AGENDA

IDAHO WATER RESOURCE BOARD

Special Board Meeting No. 8-20
Thursday, August 20, 2020
1:00 p.m. (MDT)
Water Center
Conference Rooms C & D
322 E. Front St.
BOISE

(This meeting will be conducted using guidance in accordance with Governor Little's Stay Healthy Order issued May 30, 2020 in response to the public health emergency caused by the COVID-19 pandemic. Masks are required & in person attendance is limited. Call or email if you have questions: jennifer.strange@idwr.idaho.gov)

Board Members & the Public may participate via Go-To Meeting
Please join the meeting from your computer, tablet or smartphone.
https://www.gotomeet.me/IWRB
You can also dial in using your phone.
United States: +1 (571) 317-3122
Access Code: 673-626-773

1. Roll Call
2. Priest Lake*
3. Flood Control District10 Presentation
4. Non-Action Items for Discussion
5. Next Meeting & Adjourn

* 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 telephonically/ online. If you require special accommodations to attend, participate in, or understand the meeting, please make advance arrangements by contacting Department staff by email jennifer.strange@idwr.idaho.gov or by phone at (208) 287-4800.

Memorandum

To: Idaho Water Resource Board (IWRB)

From: Neeley Miller, Planning & Projects Bureau

Date: August 19, 2020

Re: Priest Lake Water Management Project Update

ACTION: Consider resolution to accept bids, authorize funding, and execute agreements.

Background

As a result of limited water supply and drought conditions in northern Idaho in 2015 and 2016 (and 2019) it has been difficult to maintain required lake pool levels and downstream flow in the Priest River during the recreational season.

Phase 1: The Priest Lake Water Management Study was completed in February 2018. The study included the following recommendations:

- Temporarily raising the surface level of Priest Lake up to 6 inches during the recreational season for dry years and integrating real-time streamflow data to allow more operational flexibility
- Outlet dam structural and operational improvements
- Replacing the current existing porous breakwater with an impervious breakwater structure and dredging a portion of the Thorofare channel

Phase 2: The Priest Lake Water Management Project – Preliminary Engineering & Design concluded in the fall 2019.

Update on Phase 3

Final Engineering & Design which includes finalizing regulatory permitting and bidding assistance began in November 2019 and is nearing completion.

Schedule

- July 2020 –Outlet dam and Thorofare bids opened
- Aug 2020 –IWRB authorize funding resolution and issuance of Notice to Proceed
- Oct 2020 - Mar 2021 – Anticipated construction period for both projects

Attachments:

Bonner County Additional Funding Commitment Letter

Funding Resolution to Commit Funds and Provide Signatory Authority

PARKS AND WATERWAYS DEPARTMENT
1500 Highway 2, Suite 101 • Sandpoint, ID 83864 • Phone: (208) 255-5681 Ext. 4

Waterways
Item #1

August 13, 2020

Memorandum

To: Commissioners

From: Steve Klatt
Project Coordinator

Re: Priest Lake Thorofare – Phase 3 Commitment of Contribution

The Priest Lake Thorofare project has been a unique collaboration of the local Priest Lake property owners and businesses, Bonner County and the Idaho Water Resource Board. With approval of the Idaho Legislature, this collaborative effort has contributed to constructing a breakwater and dredging the navigation channel approximately $2,400,000. After four years of sustained efforts and collaboration, the project went to bid this summer and the low bid was in an acceptable cost range as per the engineer's projected cost estimate.

The large wrinkle in the budget that has become apparent is the total costs of engineering and construction management. The Water Resource Board approached Bonner County and the Priest Lake community to see if we are willing and able to make further contributions to this project. Recognizing the significance of this project to recreational boating and its associated economy, the Commissioners have indicated Bonner County is capable of contributing an additional $100,000.00. Priest Lake community members have committed to an additional $25,000.00 of in-kind matches and cash contributions.

Distribution: Original to Steve Klatt
Copy to BOCC
Email copy to Nate Demmons and Lyndsie Halcro

A suggested motion would be: Based on the information before us, I move that the Commissioners approve allocating $100,000.00 from the FY20 and FY21 budgets to be contributed to the Idaho Water Resource Board for the construction of the Thorofare breakwater and channel dredging project and sign the commitment letter to the Board.

Recommendation Acceptance: ☒ yes ☐ no

Commissioner Dan McDonald, Chairman

Date: 8/13/20

Board of County Commissioners & Department of Parks & Waterways

1500 Hwy 2, Ste. 101 • Sandpoint, ID 83864 • Phone: (208) 255-5681 xt#4

August 13, 2020

Idaho Water Resource Board
P.O. BOX 83720
Boise, Idaho 83720-0098

Re: Priest Lake Thorofare Breakwater and Dredging Project Funding

Dear Water Resource Board,

Your Board Member, Dale Van Stone, brought to Bonner County's attention the budgetary conflict that has arisen as the costs of the construction bid, engineering design, and the necessary construction management services have all been tabulated. This project has been an exemplary collaboration amongst the Water Resource Board, Bonner County, and the Priest Lake community. This project is of significant importance to the preservation of recreational access to Upper Priest Lake and the resource of our water based economy in Bonner County.

To represent the importance we feel this project is to our local community and economy, the Bonner County Commissioners hereby commit to providing an additional $100,000 to the Phase Three completion of the Priest Lake Thorofare Project. We also represent that the local Priest Lake community is committed to an additional $25,000 per the attached exhibit.

Bonner County Commissioners

DAN MCDONALD

JEFF CONNOLLY

STEVEN BRADSHAW

PRIEST LAKE THOROFARE AND DAM IMPROVEMENT PROJECTS

PRIEST LAKE'S THOROFARE

COMMUNITY SUPPORT

Cash Pledged:	$70,000.00
Engineering Match:	($20,000.00)
BALANCE DUE:	$50,000.00

Contribution Pledged: $10,000.00

Sandpiper Shores check received: $10,000.00

In-kind Services: $30,000.00

Copper Bay Construction: $10,000.00

Storro Excavating: $ 8,500.00

Huckleberry Bay Development – disposal site: $11,500.00

40 – 10 yd. loads = $7,200 ($18/yd – BonCty fee)

40 – Truck haul time savings to Dickensheet = $4,300

Priest Lake Residents' Contributions: **$110,000.00**

Bonner County's Contributions Received: **$140,000.00**

Cash from Waterways: $60,000.00

Grant Funds – IDPR Waterways $80,000.00

PHASE ONE:

TOTAL LOCAL COMMITMENT: $250,000.00

PHASE THREE:

ADDITIONAL LOCAL COMMITMENT: $125,000.00

Priest Lake Community

Cash Pledged: $10,000.00

In-kind Services: $15,000.00

Local Restaurants/Lodging - $ 5,000.00

Sandpiper Shores – access - $10,000.00

Peterson & Putnam Property Access

Bonner County

Cash Pledged: $100,000.00

BEFORE THE IDAHO WATER RESOURCE BOARD

IN THE MATTER OF THE PRIEST LAKE WATER MANAGEMENT PROJECT CONTSTRUCTION (PHASE 4)	RESOLUTION TO COMMIT FUNDS AND PROVIDE SIGNATORY AUTHORITY

WHEREAS, the State of Idaho owns the Priest Lake Outlet Dam (dam) which was constructed in 1950 and reconstructed in 1978 as an outlet control structure to maintain lake levels in the Priest Lake in accordance with Idaho Code §70-507; and

WHEREAS, Senate Bill 1261 passed and approved by the 2018 Legislature updated Idaho Code §70-507 to 1) clarify that management of the state-owned dam on Priest Lake at Outlet Bay is under the jurisdiction of the Idaho Water Resource Board, and 2) to allow for flexibility of the management of the lake level to a range between 3 feet and 3.5 feet on the USGS Priest Lake Outlet gage (located upstream of the dam) after run-off of the winter snowpack until the close of the main recreational season; and

WHEREAS, as a result of drought conditions in northern Idaho in 2015 and 2016, it was difficult to maintain required lake pool levels and downstream minimum flows in the Priest River during the recreational season; and,

WHEREAS, the Priest Lake, Upper Priest Lake and Priest River are significant draws for tourism and recreation, and are highly valued environmental and economic assets for Bonner County and the State of Idaho; and

WHEREAS, in 2016 the Idaho Water Resource Board (IWRB) authorized the expenditure of up to $300,000 from the Revolving Development Account to complete the Priest Lake Water Management Study (Phase 1) to evaluate strategies to meet long-term water management objectives for the Priest Lake and Priest River system; and

WHEREAS, the study has been completed and recommended temporarily raising water surface levels 6 inches during the recreation season of dry years/low water years and integrating real time streamflow data to allow more operational flexibility; and

WHEREAS, the study also recommended outlet dam structural and operational improvements; and

WHEREAS, the study also recommended replacing the current existing porous breakwater with an impervious breakwater structure and dredging of the Thorofare; and

WHEREAS, the estimated cost for these recommended improvements is approximately $5 million (in 2018 dollars); and

WHEREAS, in November 2017 the IWRB accepted and endorsed the recommendations in Phase 1 and recommended proceeding with the project if and when funding becomes available; and

WHEREAS, House Bill 677 passed and approved by the 2018 Legislature included 1) a $2.4 million transfer from the General Fund to the Revolving Development Account, and 2) a redirect of $2,419,600 in the Revolving Development from the Conservation Reserve Enhancement Program (CREP) to be used for the Priest Lake Water Management Project; and

WHEREAS, Mott MacDonald has been selected, through a competitive process, to assist the IWRB with this project; and

WHEREAS, in the fall of 2019 the IWRB authorized $653,000 from the Revolving Development Account to complete the Final Engineering and Design (Phase 3), which included finalizing regulatory permitting and bidding assistance; and

WHEREAS, Final Engineering and Design (Phase 3) is concluding in August 2020; and

WHEREAS, IWRB staff has worked in coordination with Mott MacDonald to develop a scope of work for the (Phase 4) Construction Management for the Priest Lake Water Management Project at the Thorofare and Outlet dam sites at a cost of not to exceed $579,744, which includes preconstruction submittal review, resident engineering, office engineering technical support, regulatory permit assistance, and construction progress observation; and

WHEREAS, bids were opened in July 2020 and a low bid of $1,542,334 was received for the construction of the Outlet dam portion (consisting of dam modifications and scour protection improvements), and a low bid of $2,047,058 was received for the construction of the Thorofare portion (consisting of dredging and stone breakwater construction) of the Priest Lake Water Management Project; and

NOW, THEREFORE, BE IT RESOLVED that the IWRB authorizes the expenditure of funds not to exceed $5 million from the Revolving Development Account for the construction of the Outlet dam portion and Thorofare portion of the Priest Lake Water Management Project as well as for the construction management and for other costs associated with the project; and

NOW, THEREFORE, BE IT FURTHER RESOLVED that the IWRB authorizes its chairman or designee to execute the necessary agreements or contracts to complete the construction of the Priest Lake Water Management Project.

Option A NOW, THEREFORE, BE IT FURTHER RESOLVED that no funds approved in this resolution, may be expended until all necessary access agreements and permits have been executed and approval to expend funds will expire on September 14, 2020 if the agreements and permits have not been executed.

Option B NOW, THEREFORE, BE IT FURTHER RESOLVED that the approval of this resolution is limited only to preconstruction activities until all necessary access agreements and permits are executed.

[Ask IWRB to pick option A or B and staff will update resolution]

DATED this 20th day of August 2020

_____

ROGER W. CHASE, Chairman
Idaho Water Resource Board

ATTEST _____

VINCE ALBERDI, Secretary

Boise River
Flood Control District #10

Boise River Management Tool

- Mike Dimmick, District Manager
- Dan Steenson, Sawtooth Law
- Mike Schubert, HDR Engineering

Boise River Management Tool (BRMT)

Purposes:

1. 2-D hydraulic model for Boise River management
2. Demonstration for use in other watersheds

Components:

1. LiDAR data acquisition, processing & reporting
2. Model Development, Calibration & Documentation
3. Boise River Management Plan (BRMP)
4. BRMP/BRMT Deployment & Training

Multiple Uses:

1. Flood Management & Land Use Planning
2. Instream Structure Assessment
3. Water Quality Management
4. Aquatic Habitat and Management
5. Plan, Manage, and Maintain Recreational River Uses
6. Groundwater-Surface Water Interactions

Budget – June, 2019

Boise River Flood Control District #10 Flood Management Grant Project Budget				
Item	Area 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**

Budget - Current

Boise River Flood Control District #10 BRMT Project Budget	
Item	Cost
LiDAR data acquisition, processing & reporting:	
Boise River	$162,551
Building	$16,081
Road Surfaces	$14,359
Model Development, Calibration & Documentation	$440,000
Project Contingency (10%)	$42,200
Planning/Project Management	$42,200
Administration/Legal	$31,600
Boise River Management Plan	$35,000
BRMP/BRMT Deployment &Training	$50,000
Total	**$833,991**

Financial Supporters – June, 2019

Supporter/Collaborator	Funding
1. Flood Control District #10	$ 50,000
2. City of Boise	$ 25,000
3. City of Caldwell	$ 18,000
4. City of Eagle	TBD
5. City of Meridian	TBD
6. City of Nampa	TBD
7. Other neighboring cities	TBD
8. Eagle Sewer District	$25,000
9. Treasure Valley Water Users Assoc.	TBD
10. Pioneer Irrigation District	TBD
11. Ada County Emergency Management	TBD
12. Canyon County	TBD
13. Flood Control District #11	TBD
14. USDA – NRCS	Grant/TBD
15. U.S. Reclamation	Grant/TBD
16. U.S. Army Corps of Engineers	Grant/TBD
TOTAL TO DATE:	**$118,000**

Participants/Contributors- Current

1.	Flood Control District #10	$ 100,000
2.	Idaho Water Resource Board	$ 160,000
3.	U.S. Army Corps of Engineers	$ 333,996
4.	USDA – NRCS	$ 34,500
5.	City of Boise	$ 25,000
6.	City of Caldwell	$ 18,000
7.	City of Eagle	$ 25,000
8.	Garden City	$ 10,000
9.	City of Middleton	$ 5,000
10.	Eagle Sewer District	$ 25,000
11.	Ada County Highway District	$ 50,000
12.	Treasure Valley Water Users Assoc.	$ 10,000
13.	Pioneer Irrigation District	$ 3,000
	TOTAL TO DATE:	**$ 799,496**

BRMT: Milestones

- June, 2019 — FCD 10 grant application to IWRB for BRMT
- July, 2019 — Presentation to IWRB
- August, 2019 — *IWRB grant award, stakeholder engagement*
- September 25, 2019 — *Planning Assistance to States Agreement with USACE*
- September 30, 2019 — RFP for LiDAR data acquisition, post-processing & reporting
- October 3, 2019 — *Interagency meeting*
- October 30, 2019 — Quantum Spatial LiDAR contract
- November 7-10, 2019 — *Quantum Spatial LiDAR collection flights*
- December 19, 2019 — Kickoff meeting with USACE
- January 21, 2020 — IWUA Water Quality Committee Presentation
- February 2020 — IWUA, TVWUA, FCD10, and TFCC presentations to the state legislature
- November- March 2020 — Quantum Spatial LiDAR data processing
- March 31, 2020 — Quantum Spatial LiDAR data to FCD 10
- April, 2020 — FCD 10 LiDAR data delivery to USACE
- May, 2020 — FCD 10 LiDAR review and delivery to Idaho LiDAR Consortium
- June, 2020 — *- Multiple projects using LiDAR data*
  - Flood management & 319 grant applications

BRMT: Remaining 2020 Milestones

- June, 2020 - Ongoing Project Coordination with USACE
- Fall, 2020 - DEQ SW Basin Advisory Group consideration of 319 Grant Application for Hydraulic Map, Web App., & Advection-Dispersion Model
- August – September, 2020
  - Draft Model delivery to FCD10 for technical review
  - Draft Boise River Management Plan
- *October – November, 2020*
  - *Final Hydraulic Model files and deliverable*
  - *Final Boise River Management Plan (BRMP)*
- *Fall, 2020- BRMT/BRMP rollout*
  - *Interagency Coordination*
  - *Stakeholder meeting*
  - *Training*

BRMT: USACE Planning Assistance to States (PAS) Agreement

- Section 3015 of the Water Resources Reform and Development Act of 2014 (WRRDA 2014)
  - Development of water resource management plans
  - Technical Assistance re State water resource management
  - ***Non-federal cost share is 50%***

- PAS Agreement:
  - Prepare BRMP for coordinated use of BRMT in Boise River Management
  - USACE modeling team prepares fully-functioning 2D HEC-RAS model
  - Floodplain mapping for various flow events up to the 0.2% annual chance event

BRMT: USACE Planning Assistance to States (PAS) Agreement

USACE Modeling Expertise & Experience

- https://www.hec.usace.army.mil/software/hec-ras/
- **USACE developed 2-D HEC RAS Model**
- **Modeling Team**
  - Brandon W. Hobbs, P.E., CFM, Project Manager
  - Tracy Schwarz, Project Modeling Lead
  - Tracy Krause, Hydraulic Engineer
  - Russ Lodge, Hydraulic Engineer
  - Joel Asunskis, Hydraulic Engineer
  - Bradley Kruse, Hydraulic Engineer

USACE BRMT Training Assistance

Cost Savings For USACE-Related Items

Without USACE

Project cost: $192,911 LiDAR collection & processing
+ $285,000 Model development (June, 2019 estimate)
+ $ 35,000 BRMP

Sponsors cost: $512,911

With USACE (PAS - cost share)

Project cost: $192,911 LiDAR collection & processing
+ $440,000 Model development
+ $ 35,000 BRMP
$667,911

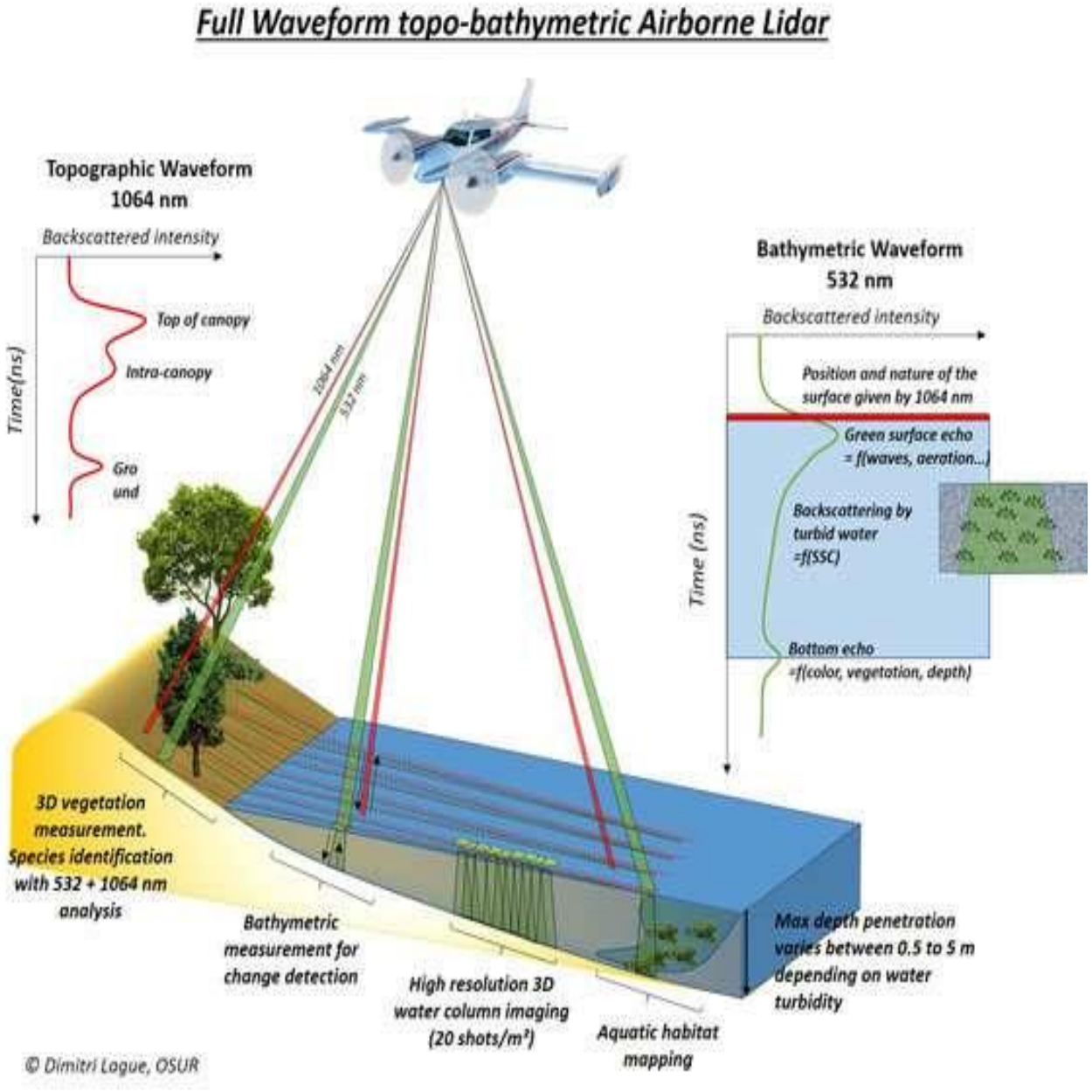
Sponsors cost: $333,996 ($667,911÷2)
- $192,911 LiDAR (in-kind)
- $ 35,000 BRMP (in-kind)
$106,085 cash

USACE share: $333,996 Model development

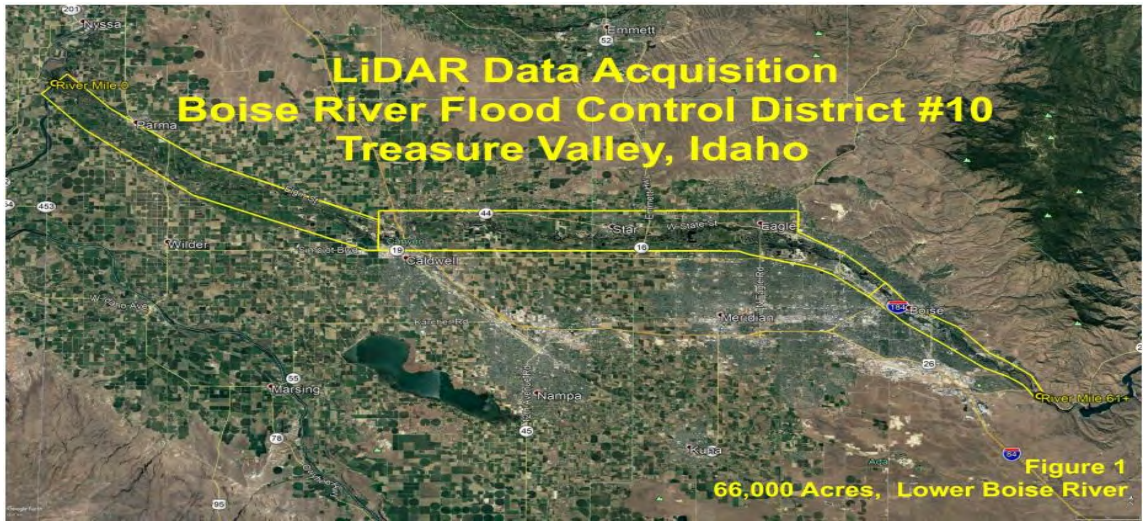
Savings

$512,911 - $333,996 = $178,915

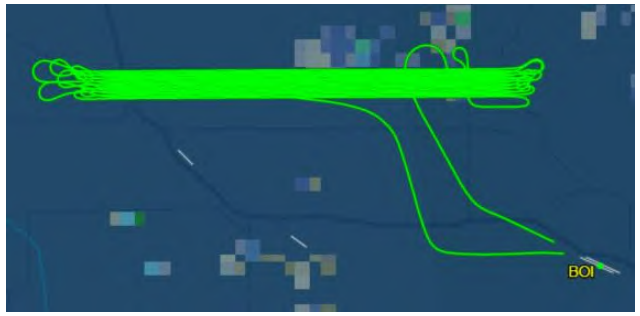
BRMT: Bathymetric (Green) LiDAR



BRMT: November, 2019 LiDAR Flight



https://flightaware.com/live/flight/N604MD/history/20191110/1623Z/KBOI/KBOI



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GRANT PROGRAM LEGISLATIVE SUMMARY
February, 2020

- **House Resources & Conservation Committee**
- **House Energy, Environment and Technology Committee**

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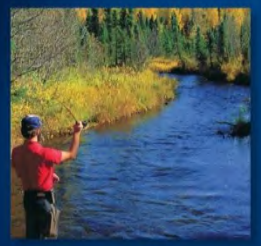
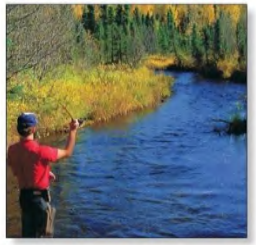
Water Resource Board



IWRB Grant Program Administration

- Grant criteria & application/guidance
- Grant application announcement & application deadline
- IWRB Finance Committee review , ranking & recommendations
- Board approval
- Grant Agreements
- Grantee project implementation
- Grantees reimbursed for invoiced work



2018 Grant Program: 18 applications;14 funded

Grantee	Grant	Project Cost
Flood Control District 9	$90,000	$273,809
Blaine County	$121,331	$306,334
Cassia County	$42,336	$84,673
Flood Control District 10	$78,400	$156,800
Flood Control District 10	$153,550	$307,100
Flood Control District 10	$38,808	$77,616
Clearwater SWCD	$155,220	$310,439
Flood Control District 10	$22,000	$44,000
Flood Control District 11	$57,675	$115,350
Twin Lakes/Flood Control District 17	$7,750	$15,500
Twin Falls Canal Company	$85,340	$591,000
Nez Perce SWCD	$115,460	$556,681
Riverside Village HOA/Garden City	$6,025	$15,980
City of Pocatello	$26,105	$70,000
Total	**$1,000,000**	**$2,925,282**

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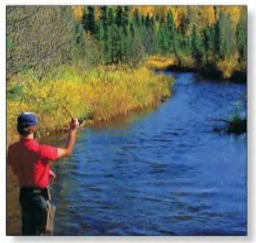
Water Resource Board



2019 Grant Program: 12 applications; 10 funded

Several 2018 projects completed under budget, returning $70,000 for 2019 grants.

Grantee	Grant	Project Cost
City of Boise - Crane Creek	$6,371	$23,236
Blaine County - Big Wood Hospital Bridge	$50,000	$432,454
Flood Control District No.10 - BRMT	$160,000	$833,991
Blaine County - Broadford Road Fishermans Access	$100,000	$263,498
City of Hailey - Della View Subdivision	$50,000	$104,134
Board of Controls Irrigation - Diversion 45	$59,050	$136,457
Clearwater SWCD - Gold Creek	$72,727	$160,896
Idaho SWCD - Deer Creek	$159,436	$330,524
Clearwater SWCD - Shanghai Creek	$190,492	$392,561
Idaho SWCD- Lower Three Mile Creek	$21,619	$43,274
Total	**$869,696**	**$2,721,025**

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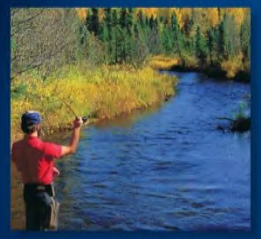
Water Resource Board

Grants Leverage Funding & Participation

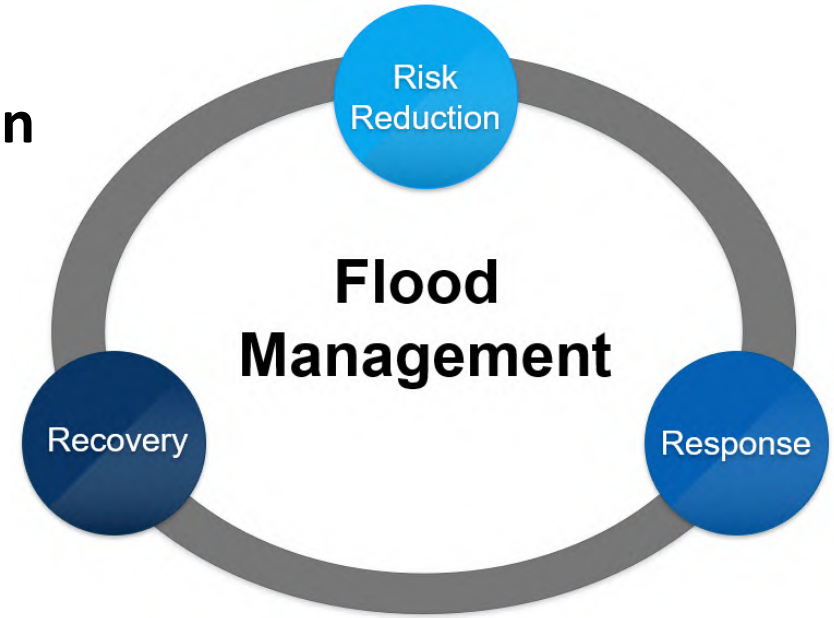
	Grants	Cost Share	Project Cost
2018:	$1,000,000	$1,925,282	$2,925,282
2019:	$ 869,696	$1,851,329	$2,721,025
	$1,869,696 (33%)	$3,776,611 (67%)	$5,646,307

Grantees & Other Project Contributors

1. Grantee
2. Stakeholders
3. FEMA
4. NRCS
5. Corps of Engineers
6. Bureau of Reclamation
7. 319 Grants
8. Local Governments & Agencies

Boise River Management Plan (BRMP)

Comprehensive Plan Format: Goals, Objectives, Implementation



1. Goals

- **Promote Public Access to Boise River LiDAR & BRMT**
- **Coordinate use of BRMT for River Management & Land Use Planning**
- **Flood Management:**
  1. Flood Risk Reduction. Reduce/mitigate the risk of flooding in the Boise River Valley.
  2. Flood Response. Enhance flood response to minimize flood damage to life, property, and infrastructure.
  3. Flood Recovery. Increase cost effectiveness, durability and long-term benefits from flood mitigation and recovery projects
- **Promote Public Awareness of Boise River Geomorphology & Hydrodynamics**

2. Objectives

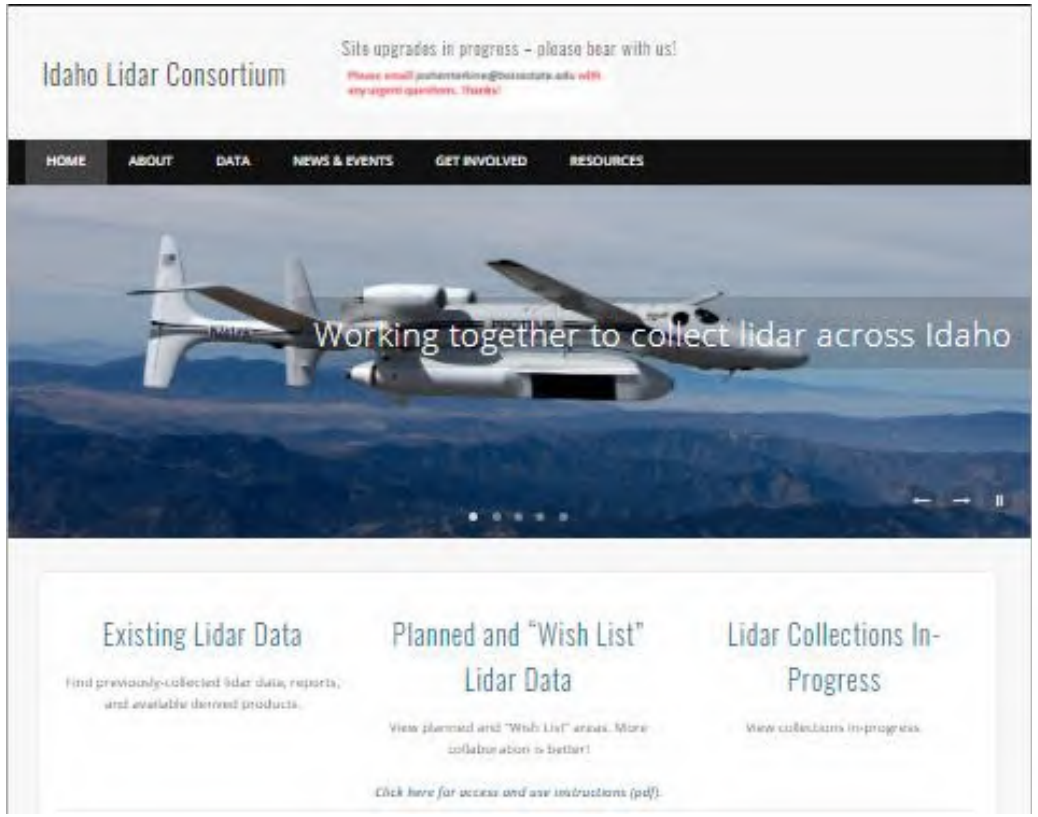
- **Promote Public Access to Boise River LiDAR & BRMT.**
- **Coordinate use of BRMT for River Management.**
- **Flood Risk Reduction**. Use BRMT to improve flood risk assessment and reduce flood risk in the Boise River Valley.
- **Flood-Wise Development**. Use BRMT to project inundation and inform flood-wise land use changes within the Boise River floodplain.
- **Flood Response**. Use BRMT to enhance flood response capabilities, strategies and coordination with public agencies and private parties.
- **Flood Recovery**. Use BRMT increase cost effectiveness, durability and long-term benefits from flood mitigation and recovery projects
- **Regulatory Review**. Use BRMT to streamline regulatory approval of flood management projects.
- **Floodplain Ordinances**. Use BRMT to inform floodplain ordinance standards andprocedures & develop model ordinance.
- **River Access**. Secure and preserve access to the Boise River for river maintenance, flood projects, emergency vehicles and personnel, flood fight and safety for the District and other agencies involved in flood management and emergency responses.
- **Public Education and Outreach**. Enhance flood management education and outreach capabilities, channels and opportunities in coordination with agencies and educational institutions engaged in flood risk assessment and flood management.

3. Implementation

- **Deployment**: availability of BRMT (LiDAR data & 2-D Model)
- **Training**: train stakeholders to use BRMT
- **Interagency Use**: coordinated use of BRMT in river management & land use planning
- **BRMT Maintenance:** continue development & updating

BRMT: LiDAR Consortium – July, 2020

https://www.idaholidar.org/



Existing Lidar Data

Find previously-collected lidar data, reports, and available derived products.

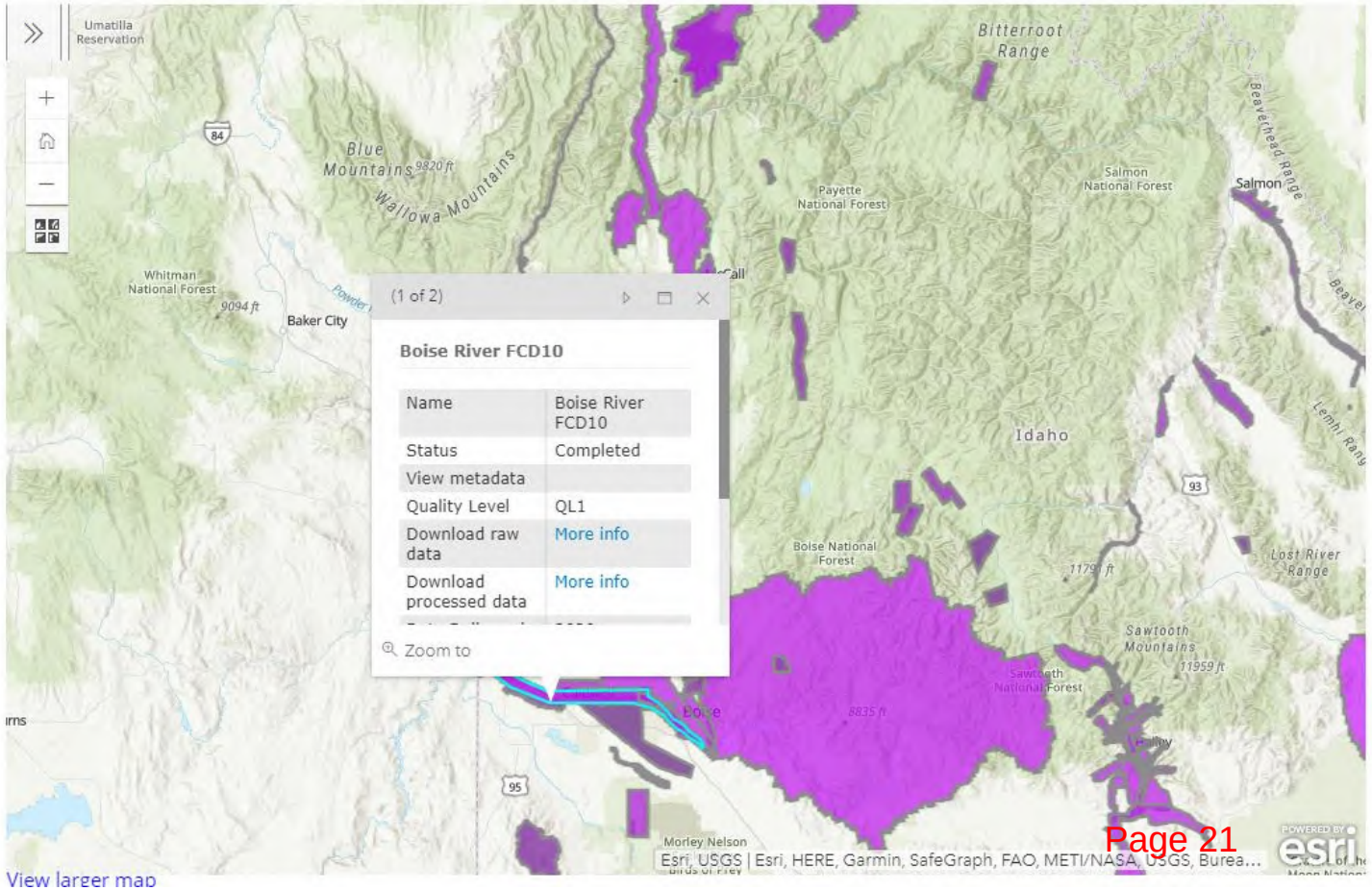
Planned and "Wish List" Lidar Data

View planned and "Wish List" areas. More collaboration is better!

Lidar Collections In-Progress

View collections in-progress.

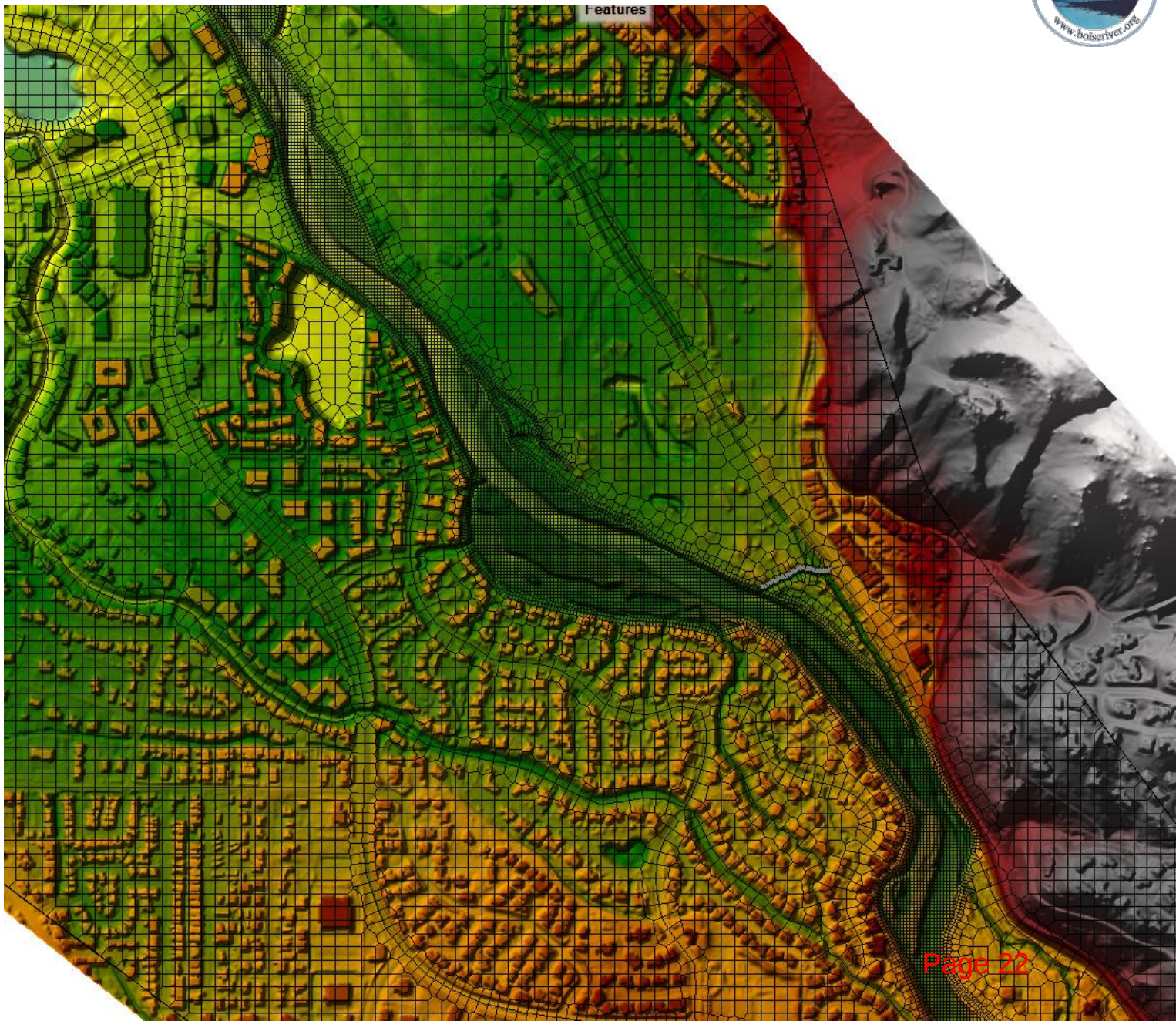
Click here for access and use instructions (pdf).



View larger map

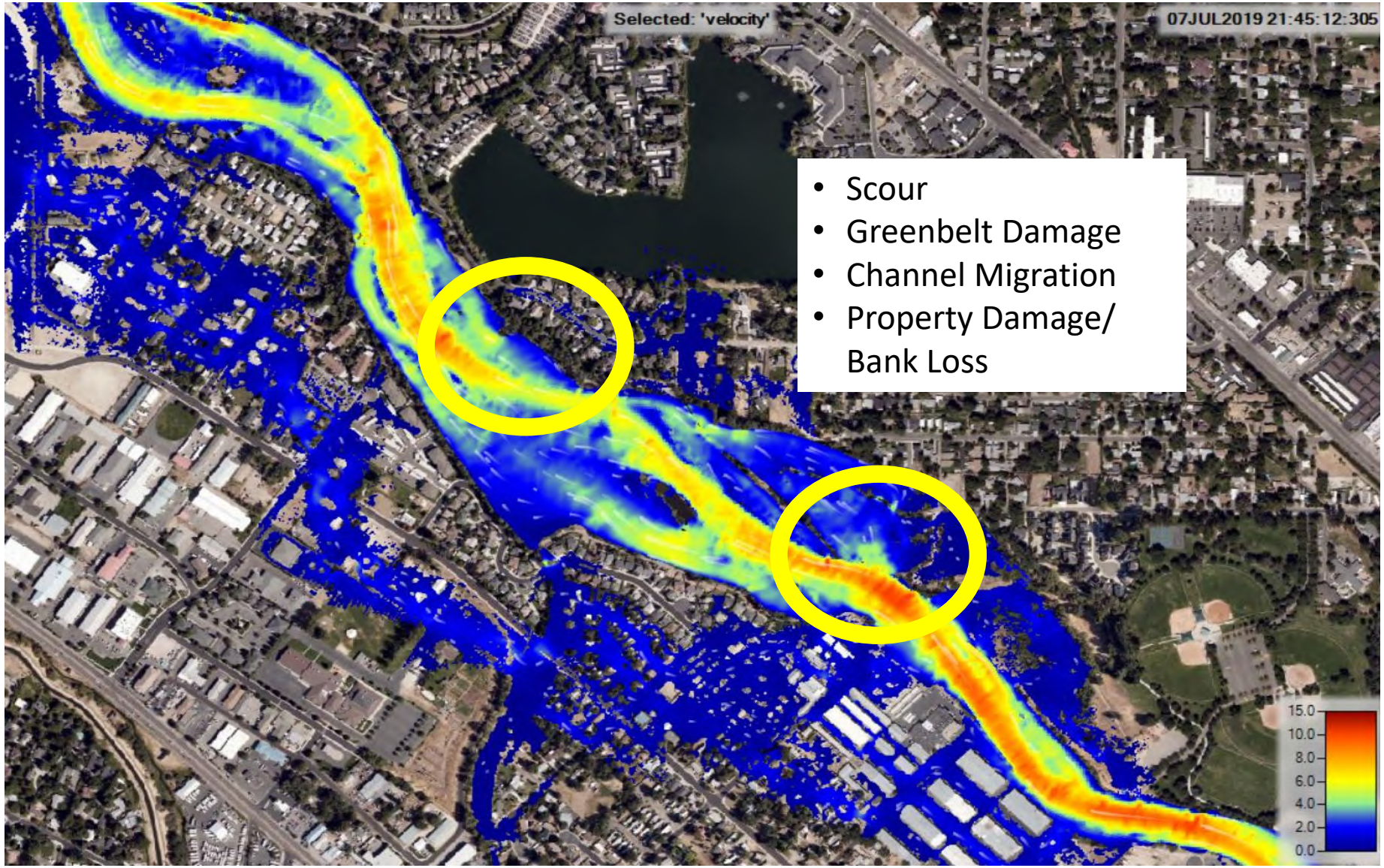
BRMT: 2-D Hydraulic Model (USACE) August – September 2020

1. Create terrain (LiDAR)
2. Develop mesh
3. Apply terrain, roughness, and structures to mesh
4. Simulate flooding across the mesh



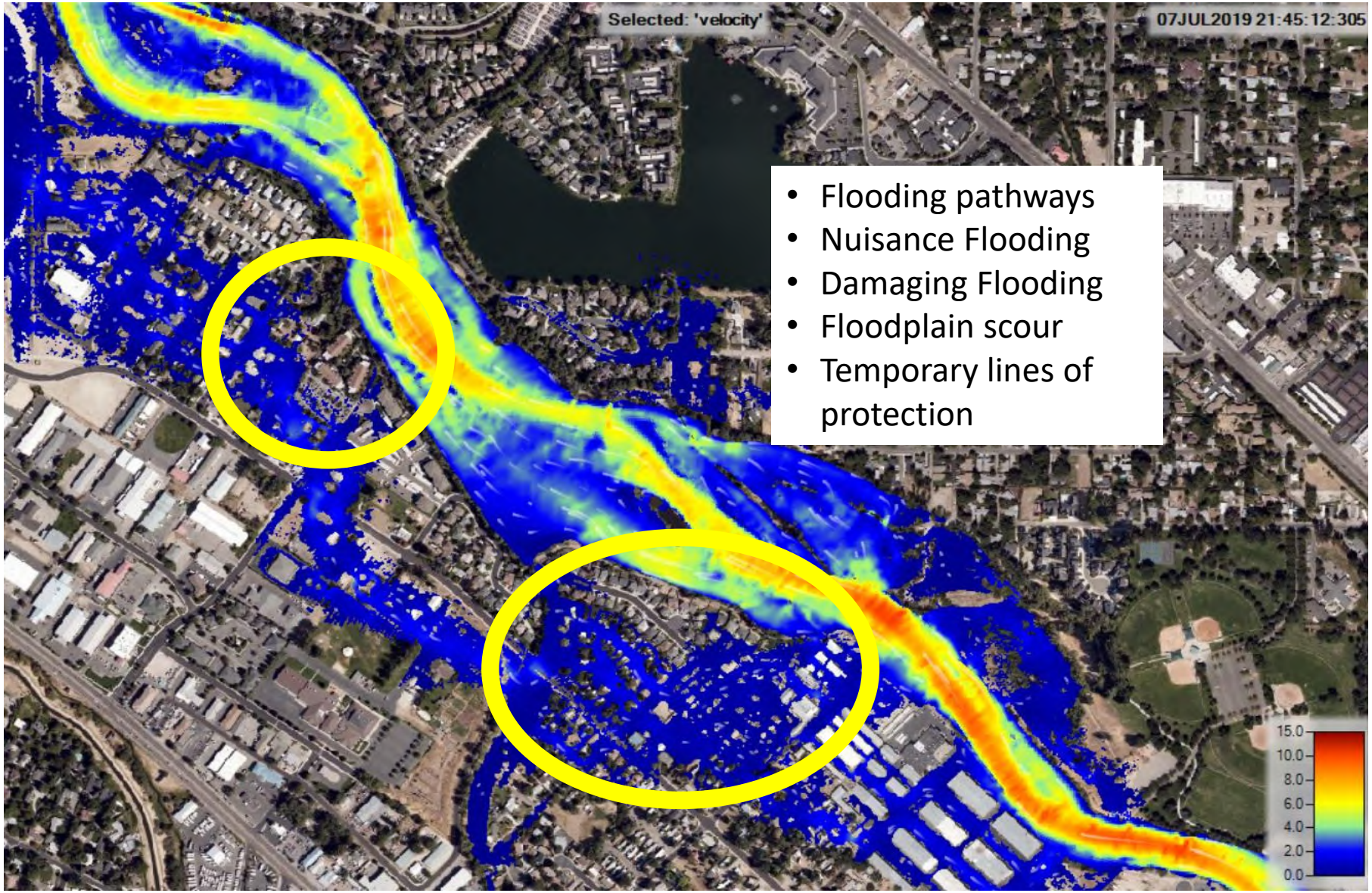
BRMT: Deployment, Training, Use

BRMT: Deployment, Training, Use – Channel Effects



- Scour
- Greenbelt Damage
- Channel Migration
- Property Damage/ Bank Loss

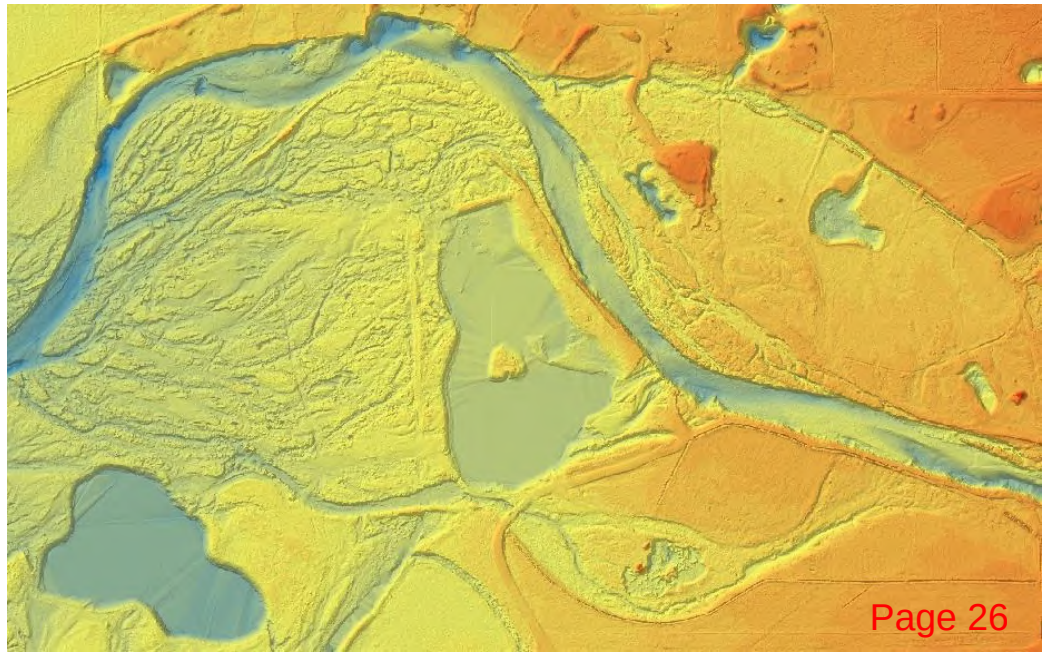
BRMT Step 4: Deployment, Training, Use - Inundation



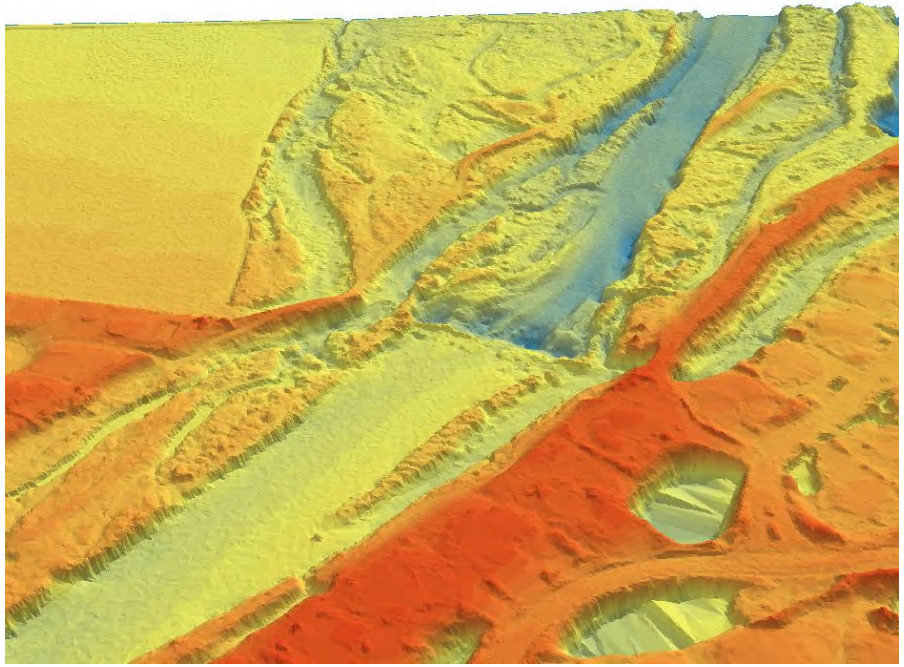
- Flooding pathways
- Nuisance Flooding
- Damaging Flooding
- Floodplain scour
- Temporary lines of protection

Early use of LiDAR Data

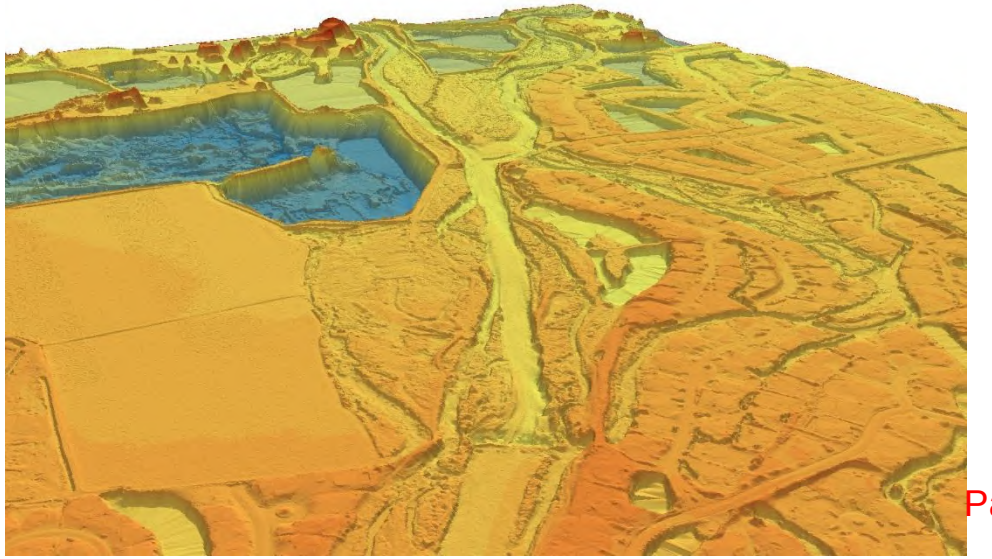
- FCD10 Grant Applications
  - IWRB & DEQ (319)
  - Eagle Road Crossing
  - Canyon Reach 1
  - Hydraulic Map, Web App. & advection/ dispersion model
- City of Eagle
- Eagle Island State Park
- City of Boise
- Barber Pool
- Garden City



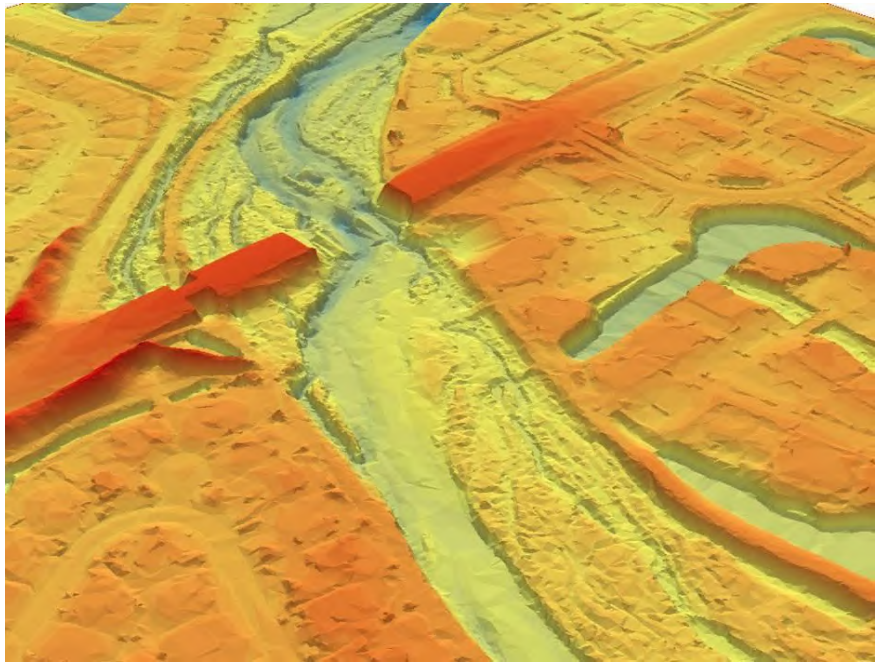
New Dry Creek Diversion



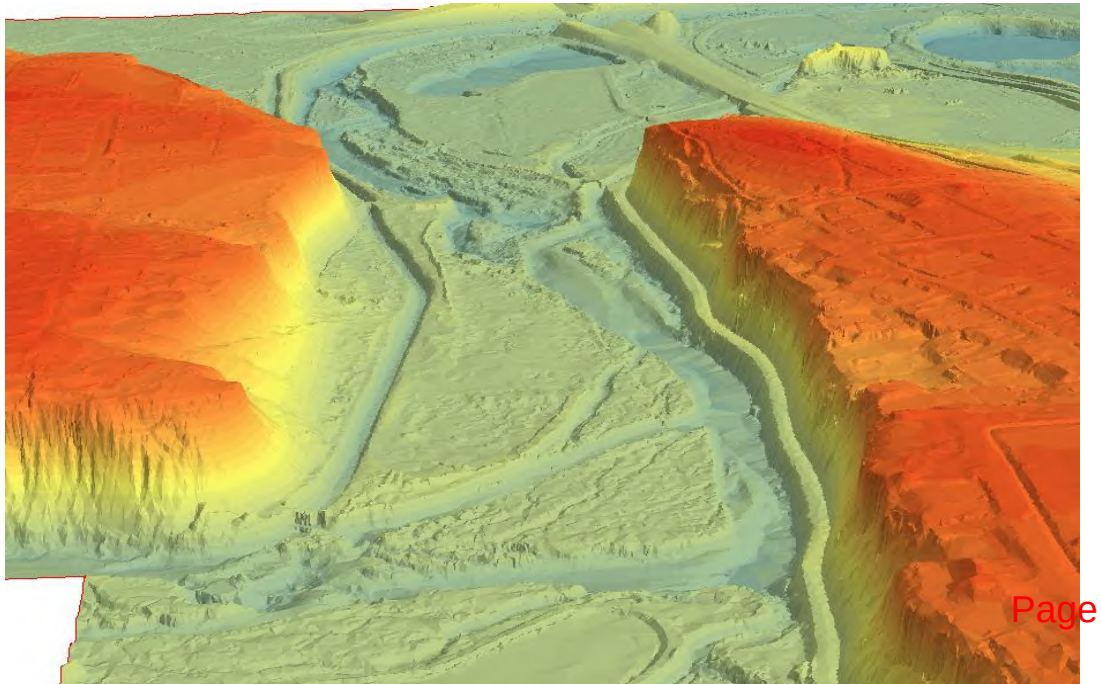
Sunroc Mine Site



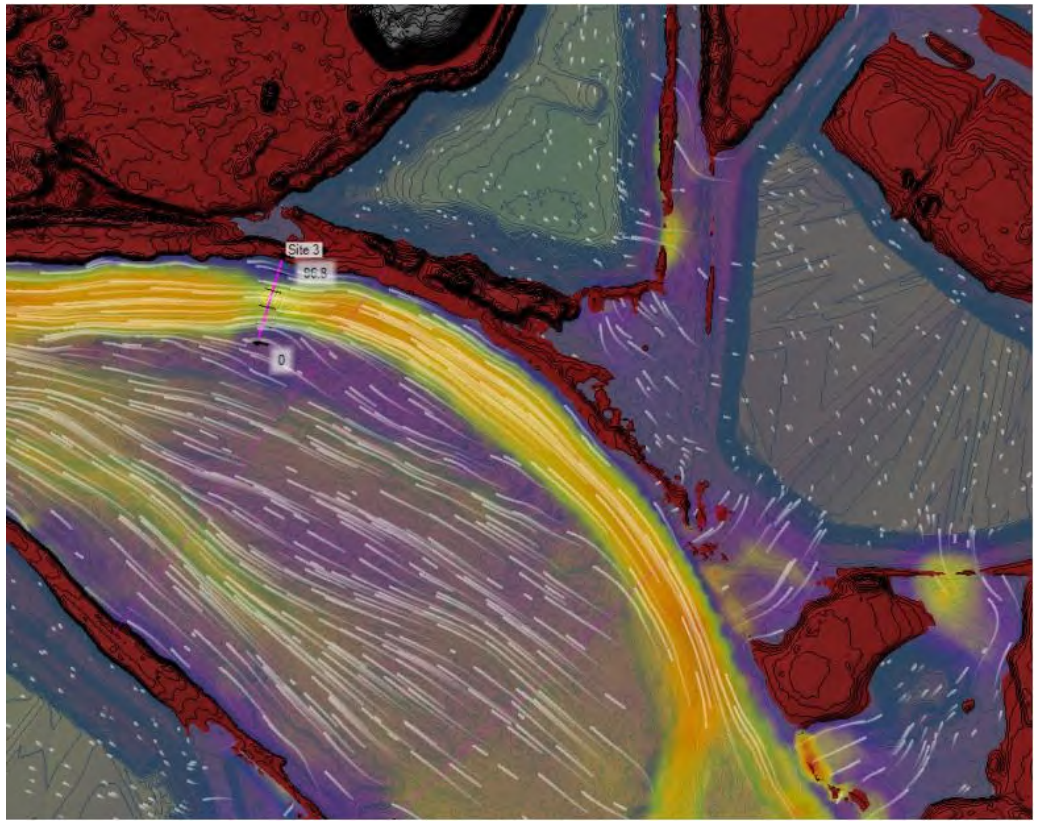
Eagle Road Crossing



Geomorphic Nick Point



"A special acknowledgement and thanks go to Flood Control District #10 and those who contributed to the acquisition of the 2019 Bathymetric LiDAR. The LiDAR is exceptional and will undoubtedly result in improved flood assessments including much better flood risk mapping. The LiDAR, coupled with 2-dimensional hydraulic modeling, was the basis for this report."



Upstream and Downstream Potential Impacts Without Mitigation

North Channel at Eagle Road

- Simulate existing conditions hydraulics
  - Angle of attack
  - Impact of Piers
  - Velocity distribution
- Evaluate existing sedimentation
  - Stream Power
  - Shear Stress
  - Compare to observed trends
- Simulate alternatives
  - Improve angle of attack
  - Arrest progressive channel migration
  - Improve sediment and flood carrying capacity
  - Identify areas for ongoing monitoring

BRMT Early Uses: Eagle Bridge North Channel

2010

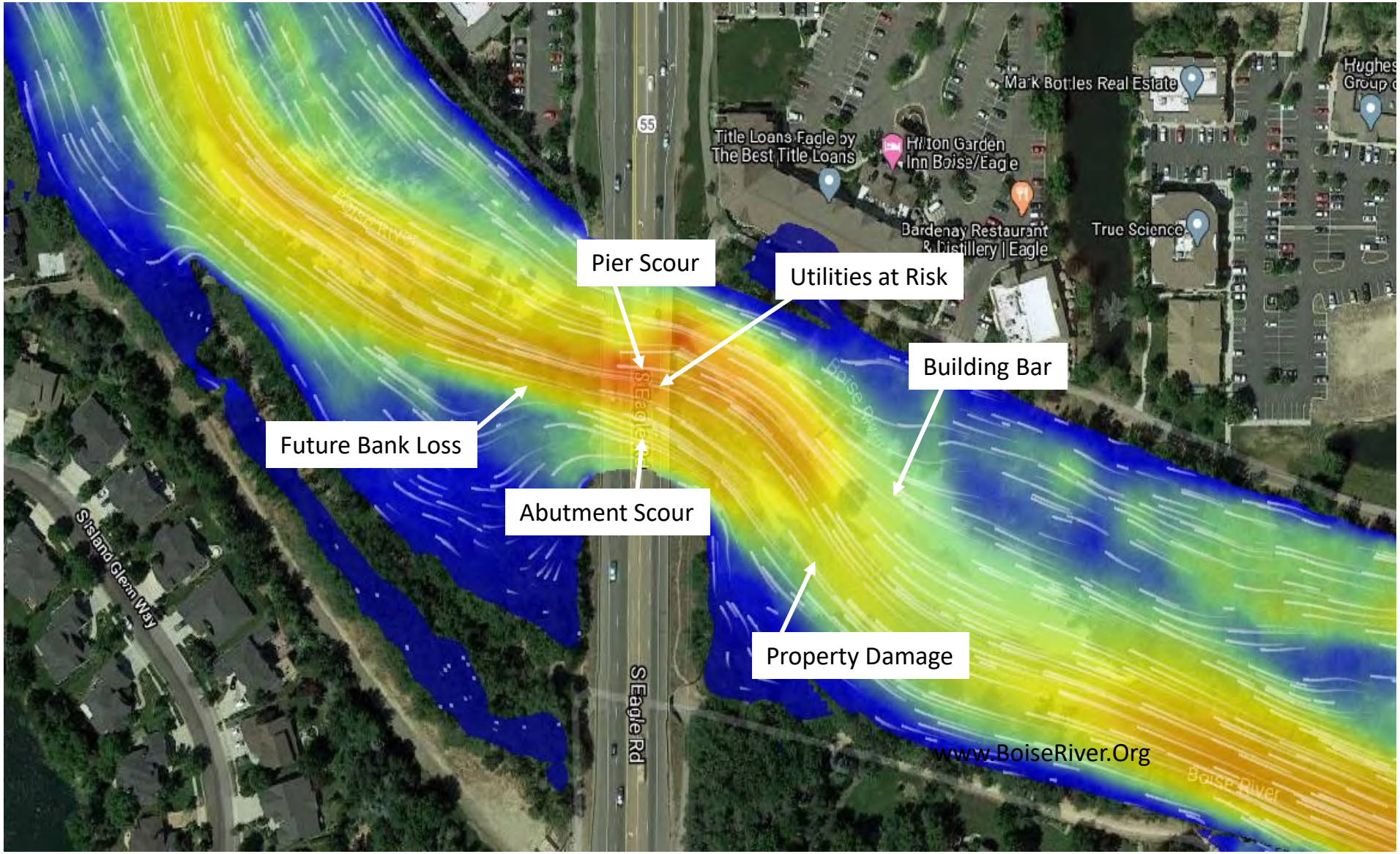
2017

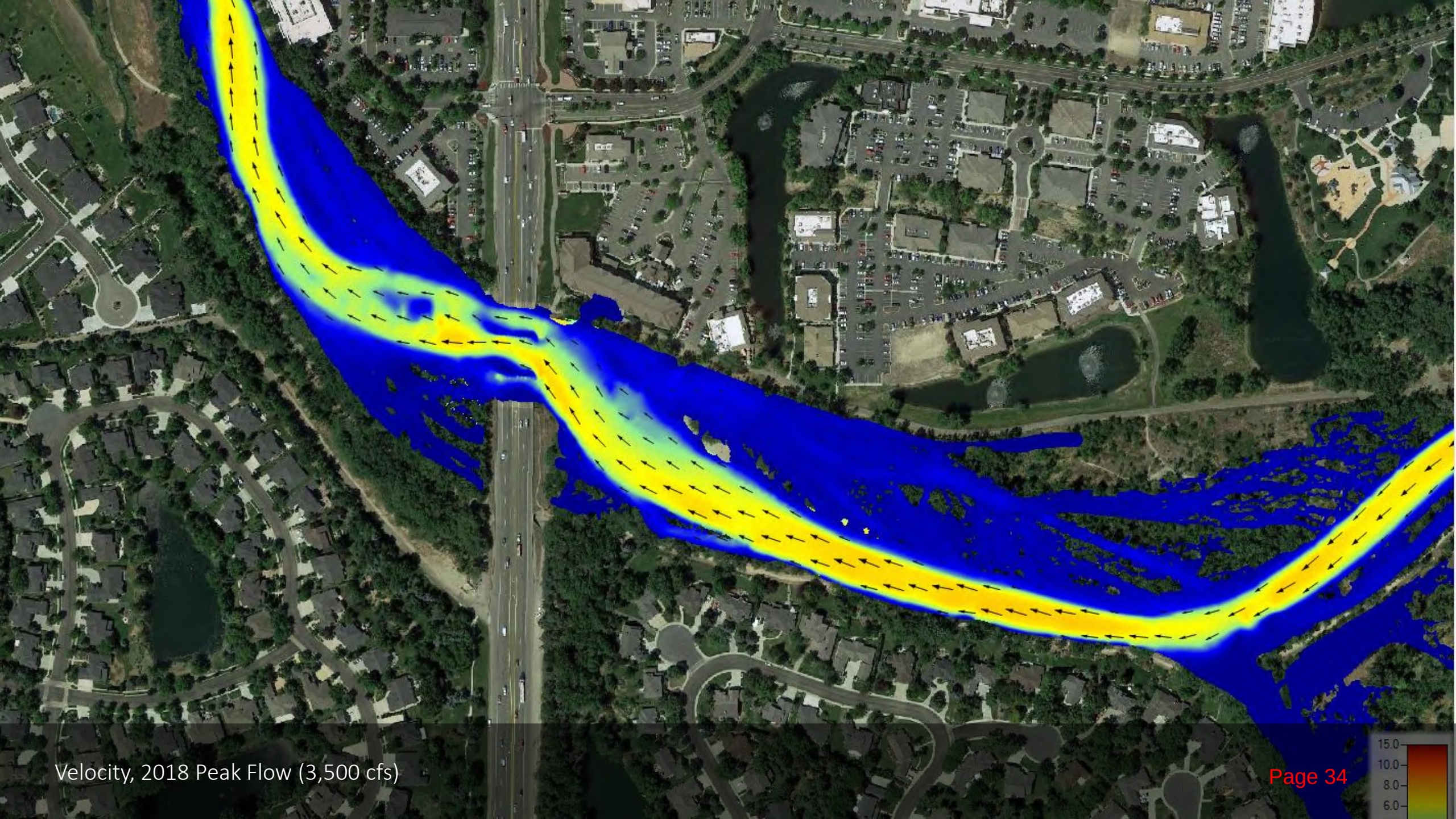
2016

2019

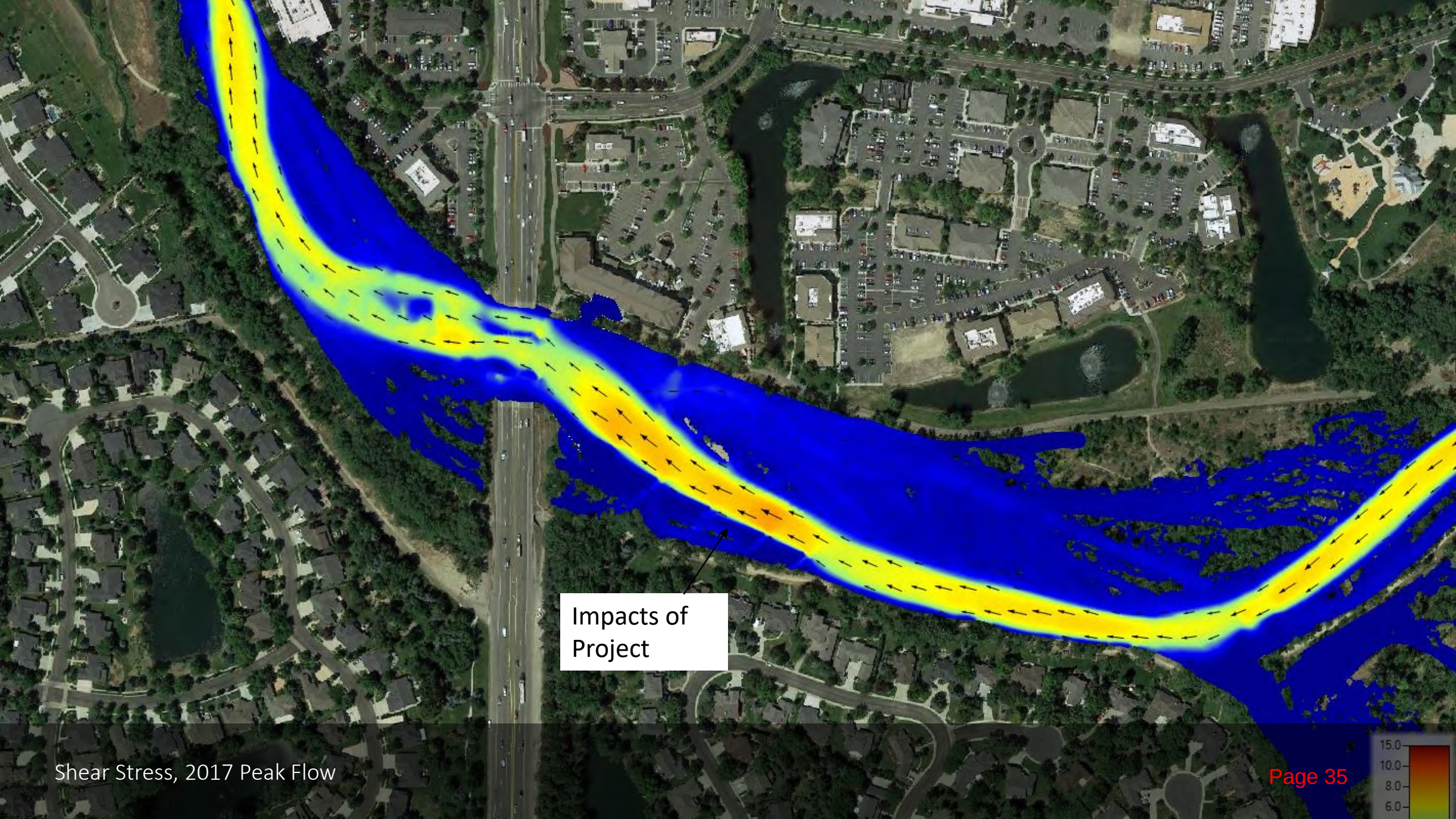
BRMT Early Uses: Eagle Bridge North Channel (2018)

BRMT Early Uses: Eagle Bridge North Channel

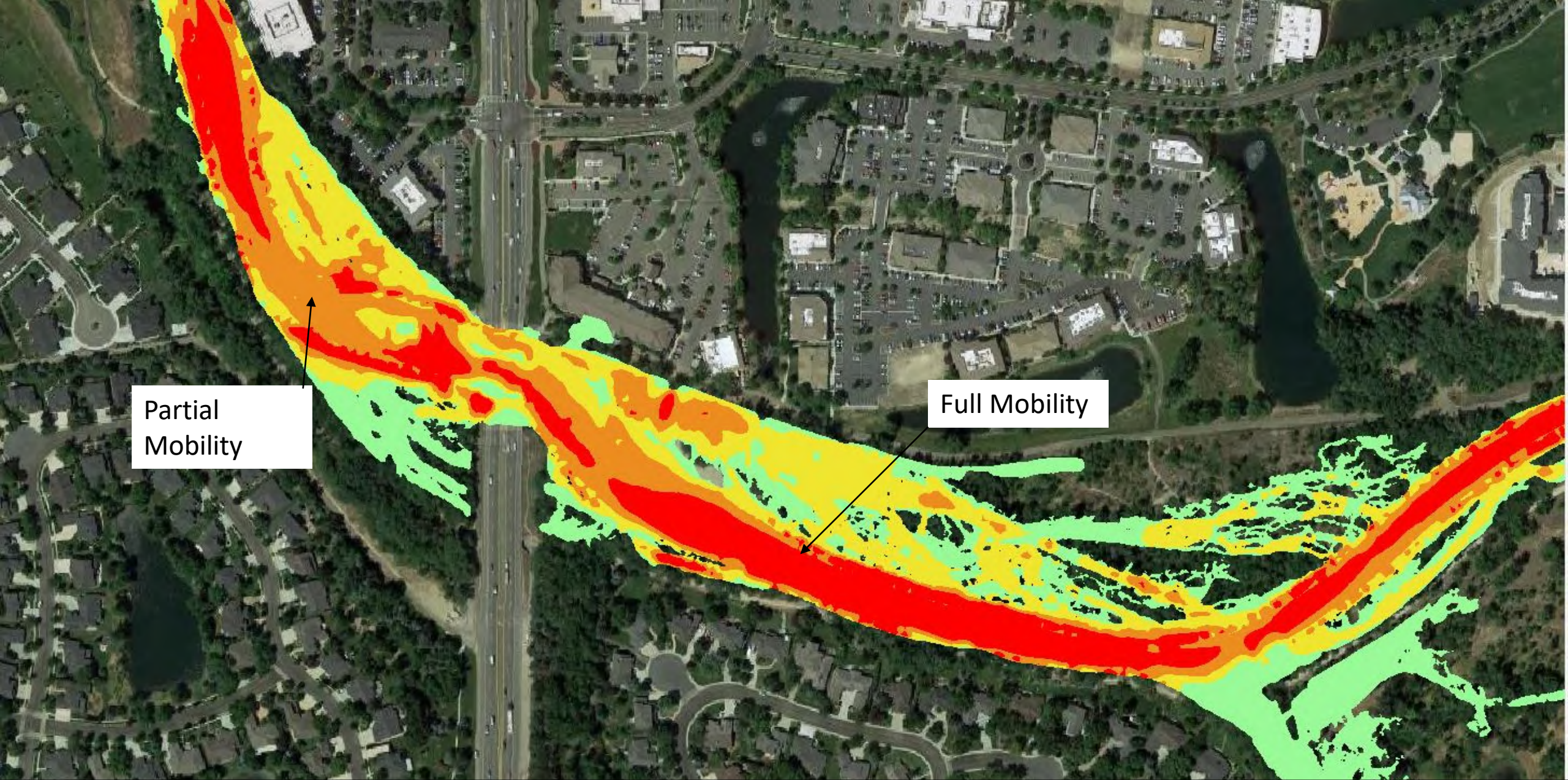




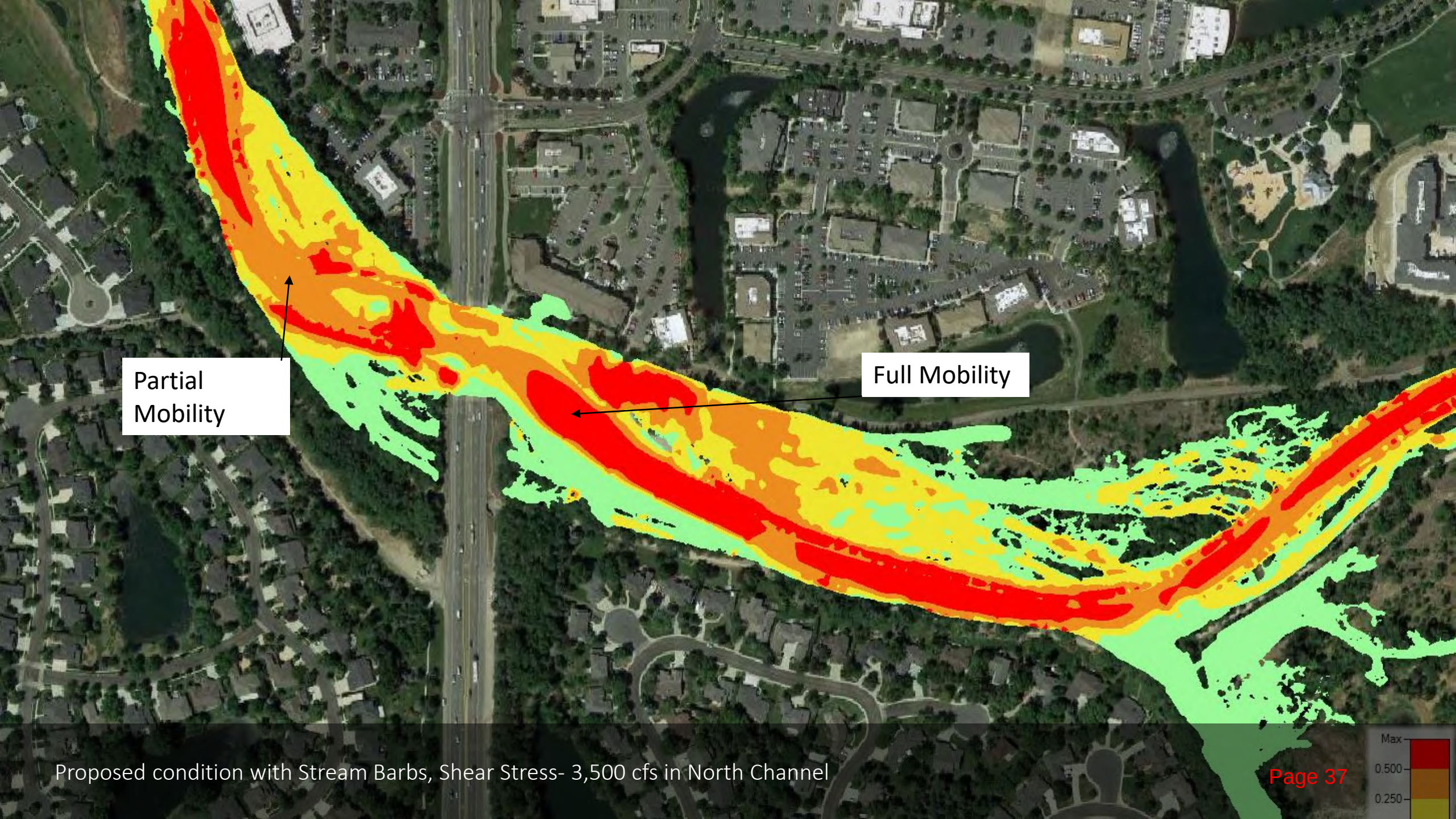
Velocity, 2018 Peak Flow (3,500 cfs)



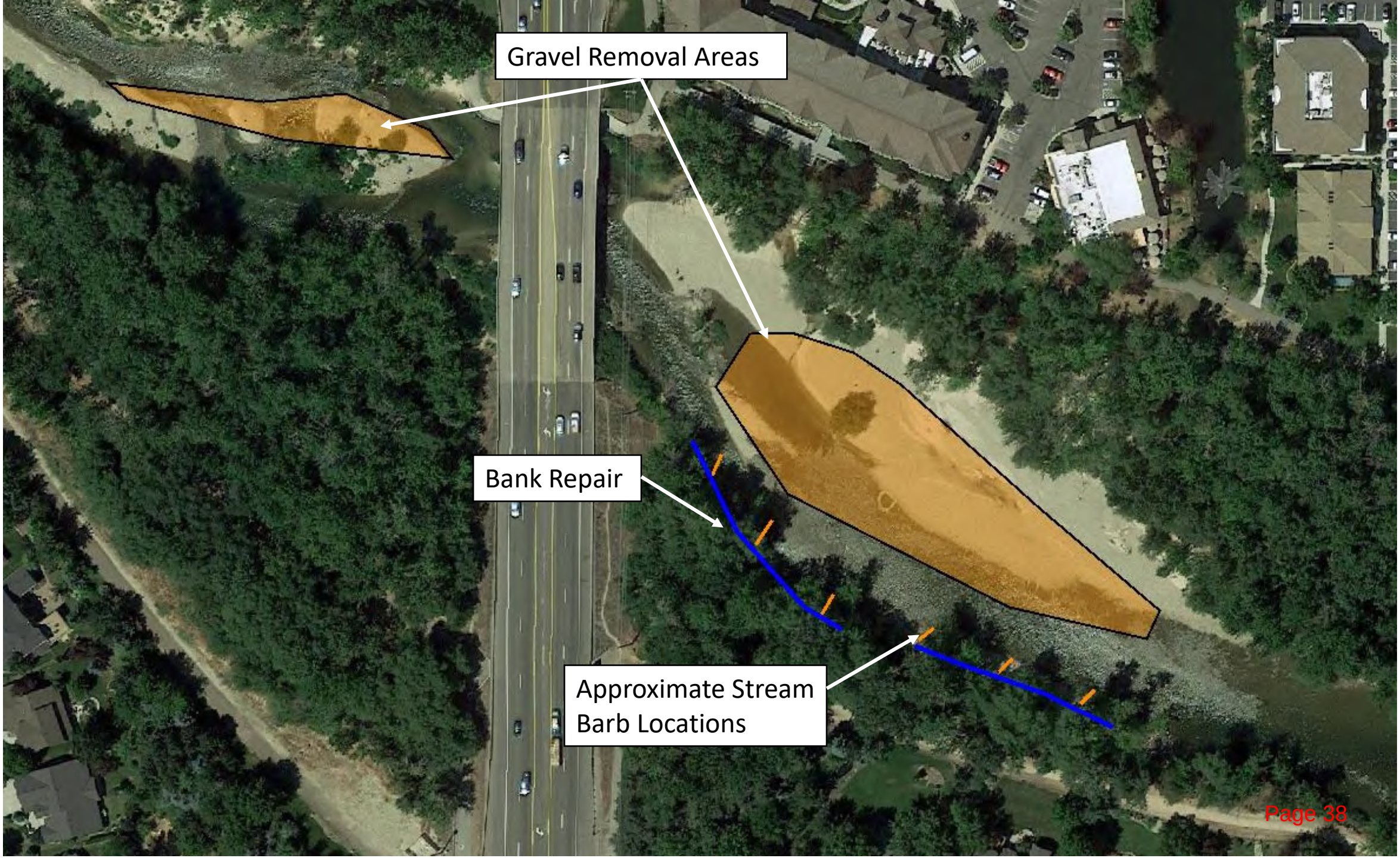
Shear Stress, 2017 Peak Flow



Shear Stress and Sediment Mobility, 2018 Peak Flow (3,500 cfs)



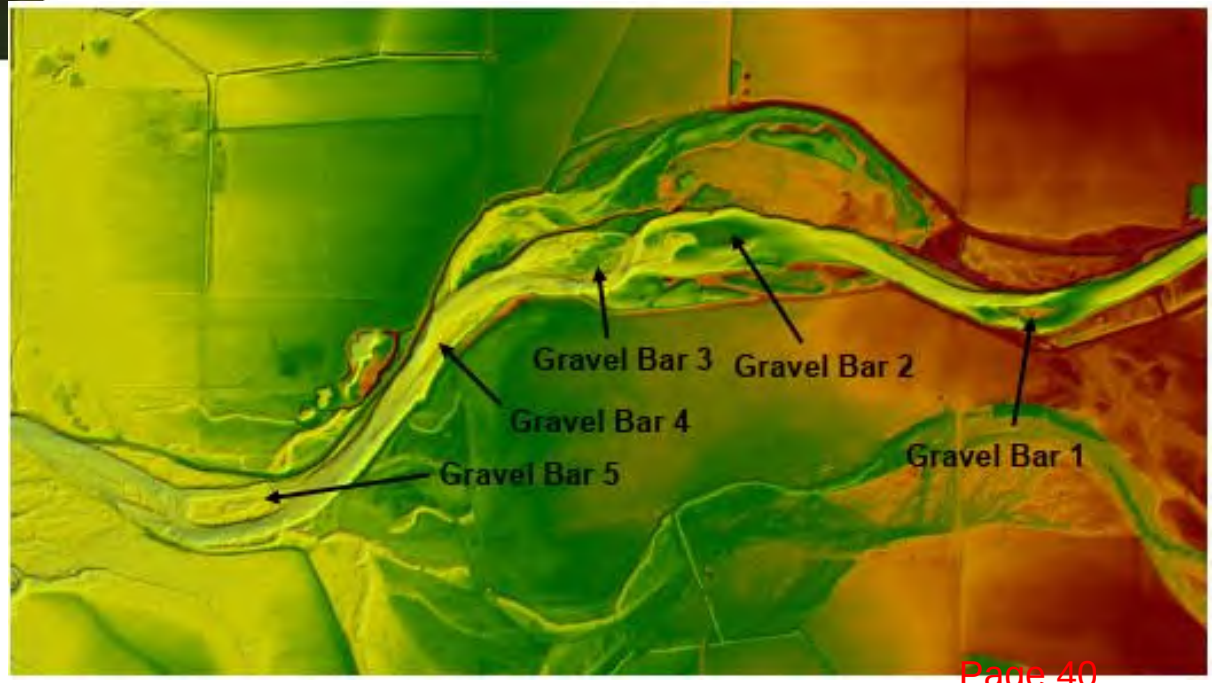
Proposed condition with Stream Barbs, Shear Stress- 3,500 cfs in North Channel

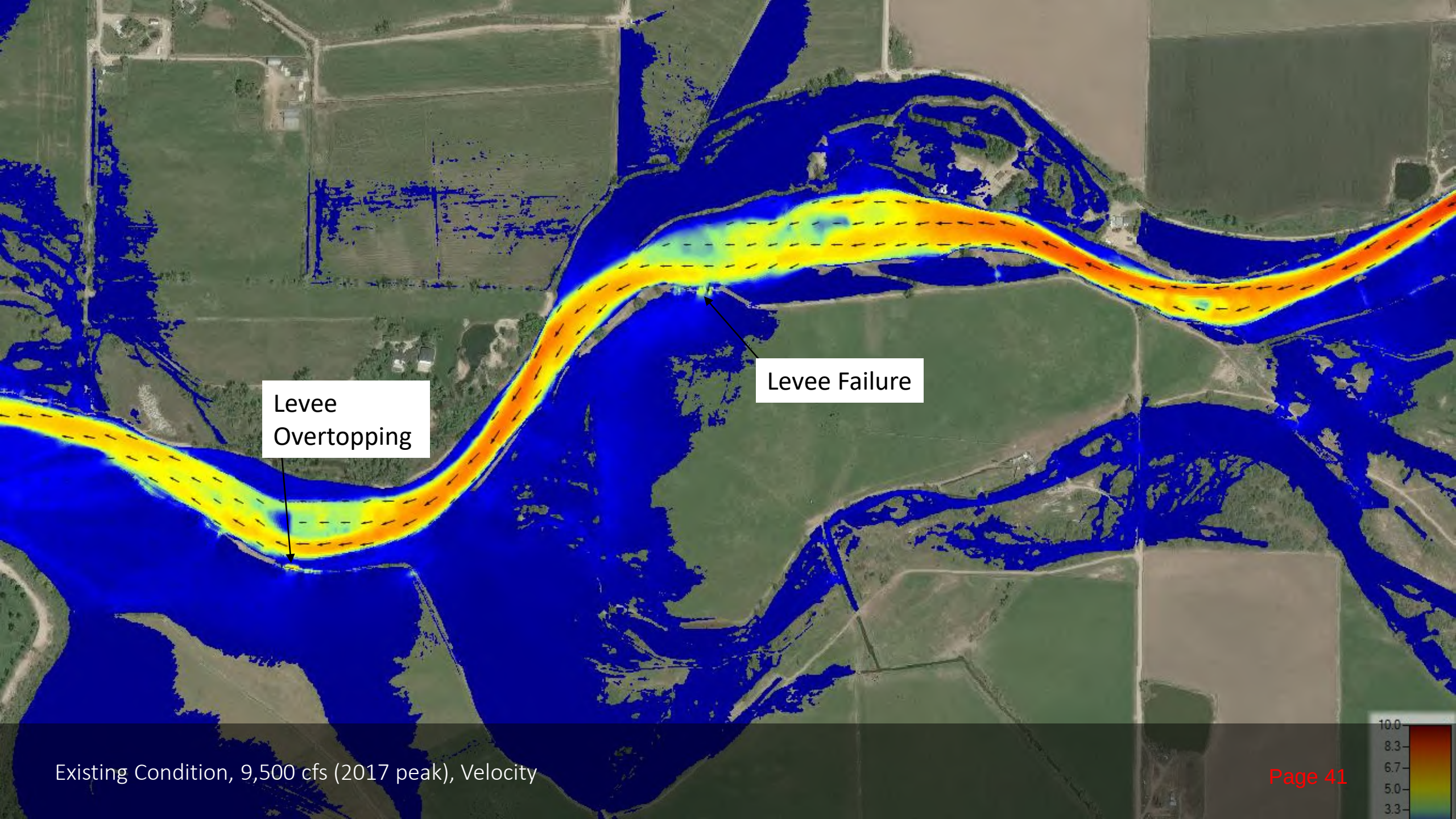

Gravel Removal Areas
Bank Repair
Approximate Stream Barb Locations

Canyon County Reach 1

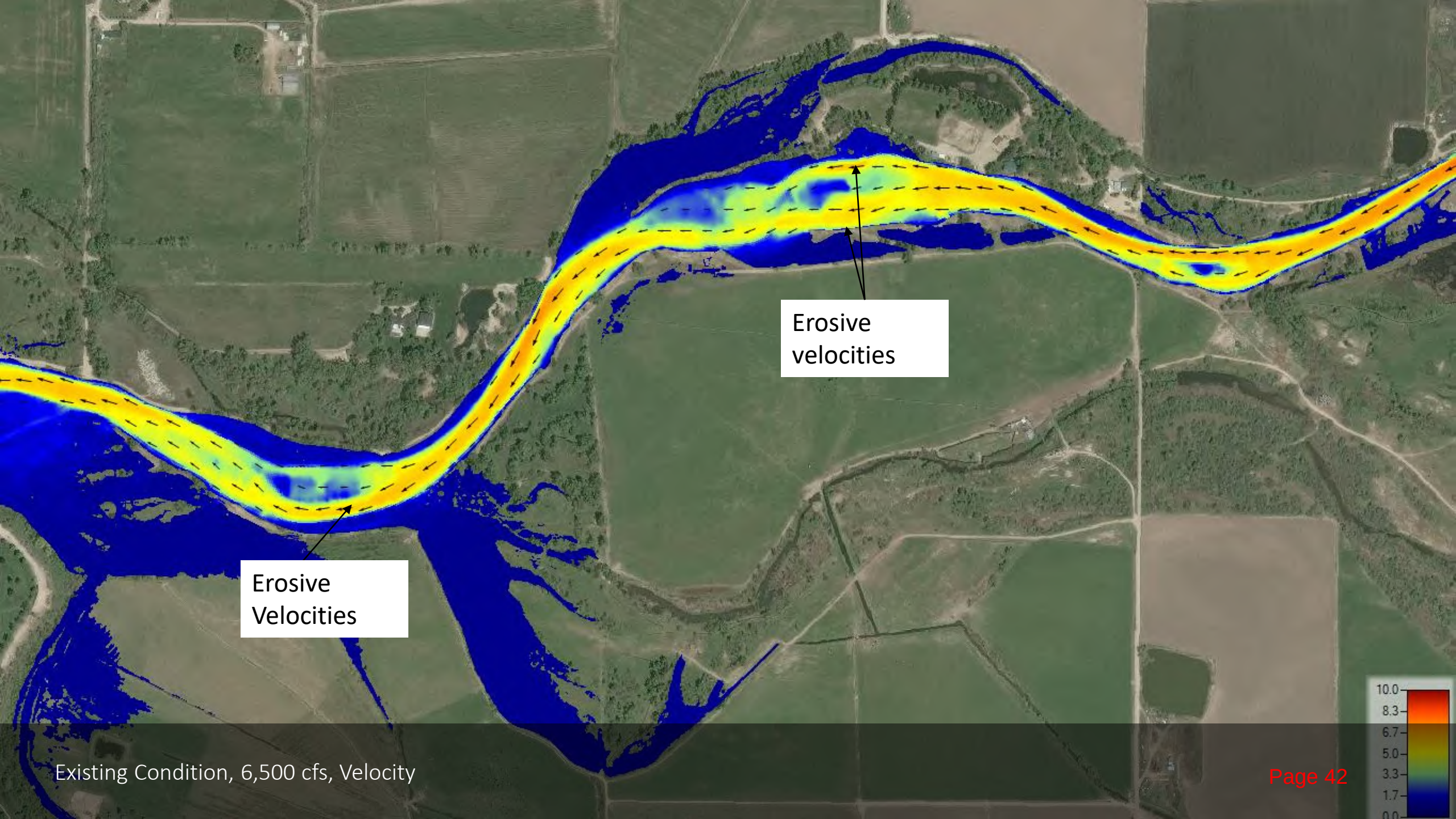
- Simulate existing conditions hydraulics
  - Velocity distribution
  - Channel capacity
  - Areas of overtopping
- Evaluate existing sedimentation
  - Stream Power
  - Shear Stress
  - Compare to observed trends
- Simulate alternatives
  - Reduce erosive velocities
  - Identify areas where bank armoring is needing
  - Improve sediment and flood carrying capacity
  - Identify areas for ongoing sediment management

BRMT Early Uses: Canyon County Reach 1

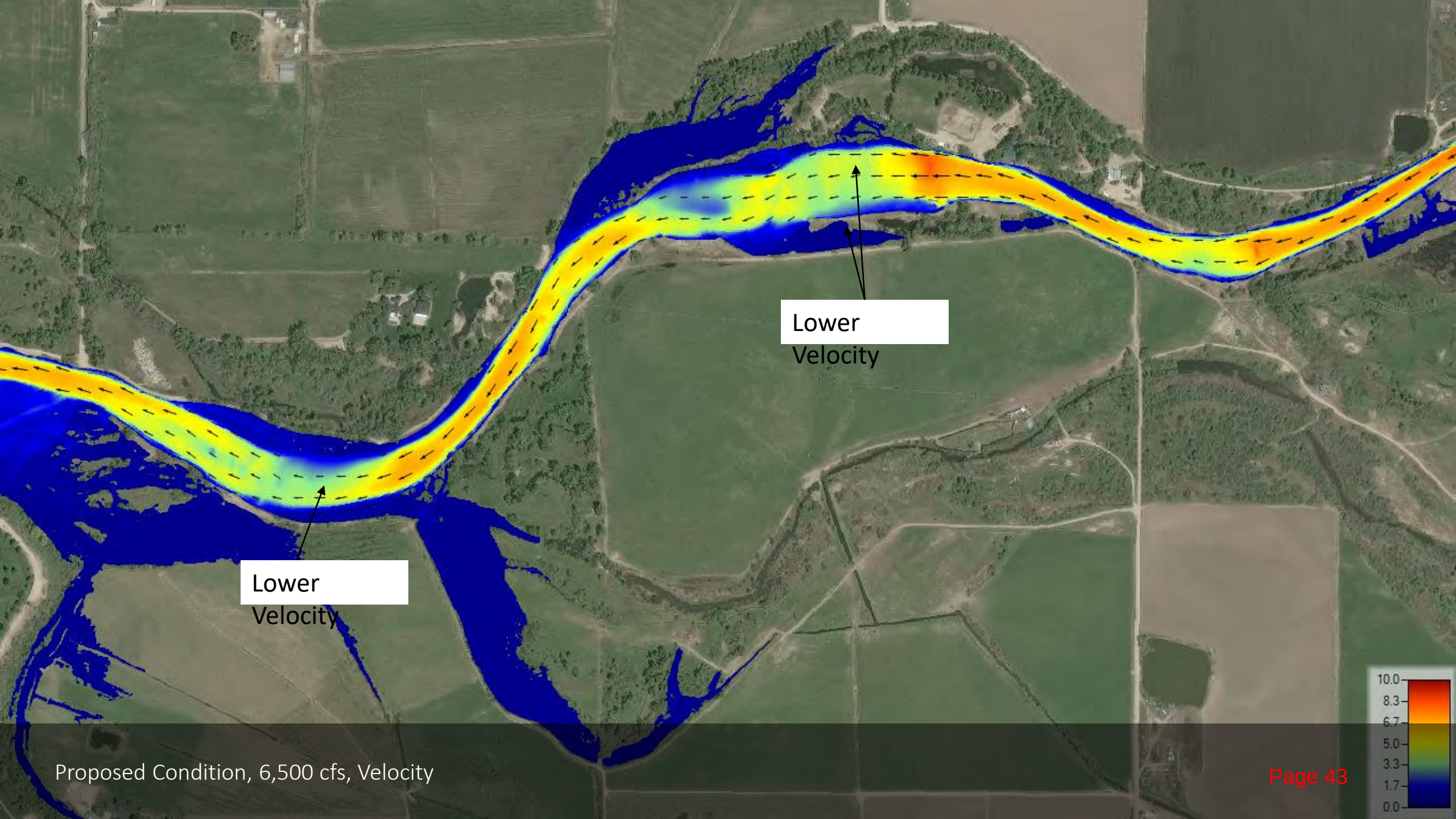




Existing Condition, 9,500 cfs (2017 peak), Velocity

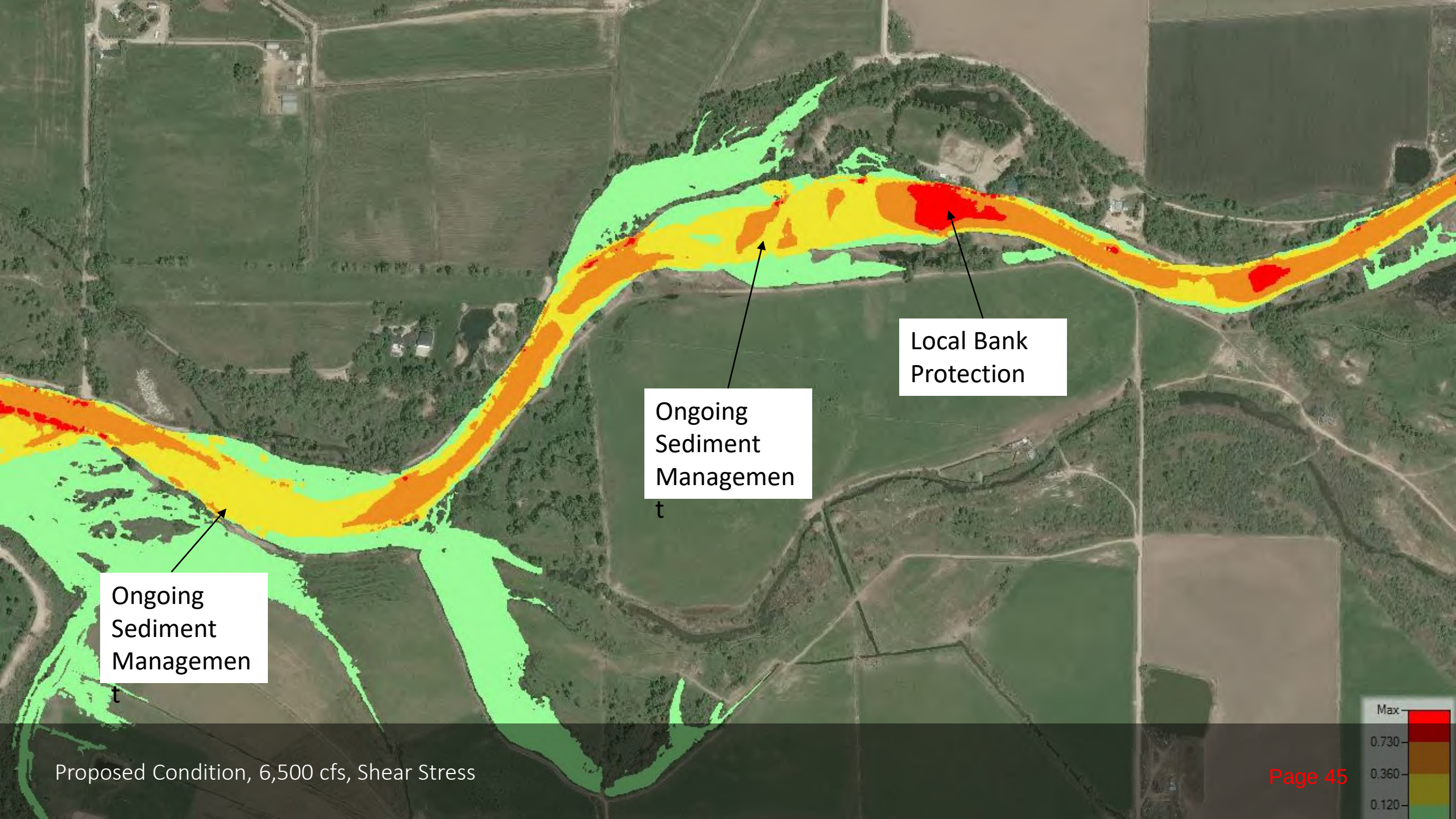


Existing Condition, 6,500 cfs, Velocity



Proposed Condition, 6,500 cfs, Velocity

Existing Condition, 6,500 cfs, Shear Stress

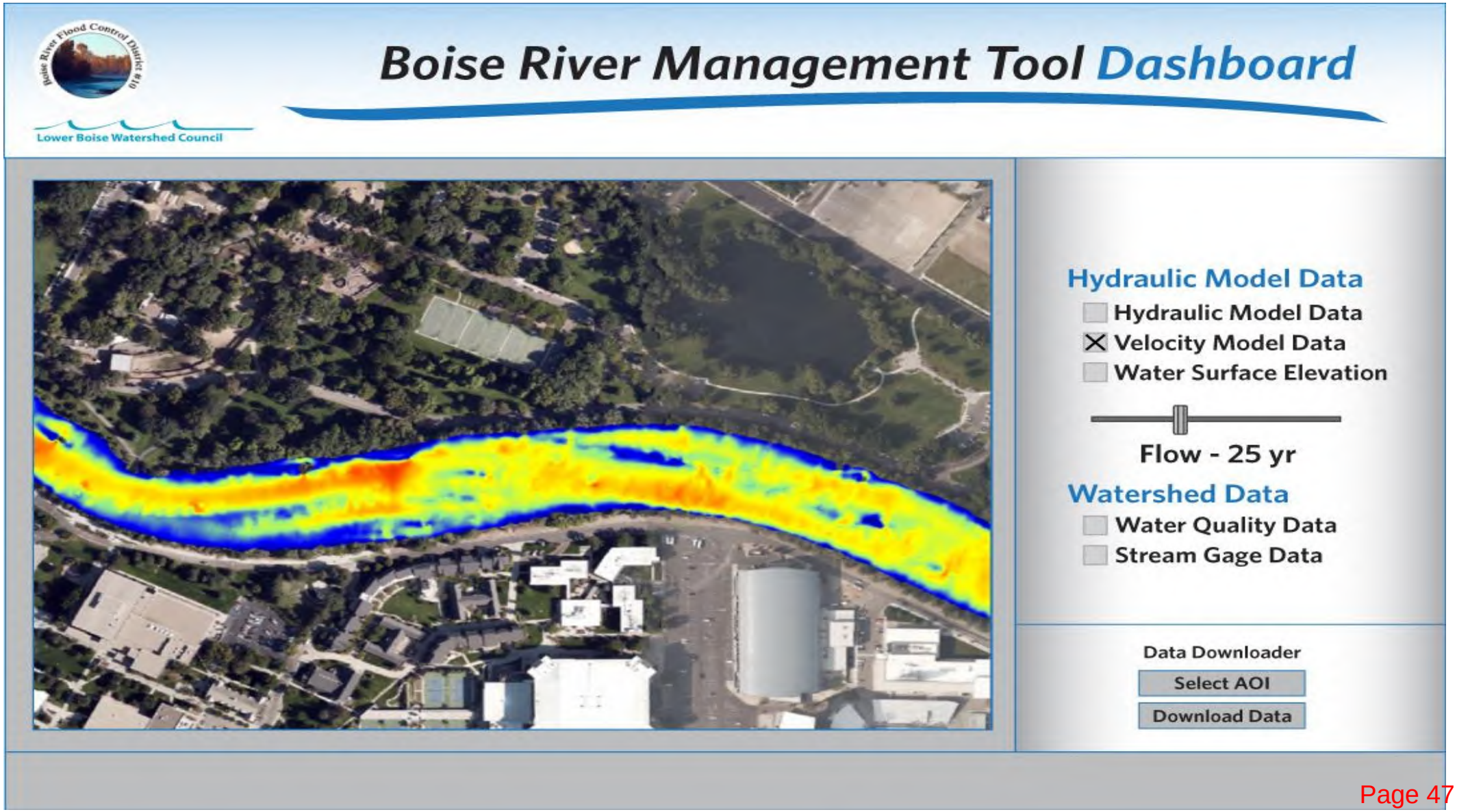


Proposed Condition, 6,500 cfs, Shear Stress

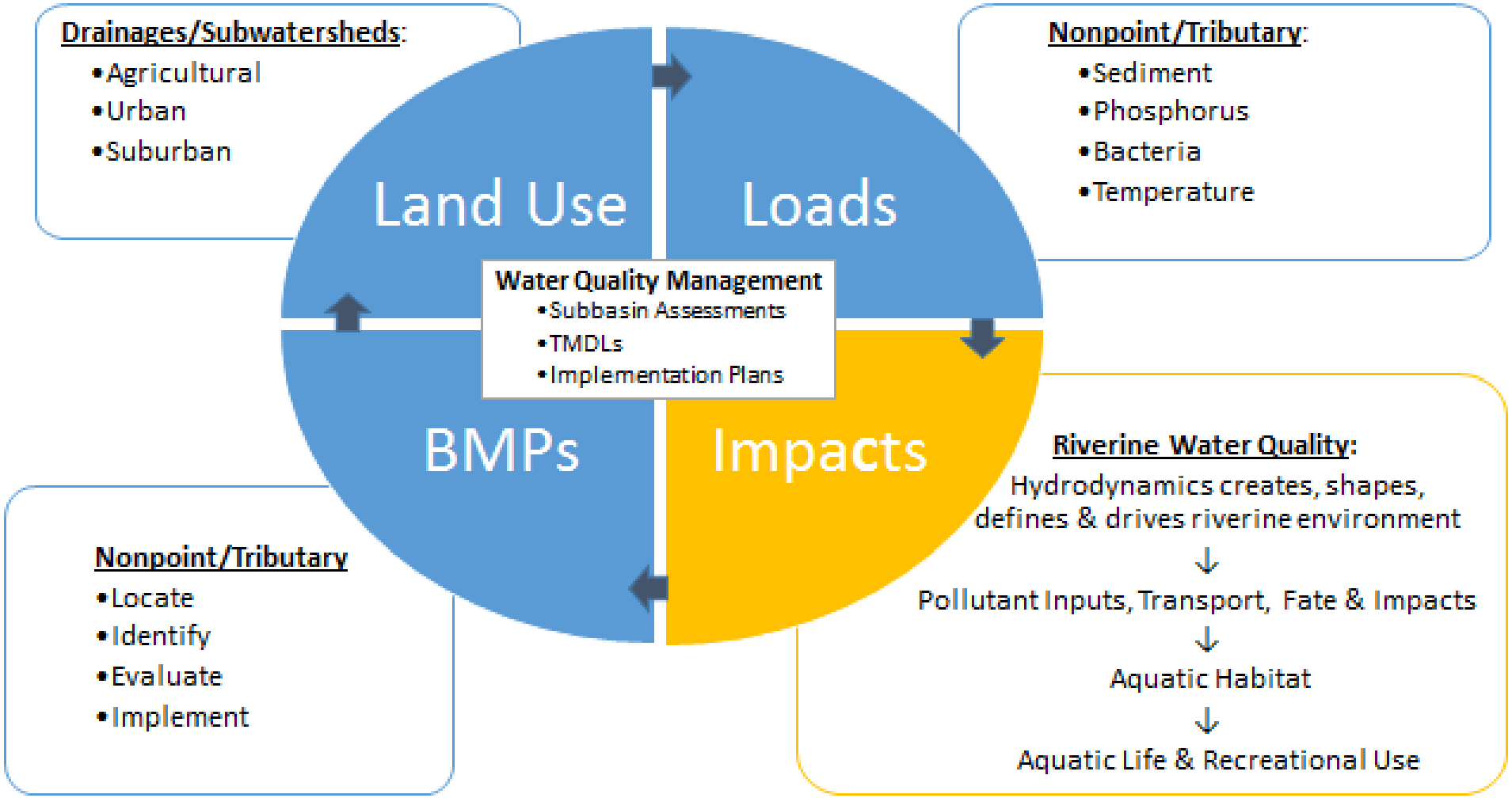
BRMT Hydraulic Map, Web Application & Advection-Dispersion Model

- Project Sponsors
  - FCD 10
  - Lower Boise Watershed Council (LBWC)
- LiDAR Data & BRMT publicly available through Web App.
- Flood Management
  - Identify areas susceptible to channel effects & inundation
- Water Quality Management
  - Model sources, transport, fate & effects of sediment, phosphorus & heat inputs to Boise River
  - Identify areas susceptible to sedimentation, nuisance aquatic algae growth, temperature effects
  - Identify impacts to recreational uses & aquatic life habitat
- Grant Applications
  - FCD 10 – IWRB flood management grant program (*not funded*)
  - LBWC – DEQ 319 grant program (*pending*)

BRMT Hydraulic Map & Web Application

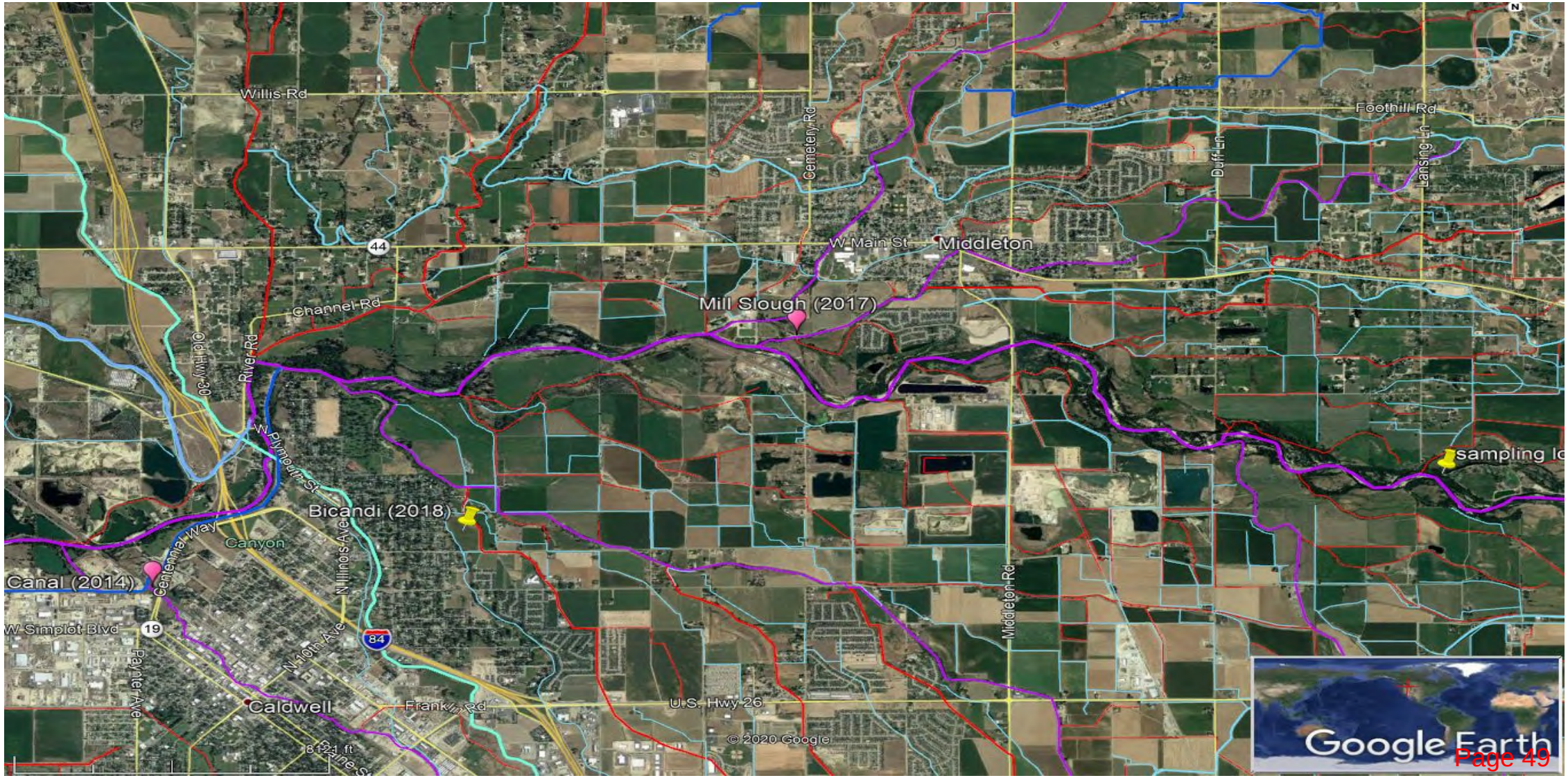


BRMT Early Uses: Water Quality Management



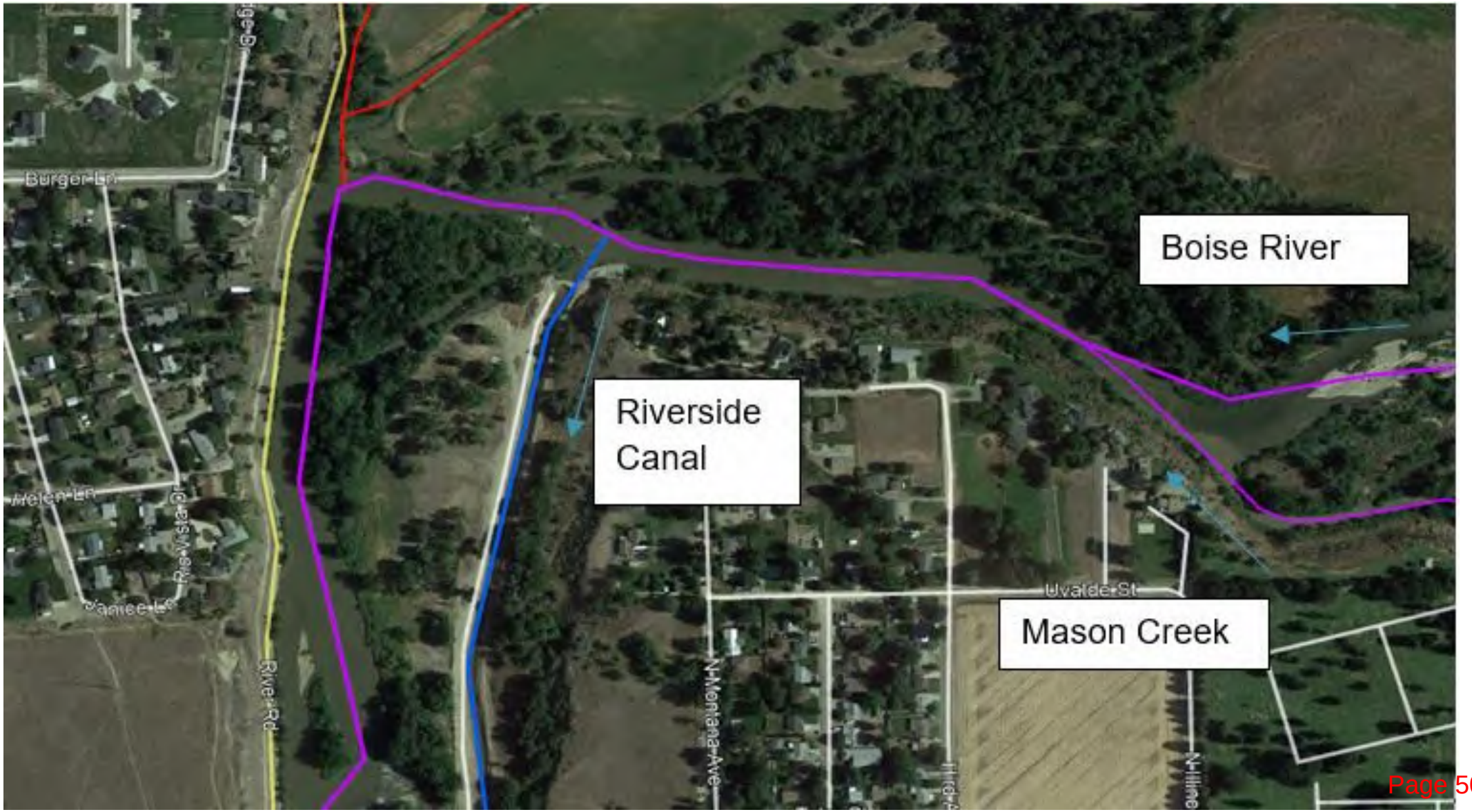
BRMT Early Uses: Advection-Dispersion Model

Assess ***fine sediment transport, temperature, and periphyton habitat*** within the reach of the Boise River between the USGS/ IPC monitoring station upstream of Middleton and the Indian Creek confluence



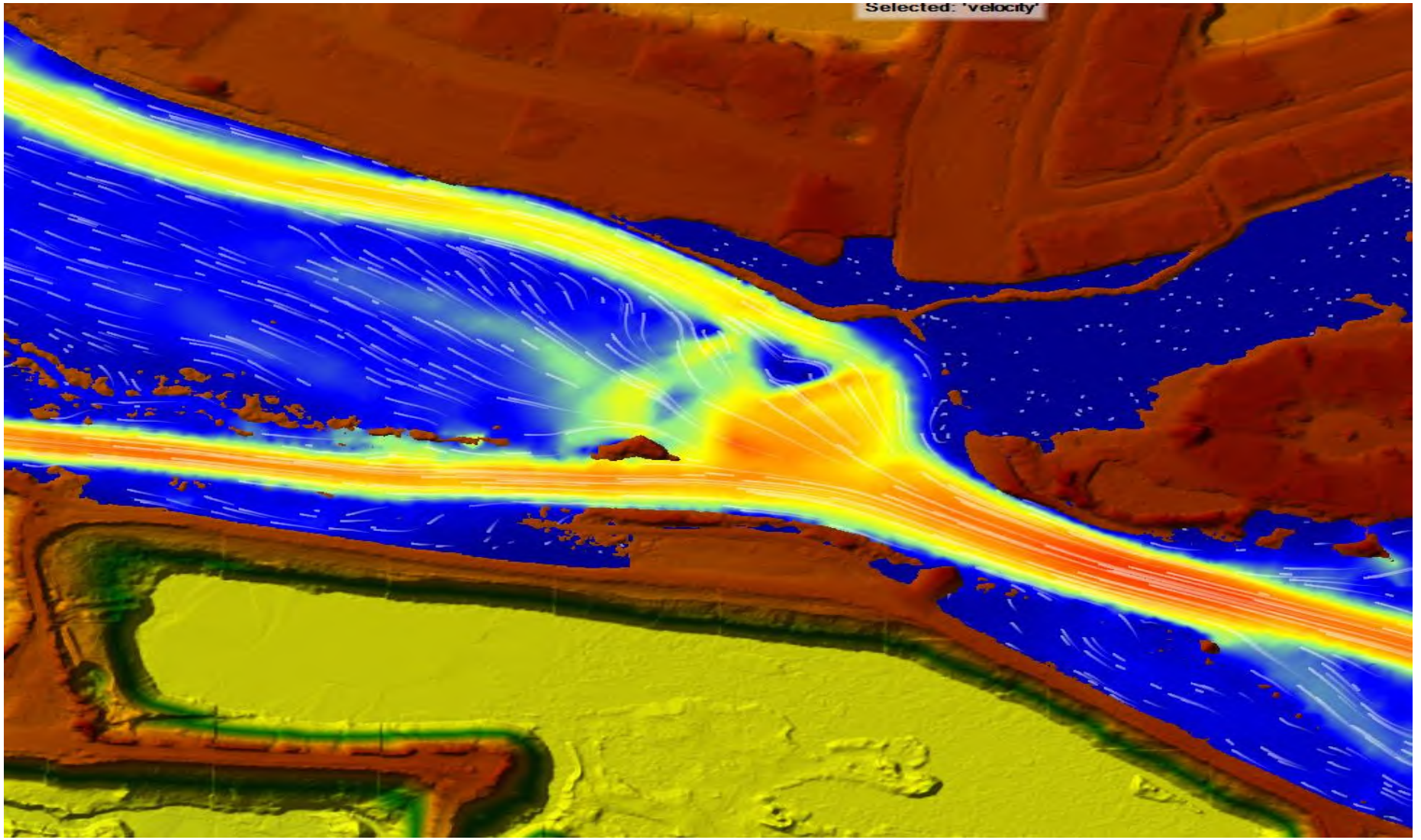
BRMT Early Uses: Advection-Dispersion Model

Mason Creek at the Geomorphic Nick Point



BRMT Future Projects: Eagle Island

BRMT Future Projects: Eagle Island



BRMT Future Projects: Eagle Island

September 2006

October 2013

BRMT Future Projects: Eagle Island (2019)

BRMT Future Projects: Eagle Island (2017)


QUESTIONS

RESOURCE SYSTEMS INC
CONSULTING ENGINEERS
BIOLOGISTS & SCIENTISTS
10306 Harvester Drive
Boise, Idaho 83709
(208) 376-5264

July 14, 2020

To: Contributors to Boise River LiDAR

From: Karl Gebhardt, P.E., P.H., Hydrologist/Environmental Engineer, Resource Systems Inc.

Subject: Topobathymetric LiDAR for the Boise River

Many of you know me from my years of working projects and initiatives associated with the Boise River. The reason for this letter is to thank you all for being part of the acquisition process for the recently completed "Topobathymetric LiDAR for the Boise River" by Quantum Spatial, for Flood Control District #10, Mike Dimmick, Project Manager. I have already put this data to use, and I wanted to let you know a little about the background for this LiDAR, it's quality, and how it is and will be used in the future.

Four or five years ago, Steve Sweet and I were discussing the need for better LiDAR along the river to supplement similar data sets acquired in 2007 and 2015. We began an effort along with Mr. Mike Dimmick (Flood Control District 10) to promote the use of two-dimensional (2D) hydraulic modeling and the value of high-quality LiDAR. The persistence in educating and fund-raising paid off with the current LiDAR product, and I want to thank everyone who saw the benefit of the LiDAR early-on and those who enthusiastically supported the state-of-the-art data acquisition.

I have recently updated some of my earlier 2D models with the new LiDAR and have also applied the data to some future bank repair work along the Boise River. In doing this, I was able to evaluate and compare the LiDAR with recently surveyed channel data, along with its performance within some 2D models. I can tell you this new LiDAR is fantastic and is beyond what any of us could have hoped. The resolution is excellent. Just examining the hidden areas (bathymetry) beneath the water's surface is eye-opening, providing something we have not had with any of the previous forms of data (LiDAR or conventional surveying).

Without going into too much technical detail, I can assure you all; this LiDAR will revolutionize flood hazard management and just about any river-related analyses for the Boise River **where the data is used**. Specifically, the LiDAR can provide much more accurate flood predictions helping to update the current and soon-to-become effective June 19, 2020, Flood Insurance Rate Maps (FIRM) (many of which will be very out-of-date even before they are released). The LiDAR itself or coupled with modeling can be used on a local basis to produce:

- Letters of Map Revision (LOMR) to correct errors in the FEMA mapping,
- Very detailed hazard mapping by having flow patterns identified at a resolution not available in the FEMA mapping (recall the problems that occurred during the 2017 flood that were not within FEMA hazard areas),
- Identification of existing and potential bank failure areas,
- Potential areas for floodplain modification which can reduce flood hazard,

- Better protection of infrastructure (roads, structures, pathways, pipeline crossings, irrigation diversions),
- Properly located and designed river projects for bridges, parks, wildlife and fisheries habitat, gravel mining, development, pathways, and other similar amenities, and
- Water quality modeling (temperature, sediment, nutrient).

The LiDAR can also be used on a larger scale to integrate and expand our understanding of how flooding occurs, how sediment moves, and how something in one part of the river may impact other elements, providing the potential for inter-jurisdictional management. Ideally, work that involves the river needs to be coordinated between jurisdictions, since the river has no such boundaries. If the LiDAR and associated hydraulic modeling projects are used consistently with a modest amount of regulation, our river management can improve significantly, allowing the river to continue on a long-term basis to provide a wonderful amenity for all of us.

After a long and involved career involving numerous projects up and down the Boise River, I thank you all for your foresight in acquiring this data. This excellent information will afford continued cooperation between jurisdictions, and I urge all the participants to forge new relationships to maximize the benefits for all.

While this new LiDAR offers new possibilities to many interests along the Boise River, we all need to acknowledge that the river is dynamic. Therefore, future management needs to be dynamic, as well. This technology will continue to improve, allowing more improvements each year. It will take an effort to go from a static planning base to a dynamic base. I am hopeful, because of this effort you all contributed to, that we all can keep the improved management opportunities forging forward. We all are at a great starting point for enhanced and sound river management. Just remember: This is a starting point; there are many more great opportunities for improvement ahead of us.

Thanks Again!

Karl Gebhardt, P.E., P.H.

Hydrologist/Environmental Engineer