start and completion dates:**

Start Sept. 1, 2020 - October 1, 2020 according to engineer estimates.

**F. Project detailed cost estimate, including all labor and materials:**

87,750.00 Engineered Summary attached.

**G. Has your organization performed stream channel or stream bank repair and/or improvement projects in the past?**

Full bridge replacement on EY Road, Narrows Road Intersection, Reid Springs Bridge

Repair and Stream Channel Repair Projects #1 and #2.

**H. Provide the required regulatory approval and permit documents for this project.**

Processing, with Army Corps of Engineers, Robert Brochu; and Idaho Department of

Water Resources - Cass Jones.

---

**IV. FINANCIAL INFORMATION:**

A. Does your organization have a regular assessment for a reserve or special needs fund?

Yes ☐ No ☒

B. Does your organization have prior experience in working with the Idaho Water Resource Board?

Yes ☒ No ☐

C. What other sources of funding have been explored to fund the project? (e.g. U.S. Army Corps of Engineers, NRCS, FEMA, Banks, Local Government, etc.)  
Local Highway Technical Council, Raft River Flood District, FEMA, US Army Corp of  
Engineers, Idaho Department of Water Resources.

---

Amount of funds requested: \$43,875.00

*By signing this document you verify that all information provided is correct and the document is filled out to the best of your ability.*

Authorized signature& date: \_\_\_\_\_

# FORSGREN

*Associates, Inc.*

## CASSIA COUNTY ROAD AND BRIDGE

ELBA BRIDGE REPLACEMENT

ALUMINIUM BOX CULVERT

PRELIMINARY COST ESTIMATE

JUNE 10, 2019

Description	Unit	Estimated Quantity	Unit Price	Price
REMOVAL OF EXISTING BRIDGE	LS	1	\$ 2,500.00	\$ 2,500.00
NEW 12.25' L. X 31.5' W. X 4.6' H. ALUM. BOX	LS	1	\$ 36,000.00	\$ 36,000.00
BRIDGE INSTALLATION	LS	1	\$ 10,000.00	\$ 10,000.00
EXCAVATION	CY	100	\$ 15.00	\$ 1,500.00
3/4" AGGREGATE FOR FOOTINGS	CY	15	\$ 50.00	\$ 750.00
STRUCTURAL BACKFILL	CY	100	\$ 35.00	\$ 3,500.00
3/4" AGGREGATE FOR ROADWAY	CY	300	\$ 25.00	\$ 7,500.00
COFFER DAM	LS	1	\$ 2,500.00	\$ 2,500.00
MOBILIZATION (10%)	LS	1	\$ 6,400.00	\$ 6,400.00
CONTINGENCY (10%)	LS	1	\$ 7,100.00	\$ 7,100.00
404 PERMIT	LS	1	\$ 5,000.00	\$ 5,000.00
ENGINEERING SUPPORT	LS	1	\$ 5,000.00	\$ 5,000.00
<b>PROJECT TOTAL</b>				<b>\$ 87,750.00</b>



Prepared by Steven R. Yearsley, P.E.  
Forsgren Associates, Inc.





June 14, 2019

Idaho Water Resource Board  
322 East Front Street, Statehouse Mail  
Boise, Idaho 83720

RE: Application for Flood Management Grant  
For Cassia County Road & Bridge

To Whom It May Concern,

The Raft River Flood District #15 is a stake holder on the proposed bridge repair known as Elba Square Bridge located .597 miles west of Elba/ Almo Hwy on 2000 South. The Flood District is in full support of said project, is a willing participant and can contribute the amount of \$10,000.00 towards the cost of the project.

Sincerely,

Lucas Spratling  
Raft River Flood Board #15 Chairman

---

Board Members:

Lucas Spratling | Cordell Sheridan | Rob Cottle | Carl Boden | Brian Kincade | Sara Jane Ward  
District 5 Chairman      District 1 Vice Chairman      District 3      District 2 Treasurer      District 4      Office Secretary



# Portneuf Soil and Water Conservation District

1551 Baldy Ave Suite 2

Pocatello, ID 83201

(208)237-4628 x111

[www.portneufswcd.weebly.com](http://www.portneufswcd.weebly.com)

June 20, 2019

## Board of Supervisors

KEVIN KOESTER  
Lava Hot Springs, ID

SCOTT HENDERSON  
Swan Lake, ID

DAVE JACKSON  
Tyhee, ID

KIT TILLOTSON  
Lava Hot Springs, ID

JOHN McNABB  
Inkom, ID

## Associates

DAVE JONES  
Swan Lake, ID

JOHN SIGLER  
Pocatello, ID

HANNAH SANGER  
Pocatello, ID

KRYSTAL HARMON  
Pocatello, ID

Idaho Water Resource Board  
322 East Front Street, Statehouse Mail  
Boise, Idaho 83720

The Portneuf Soil & Water Conservation District requests \$200,000 in grant assistance from the Idaho Water Resource Board's Flood Management Grant Program. Funds would be used to acquire land and conservation easements along Marsh Creek from McCammon, Idaho to Inkom, Idaho.

Marsh Creek is the largest tributary to the Portneuf River which flows through the City of Pocatello. Flat topography and historic land use practices have resulted in excessive sediment within the stream, which is not flushed out and contributes to undesired flooding. Streambanks are poorly vegetated and erode easily, exacerbating flooding issues. Marsh Creek is currently listed as a 303(d) and 4a impaired stream.

The proposed project will work with willing private landowners and agency partners to reduce flooding by reconnecting these historic wetlands, stabilizing eroding streambanks with vegetation, and slowing the flow of runoff to Marsh Creek, thus limiting flood damage downstream as a result of instream scour and sediment deposition.

The Portneuf Soil & Water Conservation District has nearly eight decades of experience working with agricultural landowners alongside its partners including NRCS, Idaho DEQ, US Fish and Wildlife Service, Fish & Game, US Forest Service, the City of Pocatello and Bannock County.

Idaho State University has recently completed a 3-year study of Marsh Creek analyzing historic flows and sediment transport, as well as landowner interest in various streambank restoration projects. This study will be used to guide the locations for installing Best Management Practices. The proposed project is ready to go with \$250,000 from NRCS as match, plus \$10,000 in engineering costs as well as \$25,000 from USFWS as match.

IDWR support would greatly assist the PSWCD in being able to make a lasting and widespread difference in helping landowners along Marsh Creek mitigate flood damage while also improving stream health not only in Marsh Creek but to those downstream. Thank you for considering this request.

Kevin Koester  
PSWCD Chairman



**IDAHO WATER RESOURCE BOARD**  
322 East Front Street, Statehouse Mail  
Boise, Idaho 83720  
Tel: (208) 287-4800  
FAX: (208) 287-6700



## **APPLICATION FOR FLOOD MANAGEMENT GRANT**

Answer the following questions and provide the requested material as directed. All pertinent information must be provided. Additional information may be requested by the Idaho Water Resource Board (IWRB) depending on the scope of the project and amount of funding requested.

**Incomplete documents will be returned and no further action will be taken by IWRB staff. All paperwork must be submitted within twenty-eight (28) working days prior to the next IWRB meeting.**

Board meeting agendas can be found at: <https://idwr.idaho.gov/IWRB/meetings>

---

### **I. Overview:**

This form applies to the *IWRB Flood Management Grant Program*. The Flood Management Grant Program provides financial assistance, on a competitive statewide basis, to eligible entities interested in pursuing flood damaged stream channel repair, stream channel improvements, flood risk reduction, or flood prevention projects. Pursuing flood management improvement and repair projects can assist in maintaining flow capacities in major waterways, prevent bank and channel erosion, and reduce property damage during flood events.

The grant funding shall require a 50% funding match by the sponsor of the total project costs. In-kind services can account for up to 30% of the total project costs. Legal/Administrative in-kind services are limited to 5% of total project costs.

Funds will be distributed by sponsor submitting funding reimbursement requests, which shall include:

1. Cover letter formally requesting a funding reimbursement, description of project activities, dates of project activities, and contractor or supplier invoices. Funds shall be distributed within 15-days of receipt of reimbursement request.

Upon completion of the project, sponsor and/or consultant, shall submit a notice of completion to the IWRB, and that the improvements and/or repairs were constructed in substantial conformance with the approved plans and specifications.

### **Prepare and attach a "Grant Document" to this application.**

The Grant Application Document requirements are outlined in the IWRB Flood Management Grant Program Guidelines. The guidelines can be found at:

<http://idwr.idaho.gov/IWRB/Programs/Financial>

You can also obtain a copy by contacting IWRB staff.

---

## **II. General Information:**

### **A. Type of organization: (Check box)**

- ☐ Flood Control District  
☐ Municipality  
☐ County  
☒ Other

Portneuf Soil & Water Conservation District

Organization name

Cali Johnson, District Administrator

Name and title of Contact Person

1551 Bakdy Ave, Suite 2

PO Box/Street Address

208-244-5011

Contact telephone number

Pocatello, ID 83201

City, County, State, Zip Code

portneufswcd@gmail.com

e-mail address

82-0311586

Taxpayer ID#

Project location/ legal description:

The project areas are located along the riparian areas of lower Marsh Creek, near McCammon, Idaho to the confluence with the Portneuf River, near Inkom, Idaho. See attached project map and background summary. The identified areas were historically flooded before being converted into farmland.

**B. Is your organization registered with the Idaho Secretary of State's office? Yes ☒ No ☐**

### **C. Purpose and project description for this grant application.**

- ☒ Stream Channel Repair  
☒ Stream Channel Improvement  
☒ Flood Risk Reduction  
☒ Flood Prevention  
☒ Other Reduce Sediment and Nutrient load in Marsh Creek (Portneuf River Subbasin)

---

## **III. WATER PROJECT/ACTIVITY:**

### **A. Water Source and Name: Marsh Creek**

- ☒ Surface ☐ Reservoir  
☐ Other \_\_\_\_\_



**B. Describe the Flood Management Project/Activity and the primary purpose of this grant application?**  
Years of farming practices and straightening of Marsh Creek have created eroding and incised stream banks and reduced total stream length leading to an increase in sediment and nutrient loads. These practices have impacted Marsh Creek so much that it is now listed as a 303(d) and 4a impaired stream. The primary purpose of this grant is to acquire land and/or conservation easements on flood prone riparian areas in the lower reach of Marsh Creek. Acquisition of this land would allow for the seasonal floodplain areas, construction of Wetland Reconnection, Riparian Herbaceous/Forest Cover, Fencing and Access Control, Streambank and Shoreline Protection, and any additional supporting practices needed to address flooding and water quality concerns on Marsh Creek.

**C. Does this project/activity address multiple objectives? If so explain.**

In addition to improving flood control through increasing and improving floodplain areas, this project aims to significantly improve water quality on the impaired (303(d) and 4a) listed waters by trapping sediment and nutrients (phosphorus) and removing them from the floods water. Marsh Creek is one of the most impaired streams in Idaho and a majority of the high sediment and nutrient loads occur during high-flow flood events. Marsh Creek which is the largest tributary to the Portneuf River which flows through the City of Pocatello and its 54,000 residents. See attached background summary for more information about Marsh Creek. Idaho State University as well as the Department of Environmental Quality have conducted regular testing of sites along Marsh Creek and the Portneuf River for many years. These sites will continue to be tested on a regular basis during and after construction.

**D. Will this flood management project/activity be implemented in a single year, or phased over multiple years?**

☐ 1-year      ☒ Multiple-years (Phased)

**E. Project start and completion dates:**

September 2019-December 2022

**F. Project detailed cost estimate, including all labor and materials:**

The proposed project is estimated to cost \$485,000, which includes a \$200,000 grant request in this application.

Land Purchase and/or Project Conservation Easements: \$180,000

Project Administration (including permitting): \$ 20,000

The additional \$285,000 will be a combination of matching funds, partner funding and technical assistance. These funds will be used to complete additional Best Management Practices (BMPs) which include; construction of wetlands, channel/floodplain reconnection, Riparian Herbaceous/Forest Cover, Fencing and Access Control, Streambank and Shoreline Protection, and any additional supporting practices needed to address flooding and water quality concerns on Marsh Creek.

**G. Has your organization performed stream channel or stream bank repair and/or improvement projects in the past?**

The Portneuf SWCD has successfully completed numerous projects over it's nearly 80 year life span. Recent projects similar to the proposed project include; Marsh Creek (Phases 1,2 & 3), Pebble Creek Phase 1 DEQ 319 Projects, Lava Trails Project (Idaho Parks & Rec.), Casperson Project, Arkansas Basin Project and Rapid Creek Project.

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H. Provide the required regulatory approval and permit documents for this project.

Required regulatory approval and permit documents will be secured for any associated BMP implementation upon completion of design plans (404 permits from IDWR/USACE; Erosion and Sediment Control permit from Bannock County)

**IV. FINANCIAL INFORMATION:**

A. Does your organization have a regular assessment for a reserve or special needs fund?

Yes ☐ No ☒

B. Does your organization have prior experience in working with the Idaho Water Resource Board?

Yes ☒ No ☐

C. What other sources of funding have been explored to fund the project? (e.g. U.S. Army Corps of Engineers, NRCS, FEMA, Banks, Local Government, etc.)

NRCS, 319, USFWS & Local Government, Sage Brush Steppe Land Trust and local watershed groups and NGOs.

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Amount of funds requested: \$200,000

*By signing this document you verify that all information provided is correct and the document is filled out to the best of your ability.*

Authorized signature & date: Kevin Hooster, Portneuf SWCD Chairman 06/20/2019

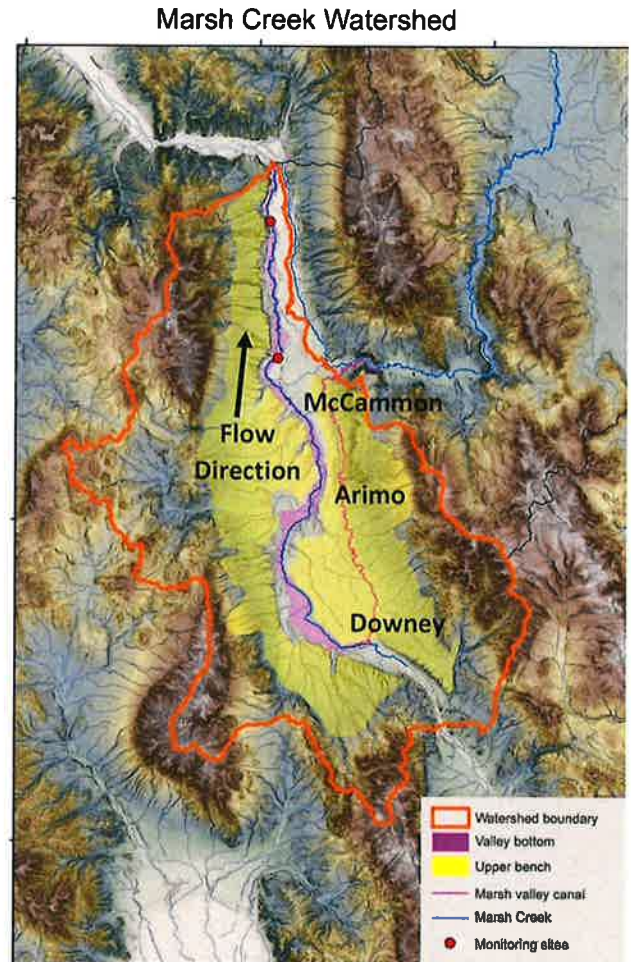
# Marsh Creek Background Summary

## Project Background

### Project Area

The proposed project targets flooding and water quality concerns along Lower Marsh Creek (below Arimo), a severely impaired and flood prone waterbody in the Portneuf Watershed, within Bannock County in Southeastern Idaho.

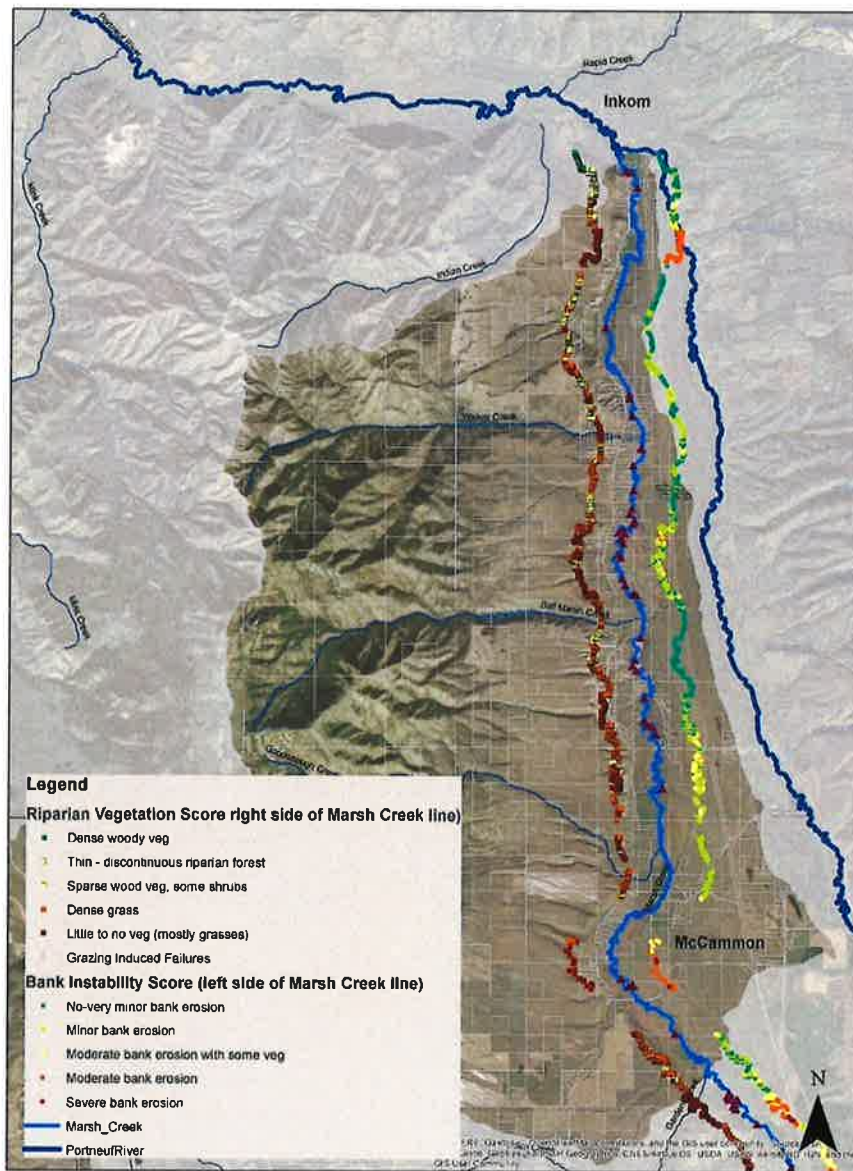
Most of the land along Marsh Creek (below Downey and within the valley bottom depicted in purple on the map to the right) is privately owned (92.5%, 24,720 acres) and in agricultural production using flood irrigation or center pivots. Much of this land is grazed by cattle or other livestock throughout the year.



Marsh Creek uplands and valley floor, 2018 ISU (Meese)

Map of proposed project area with priority areas delineated

## Lower Marsh Creek Vegetation & Bank Stability



Idaho State University MILES data collection and analysis, 2017

Research by Idaho State University (Guillinger, 2017) allows project partners to line up parcel map data with documented grazing induced bank failures, bank instability scores and riparian vegetation scores. **Priority areas are those with moderate to severe bank erosion (seen on the left side of the Marsh Creek line).**



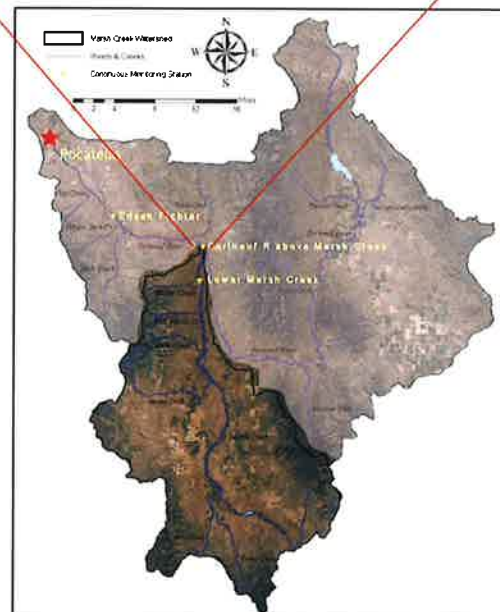
Marsh Creek, the largest tributary to the Portneuf, drains nearly 1/3 of the Portneuf Watershed and is the Portneuf's largest source of sediment, with median concentrations of sediment four times as high as are in the Portneuf River. This sediment contributes to downstream flooding by constricting the stream channel, including the Portneuf River Flood Control Project in Pocatello.



Turbidity measurements taken 7/13/2016, ISU (Guillinger)

Conservation practices (particularly CRP and AFO/CAFO) have been implemented since the 1980s, but much more is needed to reduce the sediment to historic levels and to reduce flooding.

- In 1985, Southeast Idaho was the fifth worst region in the US for fine sediment, and Marsh Creek was ranked third worst in Idaho;
- This high sediment load persists today, as seen in research conducted by Idaho State University during 2015-2018 on sediment sources in Marsh Creek.
- Additionally, the 2018 Portneuf River TMDL 5-year review reports that within the entire Portneuf Watershed, median suspended sediment concentration (SSC) concentrations (2008-March 2018) are lowest in the Portneuf River above Marsh Creek (10 mg/L) and highest in lower Marsh Creek (40 mg/L);



Marsh Creek within the Portneuf Watershed, IASCD 2013

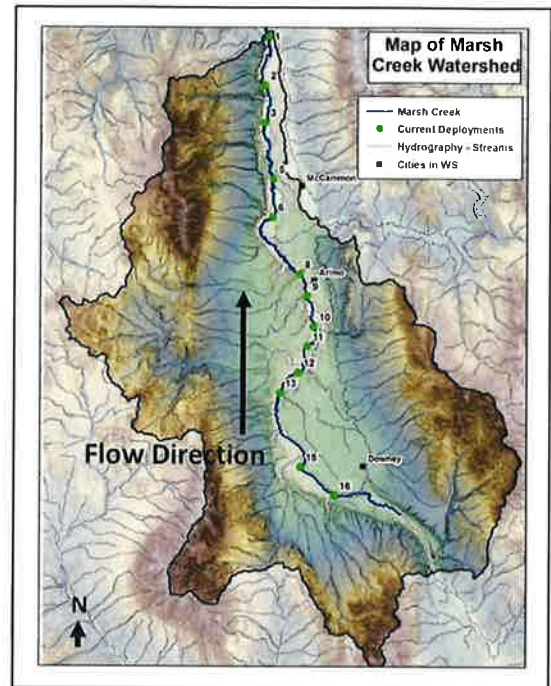
## Previous Studies

From 2015-2018 Idaho State University MILES faculty, students and staff conducted a multiyear analysis of Marsh Creek to measure the sediment load, identify its sources, understand landowner views and preferences and suggest BMPs to reduce sediment in the stream. Their data collection included:

- Installing and maintaining 13 water quality sondes along Marsh Creek to measure the sediment load along the creek and understand its transport mechanisms
- Using nitrogen isotopes to fingerprint the sediment to particular sources
- Floating the length of Lower Marsh Creek and characterized its vegetation and bank stability.
- Historic aerial photograph analysis comparing the 1941 channel to present day.
- Surveying landowners about their interests and knowledge of conservation practices.

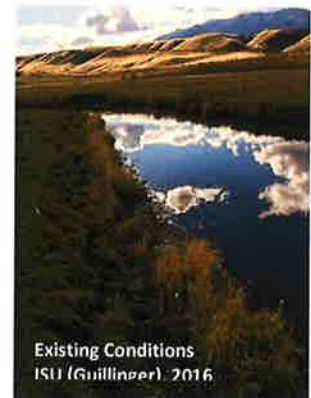
ISU researchers found that Marsh Creek's highly mobile sediment is primarily generated from unstable banks in the lower half of the creek. Levees keep this sediment from being deposited on the floodplain and the stream's low gradient limits transport downstream.

- This research determined that **the source of the sediment in Marsh Creek was coming from its banks**, and not from nearby pasture land or alfalfa crops.
- Their bank analysis work and historic aerial photography analysis corroborated IDEQ BURP data (2003 and 2010) which indicated that **bank stability is poor along a majority of Marsh Creek** (up to 50% unstable within a given 300-meter reach). Exposed un-vegetated banks are common, and most of Marsh Creek's vegetation is minimal and limited to grasses and other shallowly rooted plants, with patches of willows along the lower portion of the creek. Additionally, about 40% of the bank instability showed evidence of livestock trampling.
- Numerous small levees limit Marsh Creek's ability to deposit sediment onto its floodplain.
- Most of the smaller landowners were interested in conservation practices, but unaware of BMP specifics or funding opportunities.



ISU researchers recommended two courses of action for willing landowners:

- Mitigate at the source with bank stabilization for long-term water quality improvements,
  - Exclosure fencing/off-channel watering
  - Bank revegetation and reshaping
- Remove levees in key locations to restore wetlands, capture floodwaters in desired areas, and capture some of the mobilized sediment for short-term water quality improvements (until the wetlands fill-in).



## **Project Sponsor**

The Portneuf Soil and Water Conservation District is a subgroup of state government that is directed by an elected board of supervisors and volunteer associates. The District was organized on May 18, 1940 to assist in developing and implementing soil erosion control programs on a local level. The District, now at the age of 78, promotes conservation and protection of our natural resources and has a strong emphasis on conservation education programs for people of all ages. The Board meets monthly to discuss conservation issues, to implement conservation projects, and conduct District business. Bylaws are attached.

The District is funded by grants, state and local government to implement conservation and education programs, to identify local natural resource conservation needs, and to provide services to land owners.

The one District employee and board of supervisors work directly with United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS), Farm Service Agency (FSA), Idaho Association of Soil Conservation Districts (IASCD), Idaho Soil and Water Conservation Commission (ISWCC), and other agencies and partners, including Bannock County and the cities within the county boundaries.

The District has significant experience implementing stream restoration and flood repair projects using funding from 319, NRCS, USDA and others, along with landowner and other local contributions. Work has been done on Marsh Creek, Arkansas Basin, the main stem of the Portneuf, Pebble Creek, Rapid Creek, etc.

PSWCD staff time will be used for project administration, including landowner outreach in collaboration with NRCS and other local partners.

## **Project Description**

### **Right of Way/Easement or Possible Land Purchase**

The proposed projects will occur entirely on private land.

Options:

1) Right of Way/Easement - Floodplain easement will be negotiated with the Landowner and NRCS or a Land Trust to increase and improve seasonal floodplain capacities along the lower Marsh Creek

2) Land Purchase - Purchase of Riparian areas to enhance floodplain capacities, improve riparian areas and reduce Marsh Creek Sediment and Nutrient loads

## **Partner Match - Project Description**

### **Conceptual Design**

The proposed project will focus on addressing a flood prone and water quality impaired (303(d) and 4a listed) waterbody. The NRCS planning policy will be followed by NRCS field offices and partners. Using the 9 steps of conservation planning, certified conservation planners will offer alternatives to interested landowners to address water quality resource concerns. Some of these alternatives and associated practices include Wetland reconnection, Riparian Herbaceous/Forest Cover, Fencing and Access Control, Streambank and Shoreline Protection (580), and any additional supporting practices needed to address

During the 9-step planning process, the NEPA process will be evaluated for any significant considerations to subjects such as the Clean Water Act, and the Endangered Species Act. The proposed project is expected to have positive benefits to water quality and wildlife habitat. If any adverse impacts are found as a result of practice implementation, those impacts will be further evaluated prior to implementation.

Cross sections and conceptual plans are not available. A portion of funds will be used to support Engineering Design work for removing levees to utilize the existing floodplain for sediment deposition during flood events, but most of the project Engineering will be conducted by NRCS staff (in-kind match).

Landowners will sign agreements with NRCS for maintenance of the conservation practices implemented.

## **Cost Estimate**

Project Engineering Design	\$10,000 + NRCS staff time (not counted as part of the match)
Project Construction	\$465,000
Project Administration (including permitting)	\$20,000

## **Implementation Schedule**

- Fall 2019 - Acquisition of Land and Conservation Easements
- Fall 2020 - Begin BMP Implementation with 1 selected landowner on Marsh Creek
- Publicize Program, landowner outreach & education
- Spring 2021– Fall 2022 – Continue implementation and education programs
- November 2022 – Project completion

A joint stream alteration permit from IDWR and USACE may be required for some projects. It is anticipated that this will take a few weeks to process.

## **Financial Feasibility Analysis**

The proposed project is estimated to cost \$485,000, which includes a \$200,000 grant request to the IDWR Board



**Match Sources:**

- \$200,000 cash match by NRCS, using current NRCS payment rates for BMP implementation.
- \$25,000 cash match from USFWS
- \$10,000 in-kind administrative support match from PSWCD (5% of project cost)

Additionally, landowners are expected to contribute up to \$5,000- \$15,000 in in-kind support to the proposed project.



United States Department of Agriculture

June 20, 2019

Kevin Koester  
Chairman  
Portneuf Soil and Water Conservation District  
1551 Baldy Avenue; Suite 2  
Pocatello, ID 83201

Dear Chairman Koester:

It is my pleasure to write a letter of support of the proposal of the Marsh Creek Flood Management Project being submitted to the Idaho Water Resources Board.

For many years different groups and agencies have worked to repair the damage on Marsh Creek and while these efforts have undoubtedly made a difference I am excited to see a project of this size in the works. Our agency will be able to provide technical assistance for the work that will be done and may also potentially provide financial assistance to cooperating landowners. NRCS staff look forward to working alongside not only the Portneuf SWCD but other agencies who are supporting this project as well.

The Marsh Creek Flood Management Project will not only provide the river the rehabilitation that it desperately needs but will have a great impact on water quality in the Portneuf River and those living downstream including the residents of Pocatello.

In conclusion, I fully support the efforts of the Portneuf Soil and Water Conservation District as they seek external funding to support a program designed to improve the health of both the river and the community.

Sincerely,

A handwritten signature in cursive script, reading "Nate Matlack after for", is written over the typed name.

Nate Matlack  
District Conservationist

**Natural Resources Conservation Service**  
Pocatello Field Office  
1551 Baldy Avenue, Pocatello, ID 83201  
Voice: (208) 237-4628 ext.111 Fax: (208) 237-3412

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www.deq.idaho.gov

Brad Little, Governor  
John H. Tippetts, Director

June 21, 2019

Mr. Kevin Koester  
Chairman  
Portneuf Soil and Water Conservation District  
1551 Baldy Avenue; Suite 2  
Pocatello, ID 83201

Dear Kevin Chairman Koester:

We are writing this letter of support for your Marsh Creek Flood Management Project proposal. The Idaho Department of Environmental Quality (DEQ) has worked many years with the Portneuf Soil and Water Conservation District and other entities to improve water quality in Marsh Creek, the Portneuf River and its other tributaries. Projects such as this have the potential to improve water quality both on site and downstream.

Both Marsh Creek and the Portneuf River are listed as being impaired due to excess sediment. It is our understanding that the proposal focuses on potential construction of wetlands in lower Marsh Creek to aid in abatement of flood waters. Such a project would likely improve water quality, help restore a more normative hydrograph while also providing additional wildlife habitat.

DEQ supports the efforts of the Portneuf Soil and Water Conservation District as they seek external funding to help improve water quality in Marsh Creek and the Portneuf River. Please contact me at 208.236.6160 if we can be of any further assistance.

Sincerely,

A handwritten signature in blue ink, which appears to read "Lynn Van Every".

Lynn Van Every  
Surface Water Quality Manager

Cc: Bruce Olenick, Regional Administrator



Science & Environment Division  
City of Pocatello  
PO Box 4169  
Pocatello, ID 83201  
(208) 234-6518

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June 20, 2019

Kevin Koester  
Chairman  
Portneuf Soil and Water Conservation District  
1551 Baldy Avenue; Suite 2  
Pocatello, ID 83201

Dear Chairman Koester:

I am pleased to write a letter of support for the Marsh Creek Flood Management Project being submitted to the Idaho Water Resources Board.

This project is of great significance to the City of Pocatello. Our City Council is continually asking about progress with reducing erosion on Marsh Creek. Several years back, we invested in research (conducted by ISU and other partners) to assess the source of sediment in Marsh Creek, and are excited that the Portneuf Soil and Water Conservation District and other watershed partners are using this research to drive project implementation where it will be most effective.

Marsh Creek is the primary source of sediment to the Portneuf River. Improving bank stability and capturing this sediment along with flood waters will dramatically improve water quality downstream, in addition to local habitat improvements. Managing flood waters on Marsh Creek, and controlling sediment at its source is significantly more cost-effective than constructing sediment basins downstream on the Portneuf River.

The City is excited to be a part of this collaborative effort between so many partners to not only understand the problem, but also work with local landowners on solutions. If you have any questions, do not hesitate to call.

Sincerely,

Hannah Sanger  
Science & Environment Administrator  
[hsanger@pocatello.us](mailto:hsanger@pocatello.us)





**Science & Environment Division**

City of Pocatello  
PO Box 4169  
Pocatello, ID 83201  
(208) 234-6518

# Marsh Creek Flood Management Project

