



Wyoming Flow Split Project

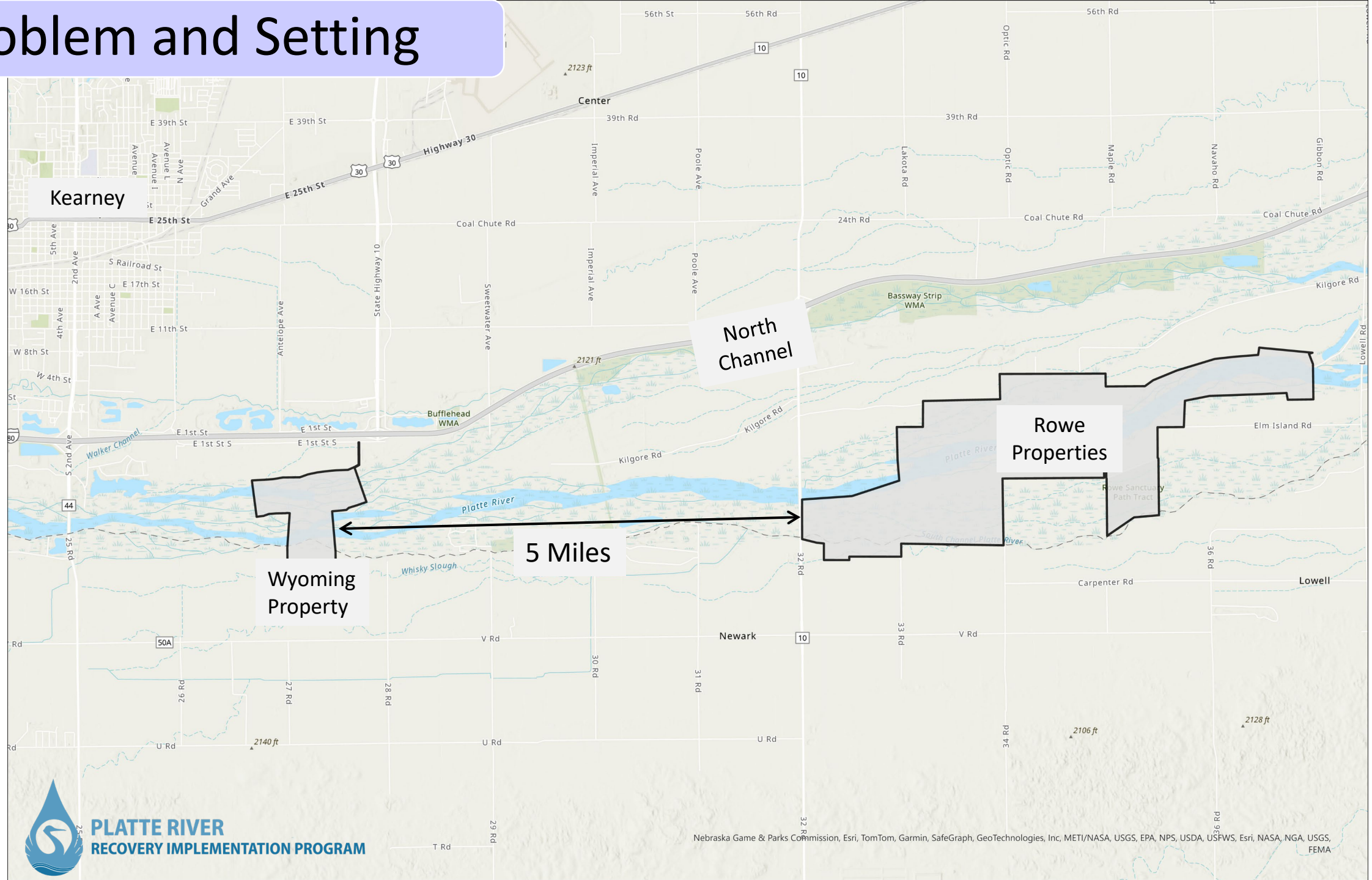
Libby Casavant, P.E.

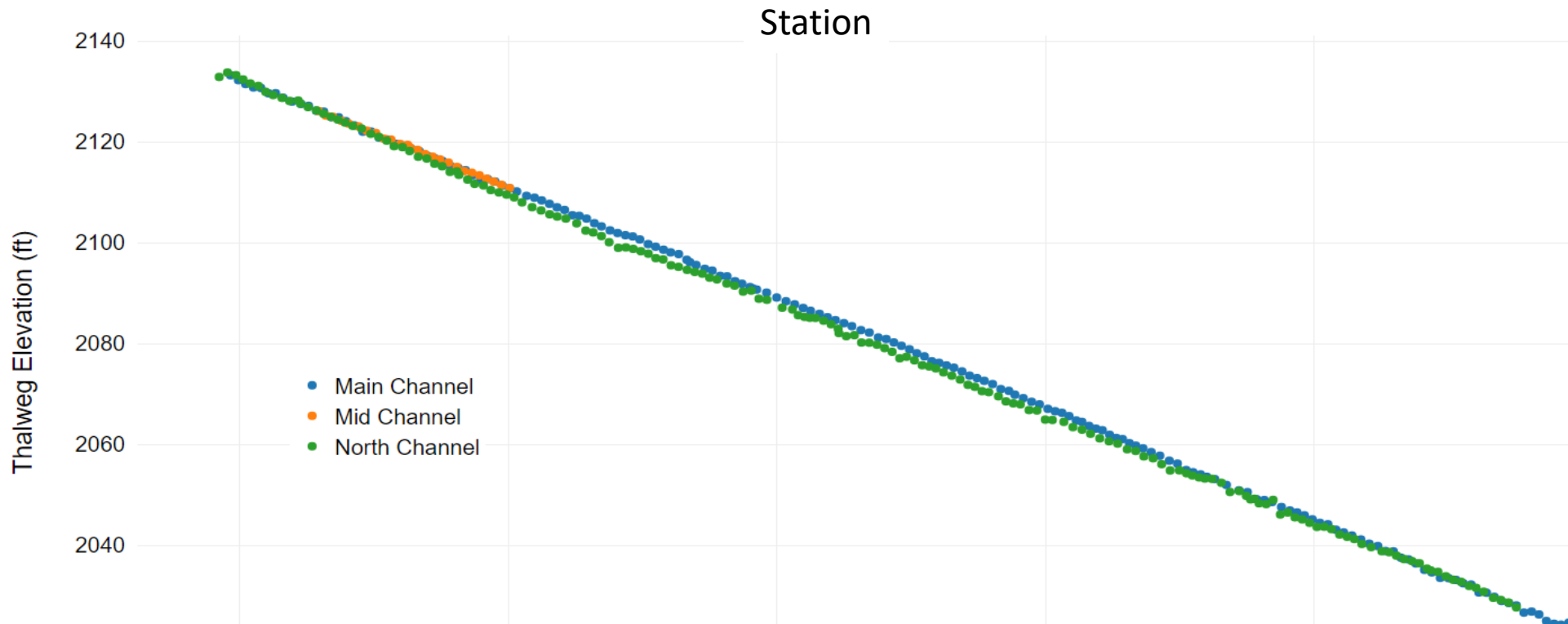
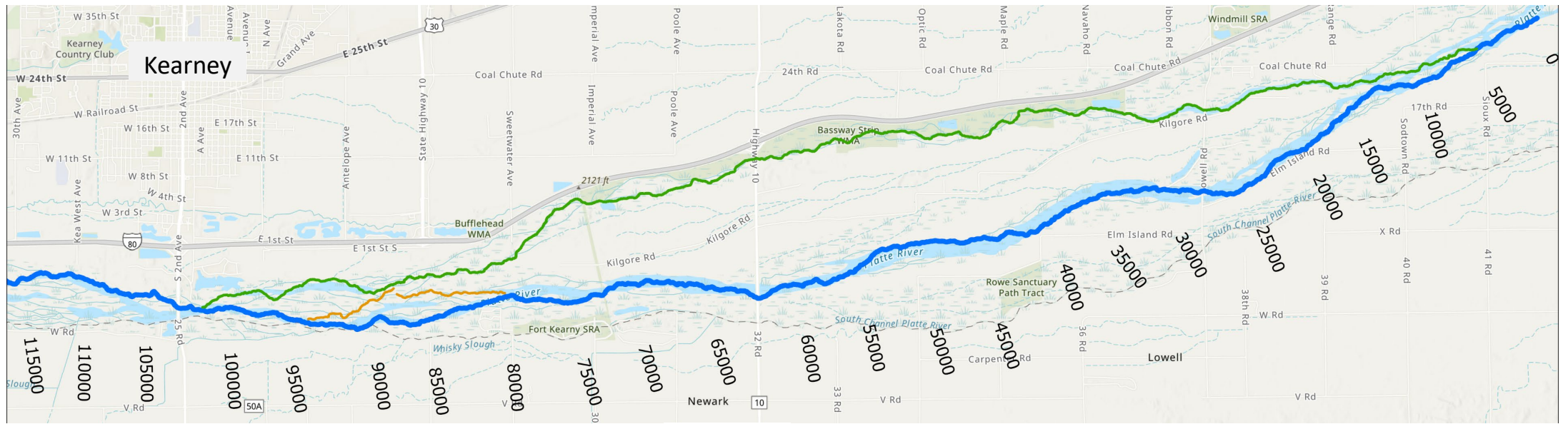
Problem and Setting: Reduced flows at Rowe Sanctuary

Designed solution: Construct a berm to keep water in mid and south channels

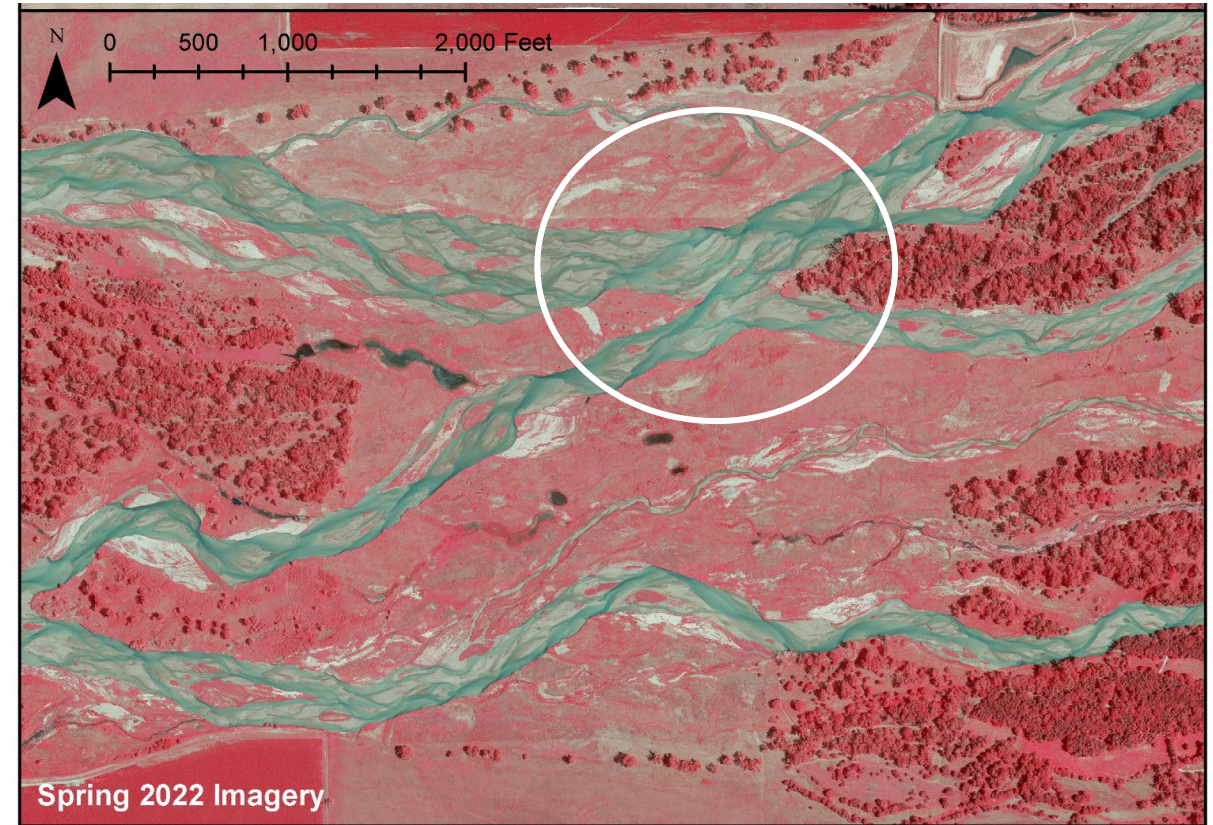
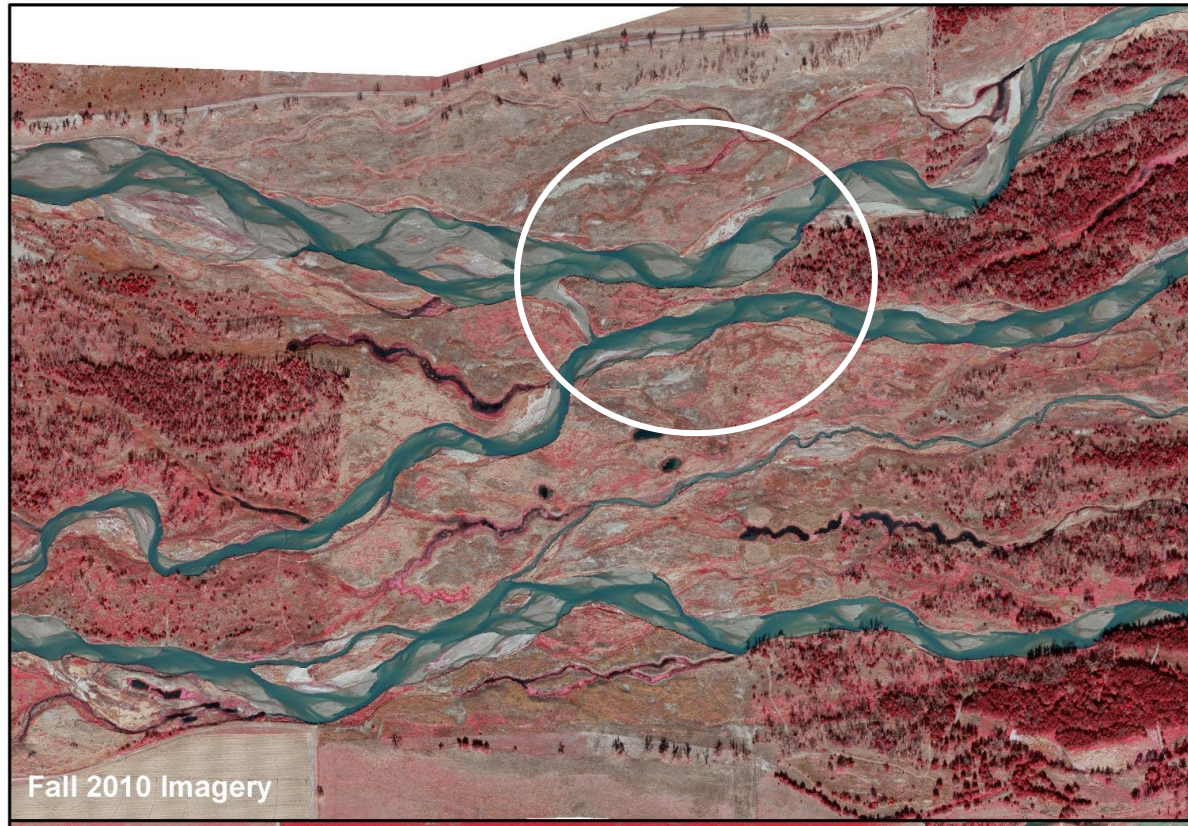
Expected Result: Up to 50% flow gain at Rowe Sanctuary during dry conditions

Problem and Setting



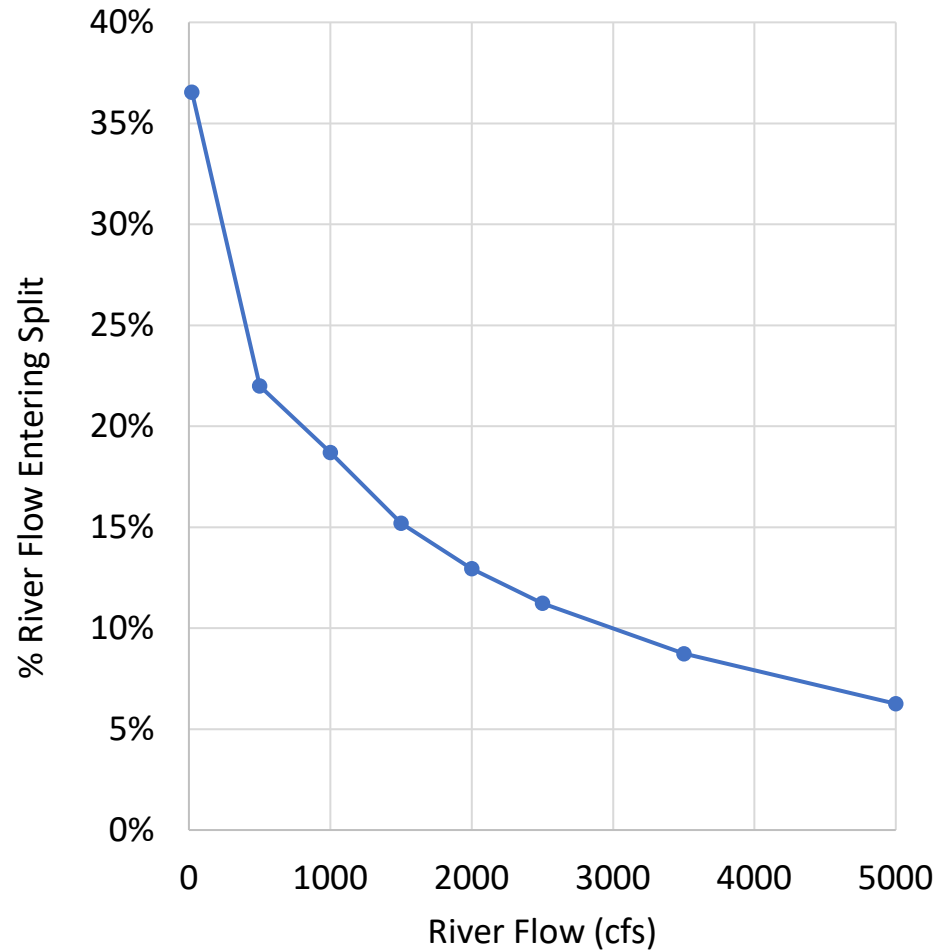


Problem and Setting



Problem and Setting

% Flow Entering North Channel Through Split



Problem and Setting

Rowe Sanctuary Vegetation 2023



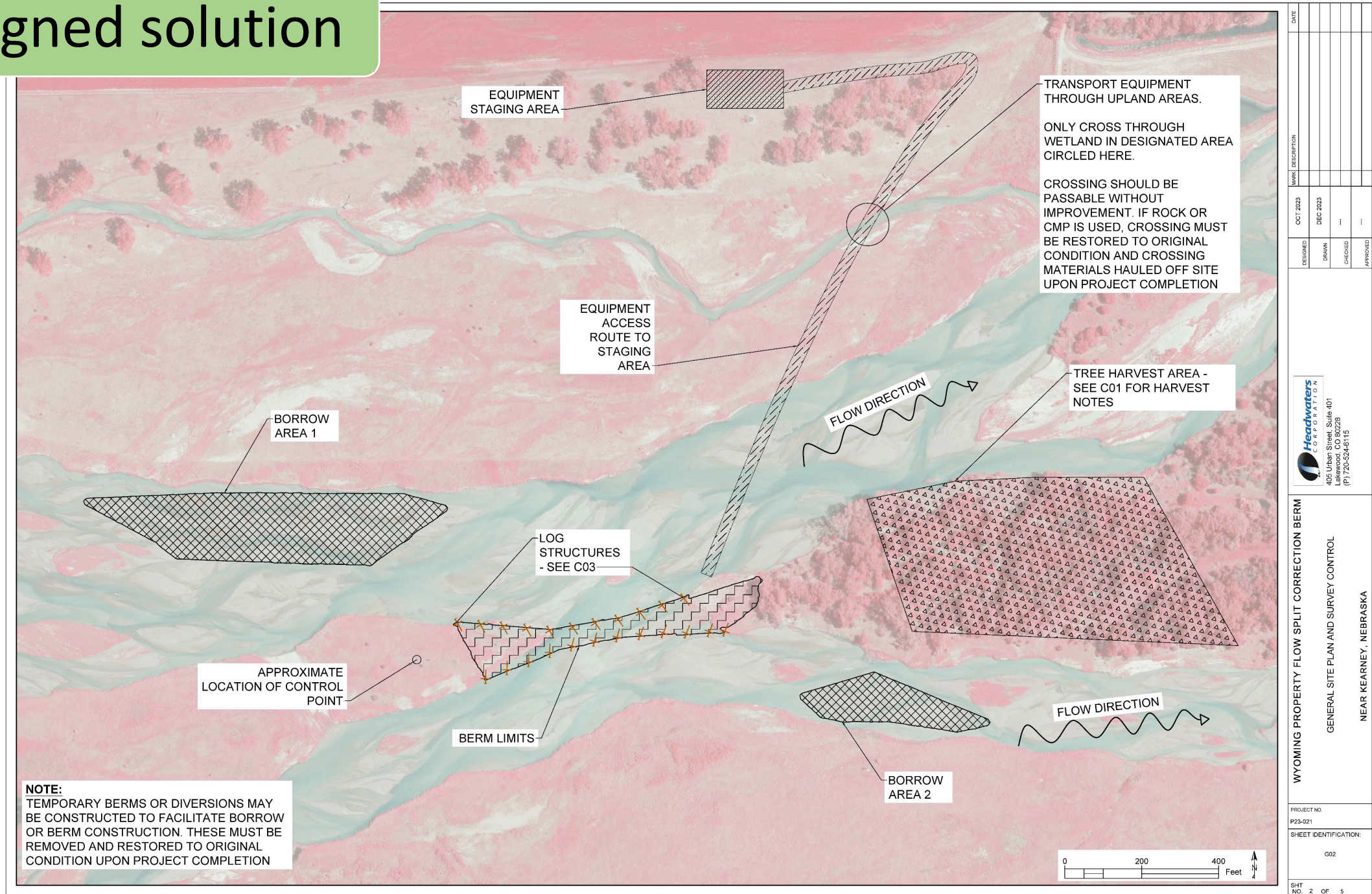
PLATTE RIVER
RECOVERY IMPLEMENTATION PROGRAM

Problem and Setting



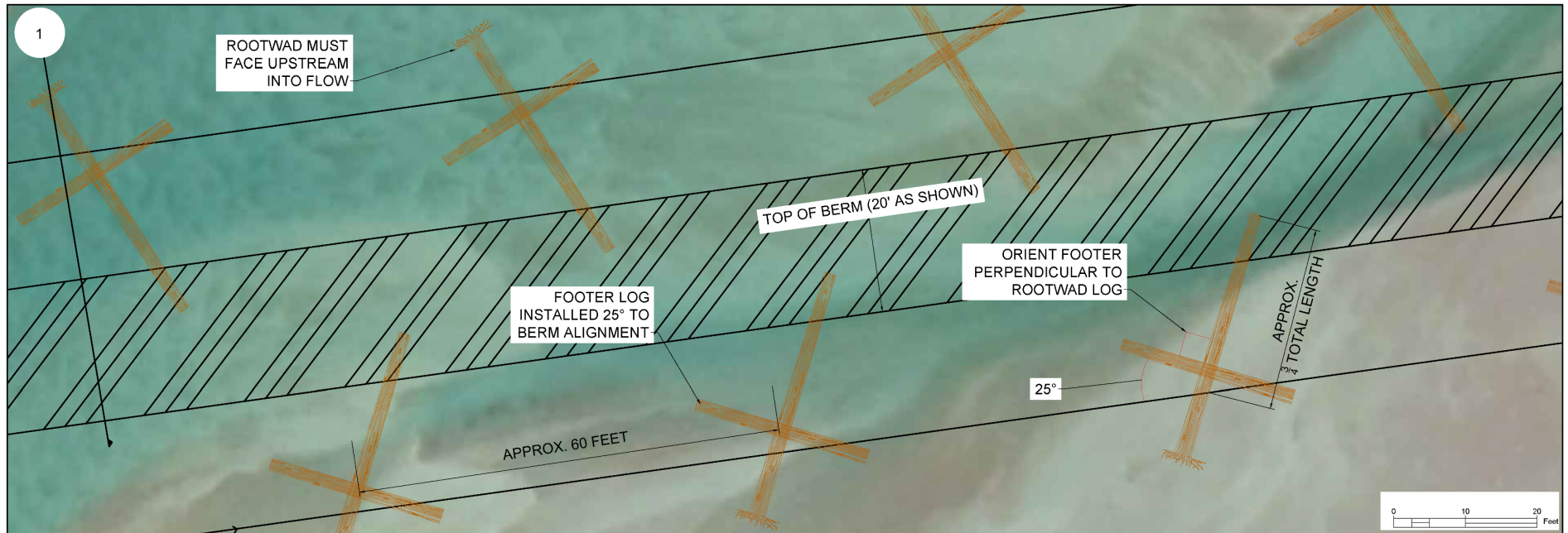
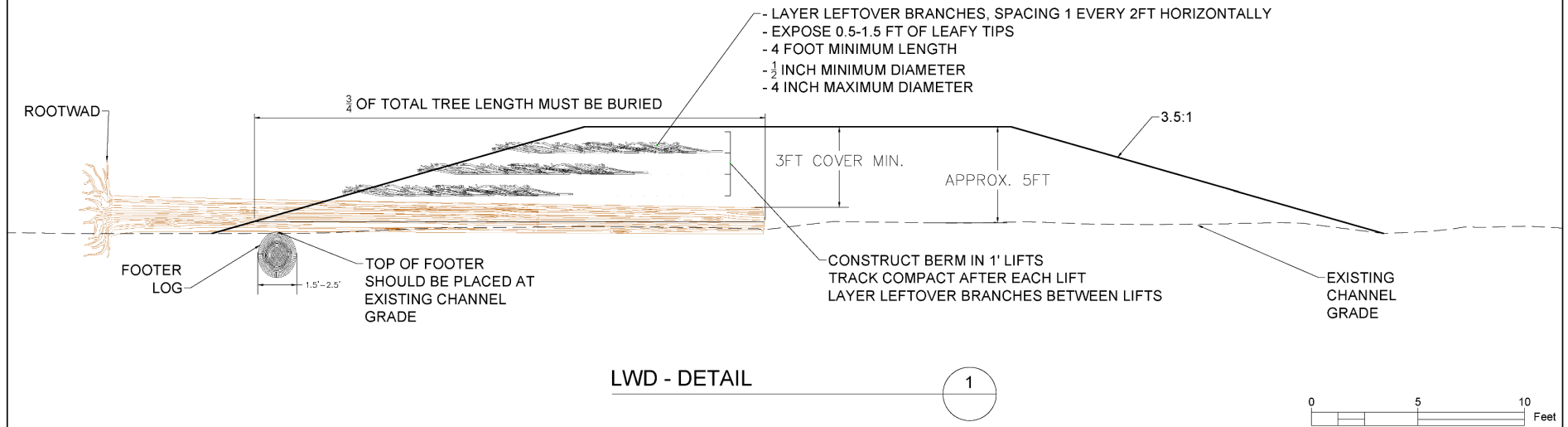
Rowe Sanctuary Vegetation
2023

Designed solution



Designed solution

LOG STRUCTURE, BRANCH PLACEMENT, AND BERM DETAIL



DATE	
DESCRIPTION	
MARK	
DESIGNED	OCT 2023
DRAWN	DEC 2023
CHECKED	
APPROVED	

Headwaters CORPORATION 405 Urban Street, Suite 401 Lakewood, CO 80228 (P) 720-524-6115	WYOMING PROPERTY FLOW SPLIT CORRECTION BERM LOG STRUCTURE AND BERM DETAIL NEAR KEARNEY, NEBRASKA
---	---

PROJECT NO.	P23-021
SHEET IDENTIFICATION:	C03
SHEET NO.	5 OF 5

Wetland
Delineation



Permit
Application
(January-Feb)

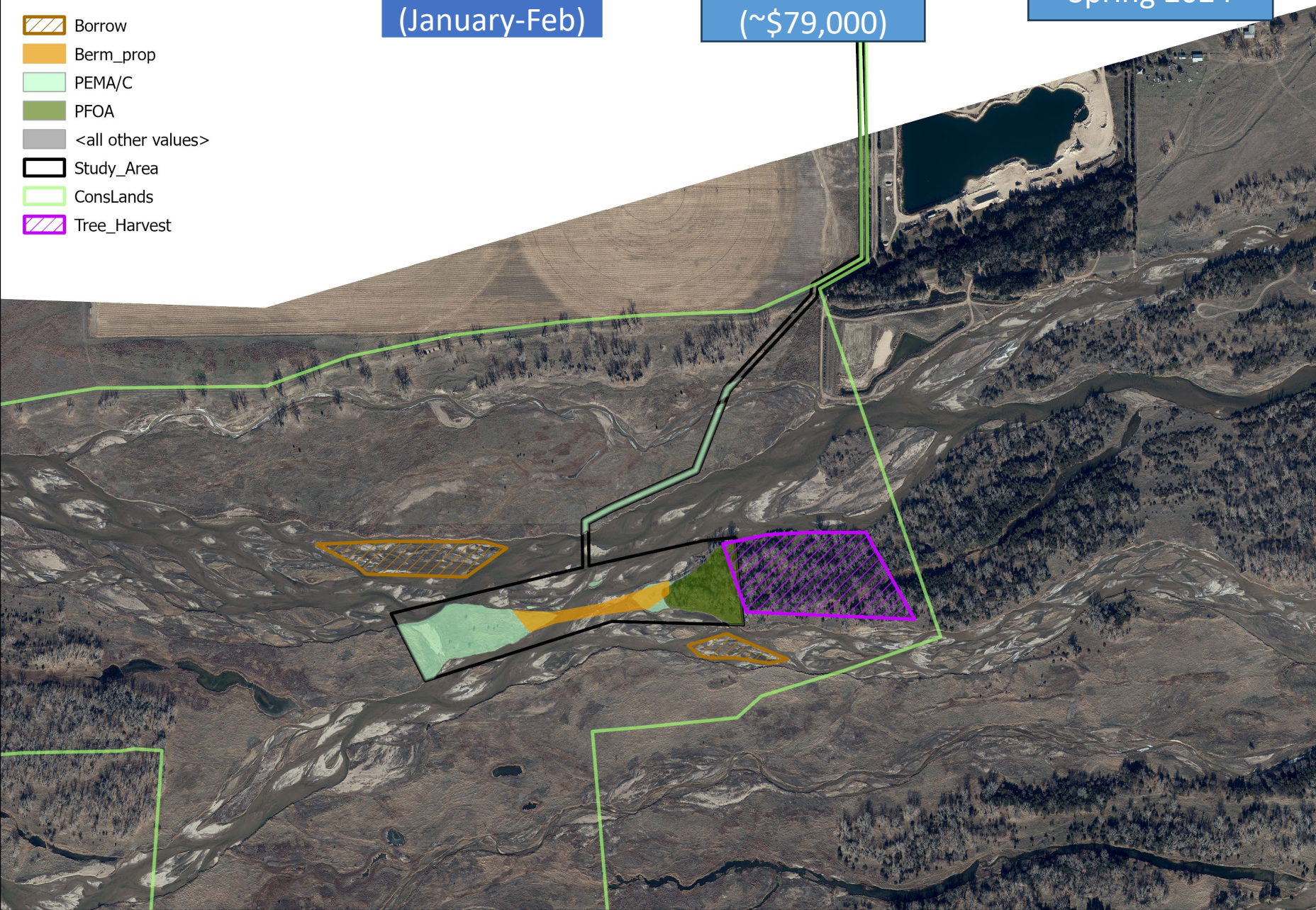


Bid and
Selection
(~\$79,000)

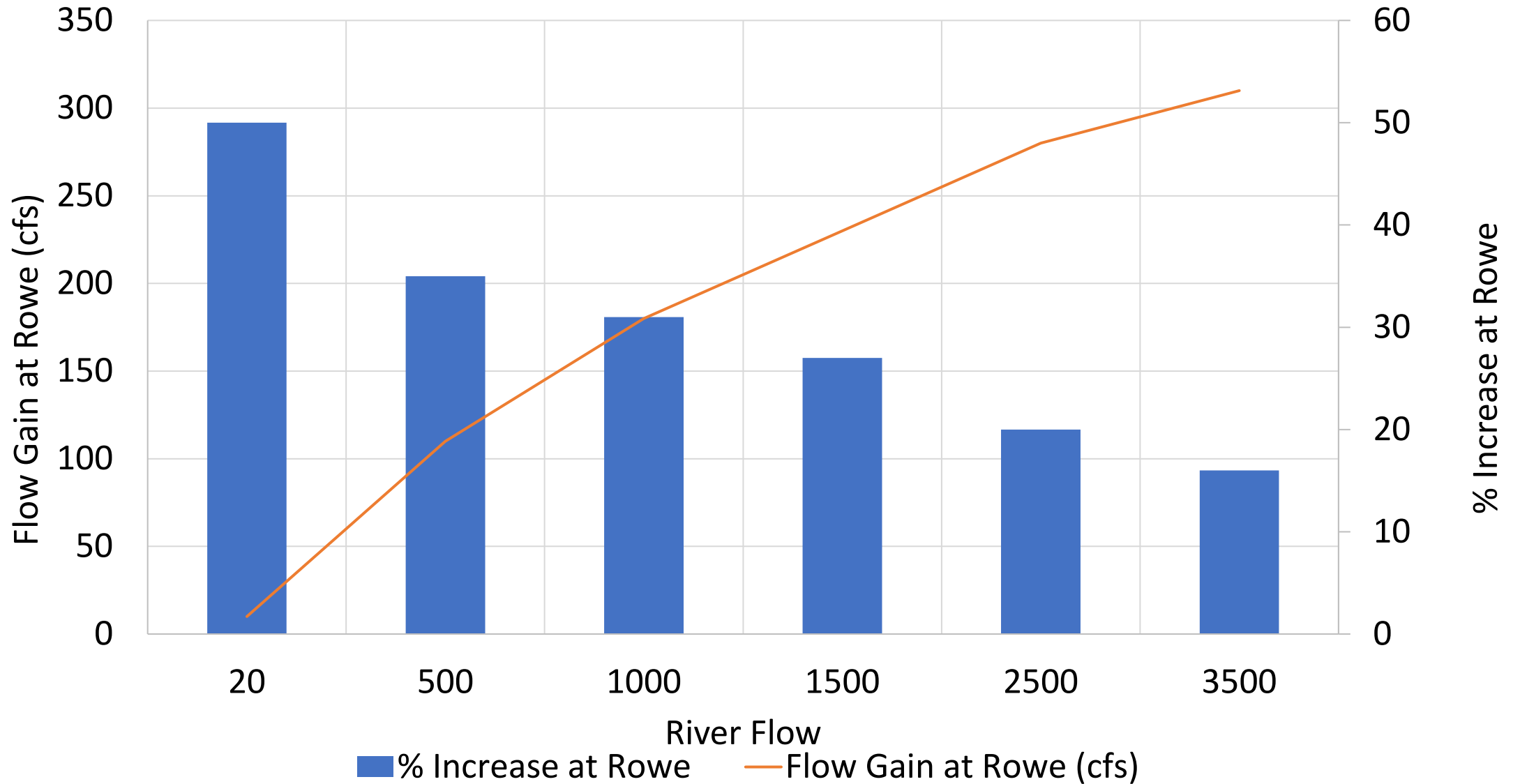


Construction
Spring 2024

-  Borrow
-  Berm_prop
-  PEMA/C
-  PFOA
-  <all other values>
-  Study_Area
-  ConsLands
-  Tree_Harvest



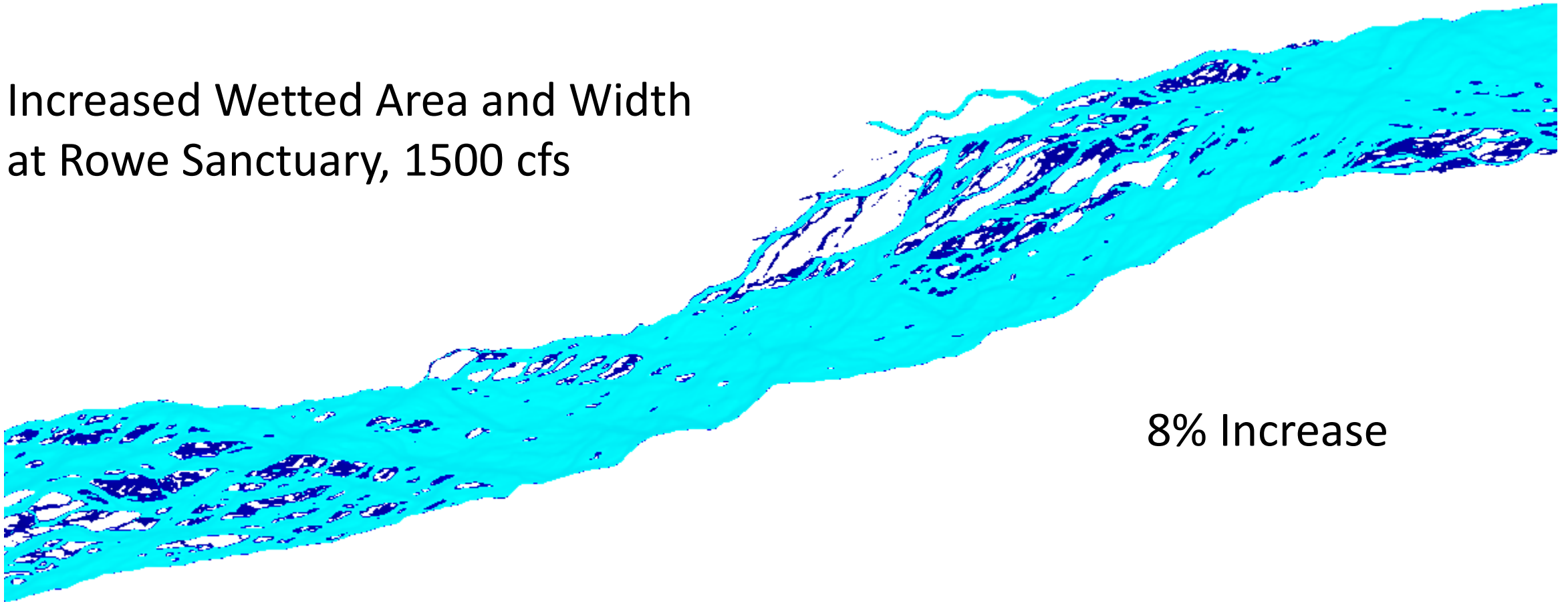
Expected Result



Expected Result



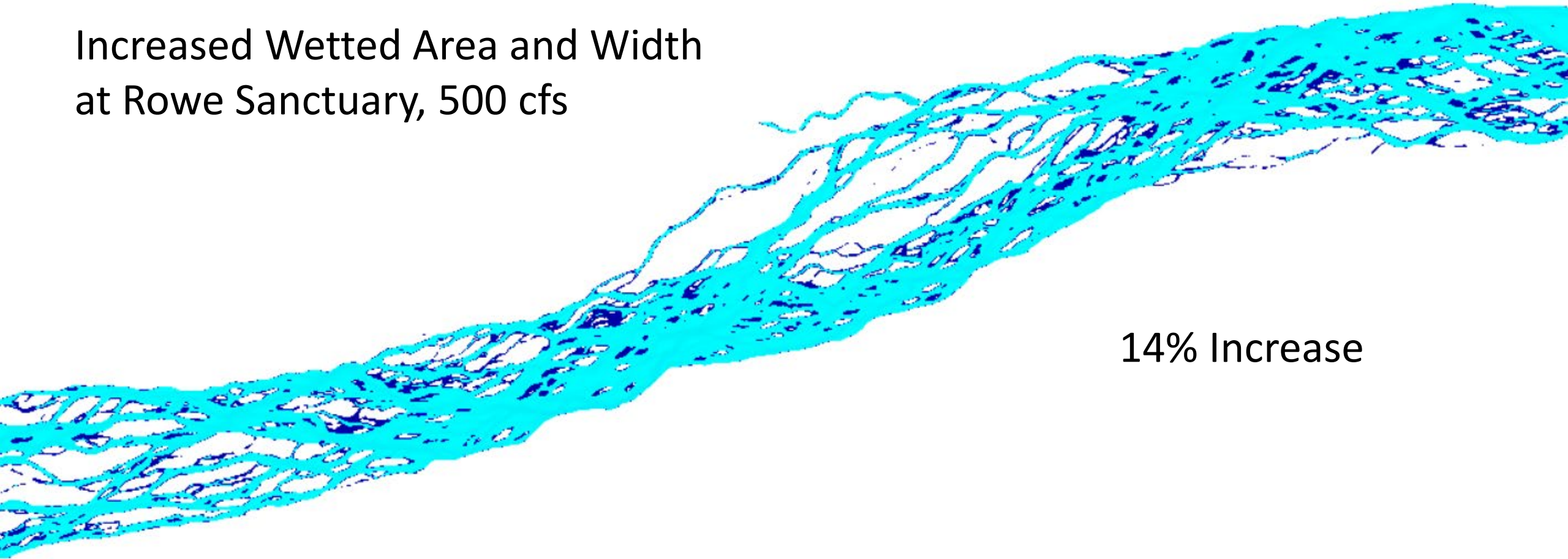
Increased Wetted Area and Width
at Rowe Sanctuary, 1500 cfs



Expected Result



Increased Wetted Area and Width
at Rowe Sanctuary, 500 cfs



14% Increase



PLATTE RIVER
RECOVERY IMPLEMENTATION PROGRAM

Sediment Augmentation

Libby Casavant, P.E., Ed Weschler, E.I.

Introduction

- **Extension Big Question (EBQ) Assessments**
- **2022 & Peer Review Update**

2024: Decision on Augmentation Pending GC

- **Learning vs. Management**
- **Prevent J-2 Incision Upstream or Downstream?**

Investigation of more Passive Solutions

- **Side Channel Re-activation**
- **Vegetation Management**
- **Sand Dam Pre-feasibility Analysis**
- **Estimating “Annual Augmentation Need”**

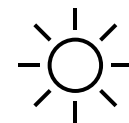
EBQ #3: Is sediment augmentation necessary to create and/or maintain suitable whooping crane habitat?

- 6 years of augmentation completed and analyzed
- Report undergoing peer review, results expected late March 2024
- Peer review results will be used to determine if another experiment is necessary to address outstanding uncertainties.

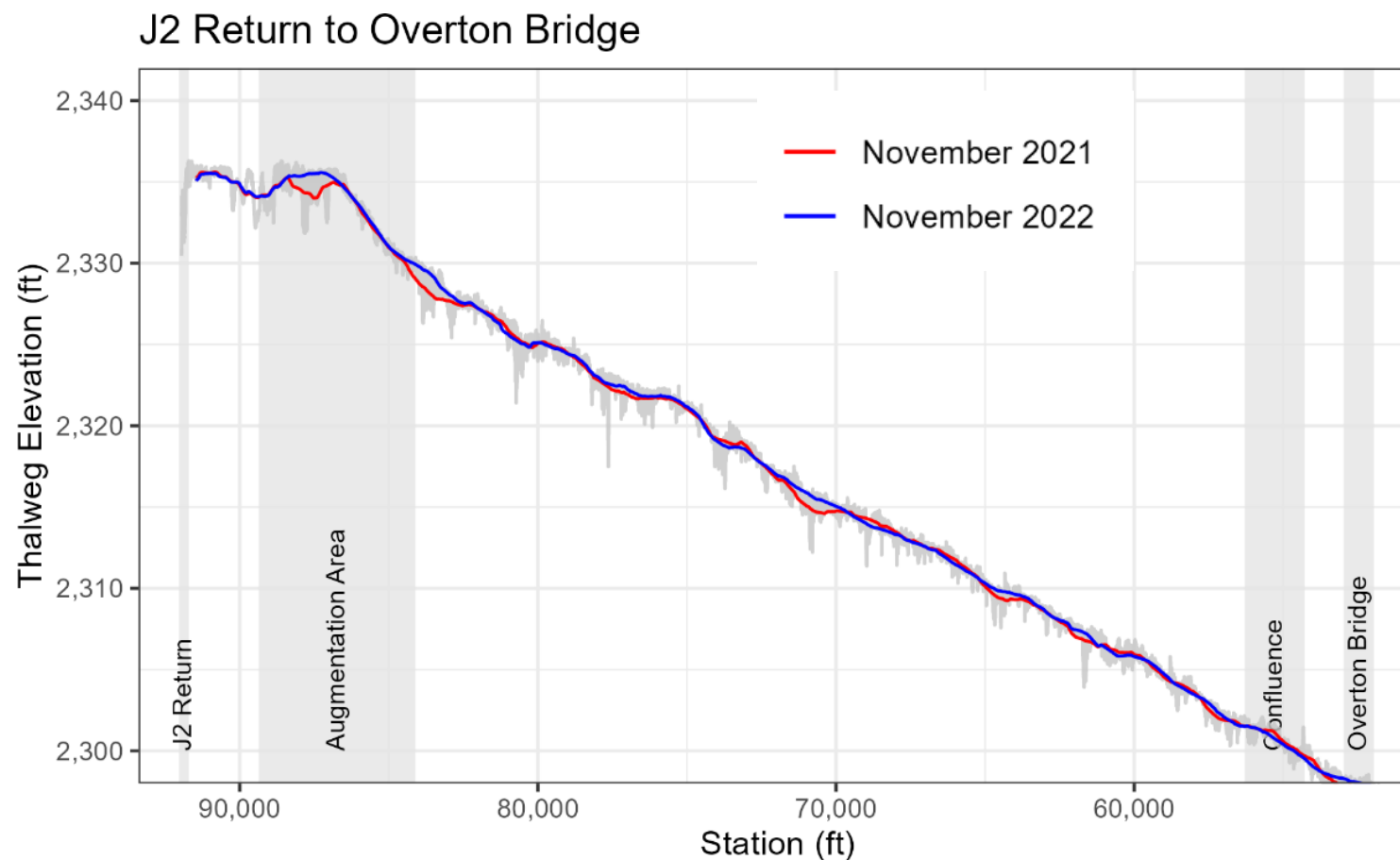
2024 Assessment

- Incision and narrowing continue to progress downstream towards Cottonwood Ranch habitat.
- The rate of progression has been slower than expected. Future rates will depend on flow and sediment conditions.
- Augmentation decreased bed erosion in the J2 Return Channel by ~ 50%, indicating it can successfully slow and counteract incision.
- Frequency and magnitude of recommended augmentation are still open discussions where the answers depend somewhat on goals and risk tolerance.

2022 Data Update

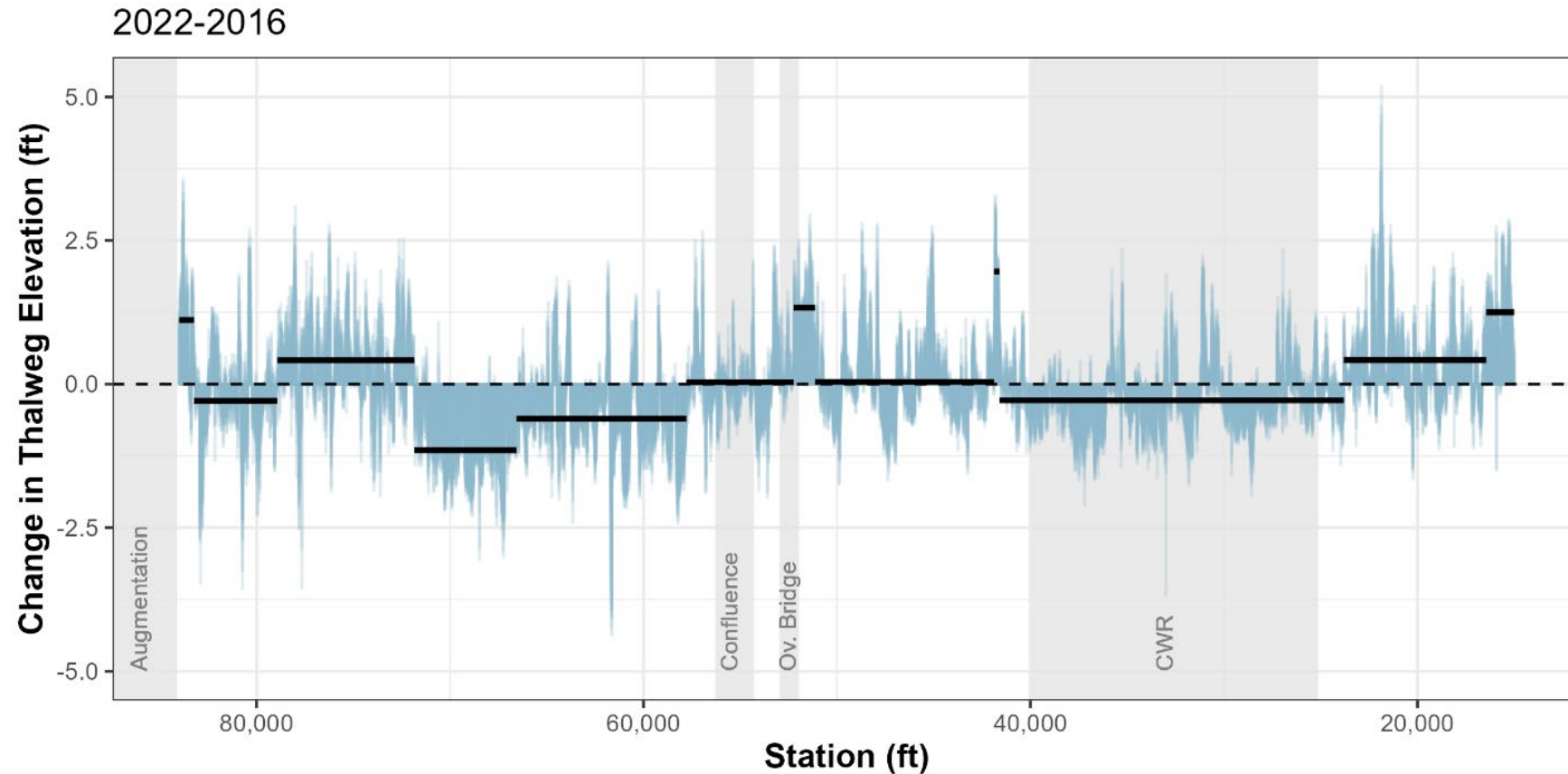


Driest year since augmentation began



Several low-elevation areas (Stations 96,000, 70,000)
have seen aggradation over the past year.

2022 Data Update



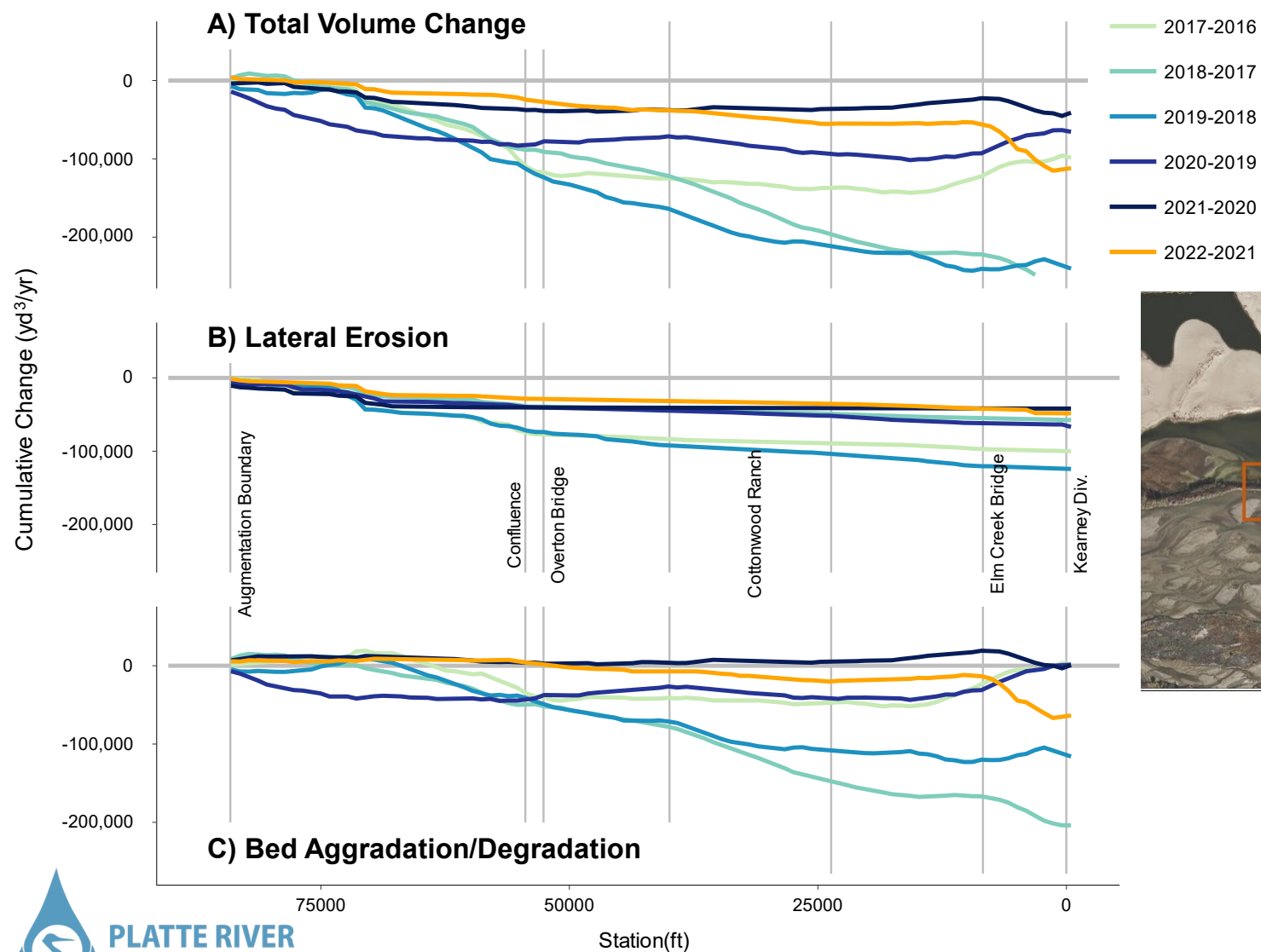
2016–2022 Thalweg Changepoint Analysis results. Compared to the 2016 – 2021 analysis, there are 3 new areas of positive change.

2022 Data Update

With the inclusion of 2022 data, we observed an overall decrease in each category of erosion (lateral, bed, and total) compared to the pre-augmentation period.

	Augmentation Boundary to Overton Bridge (yd ³ /yr)		Overton Bridge to KCD (yd ³ /yr)	
	Pre-Augmentation	Post-Augmentation	Pre-Augmentation	Post-Augmentation
Lateral	-63,000	-59,800	-154,400	-40,200
Bed	-59,700 to -42,000	-18,300	-46,100 to 23,700	-16,300
Total	-122,700 to -105,000	-78,100	-200,400 to -130,700	-56,600

2022 Data Update



Levee Breach at Downstream End



November 2021



November 2022



2024: Decision on Augmentation Pending GC Input


2024 Augmentation

J-2 Return

Jeffrey Island

Plum Creek Complex

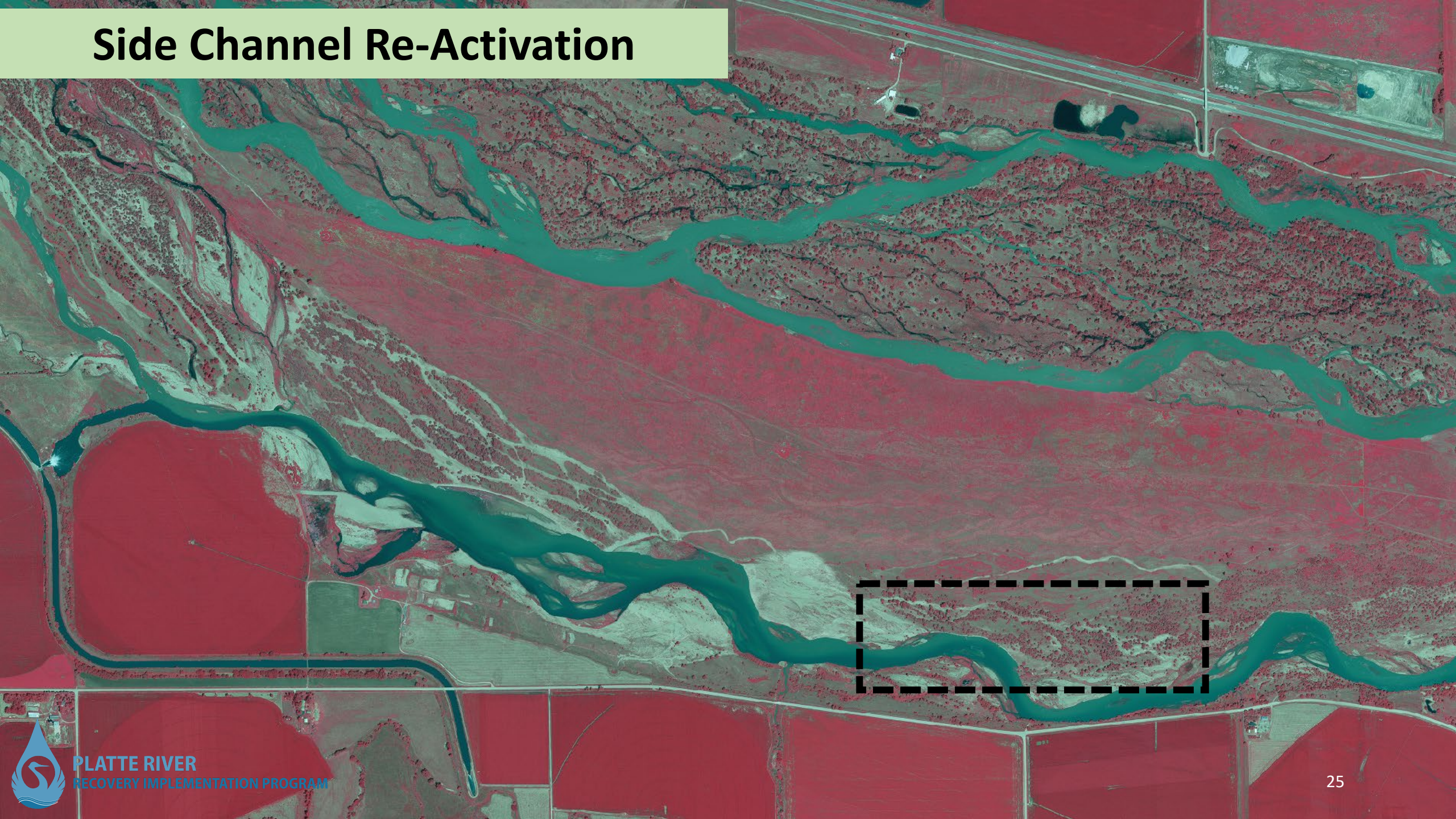
- Prioritize learning or management?
- Target Incision at J-2 return or further downstream?

An aerial photograph of a river system. A large, light-colored sandbar or gravel bar is prominent in the lower right, where the river has shifted its course. The river flows from the upper left towards the lower right. The surrounding landscape is a mix of brown, dry-looking fields and green agricultural fields. There are some clusters of trees along the riverbanks.

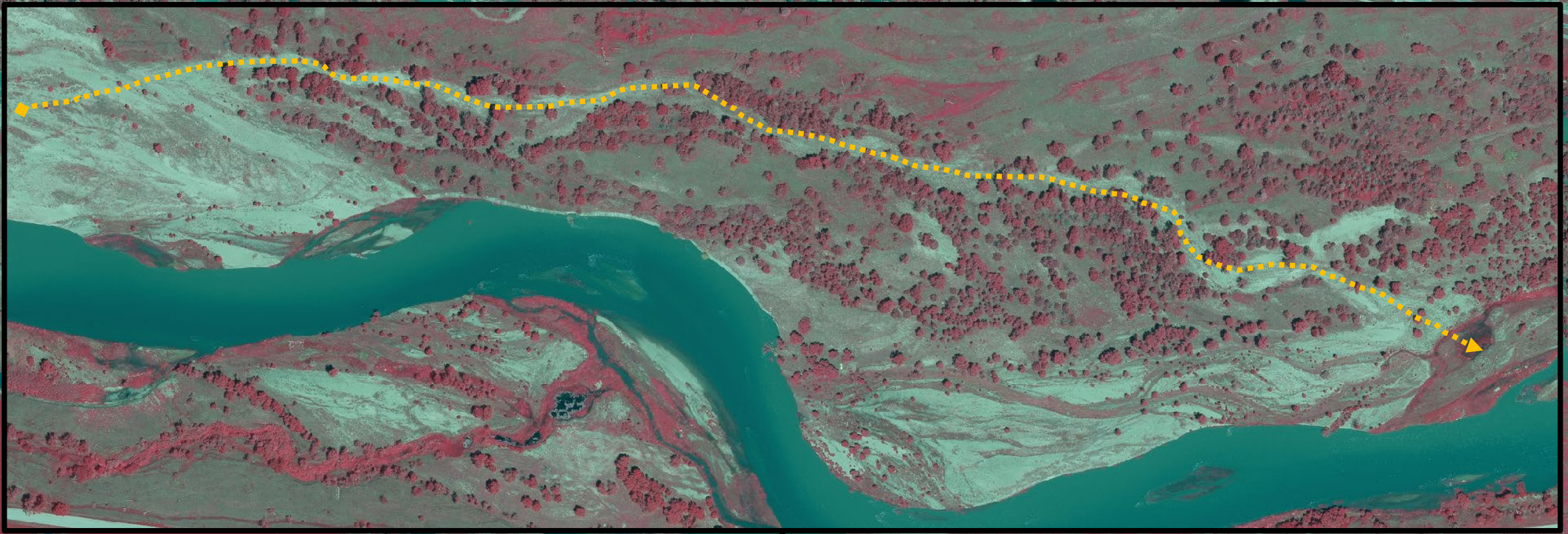
Investigation of passive solutions



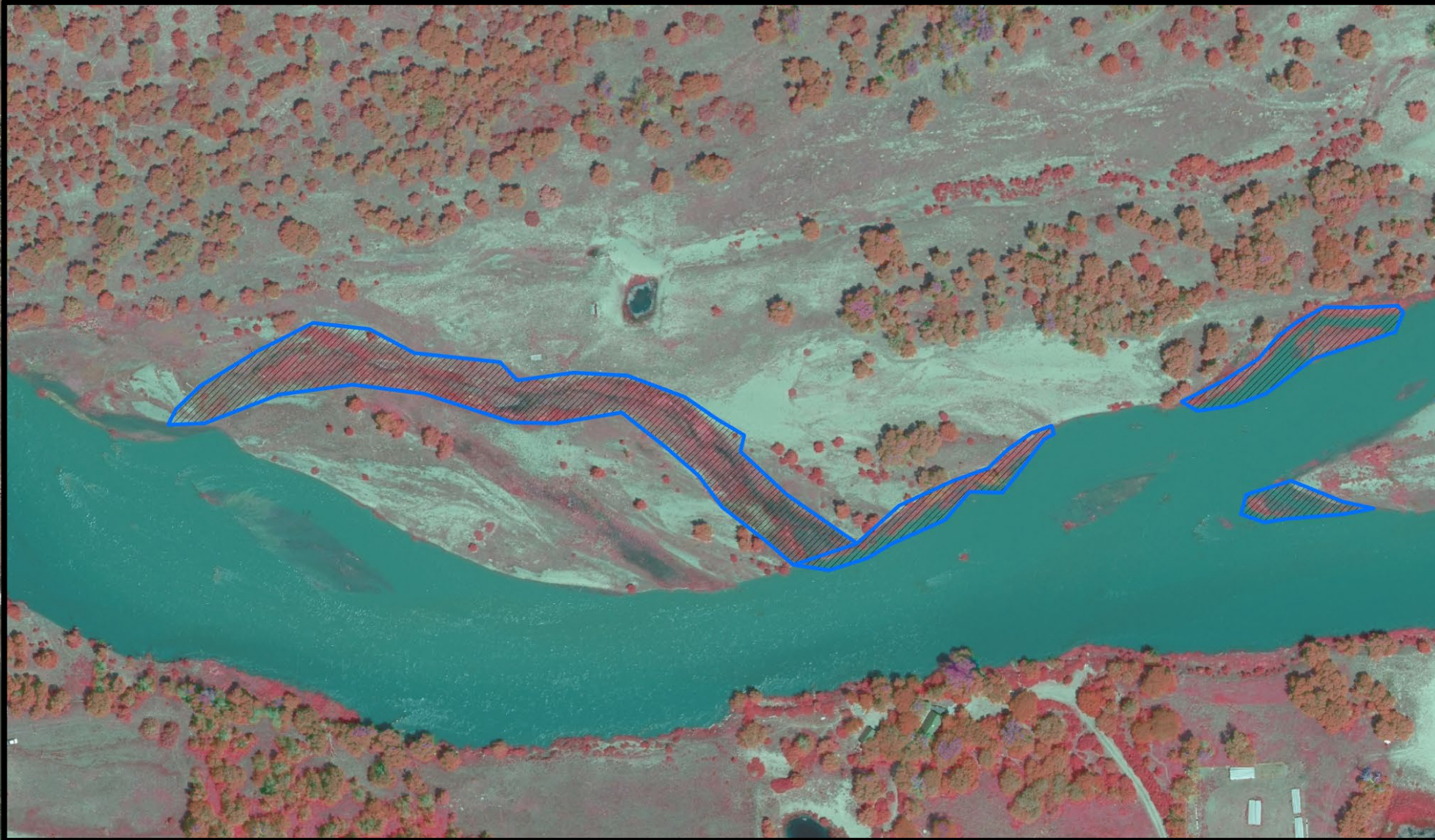
Side Channel Re-Activation



Side Channel Re-Activation



Vegetation Management



PLATTE RIVER
RECOVERY IMPLEMENTATION PROGRAM

Estimating “Annual Augmentation Need”

Sediment Input Volumes

Sediment Loss Volume

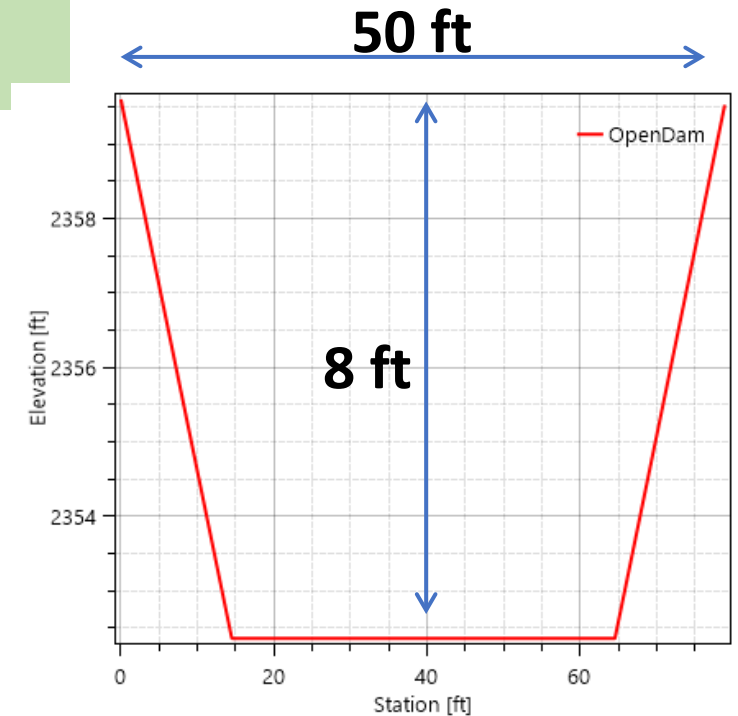
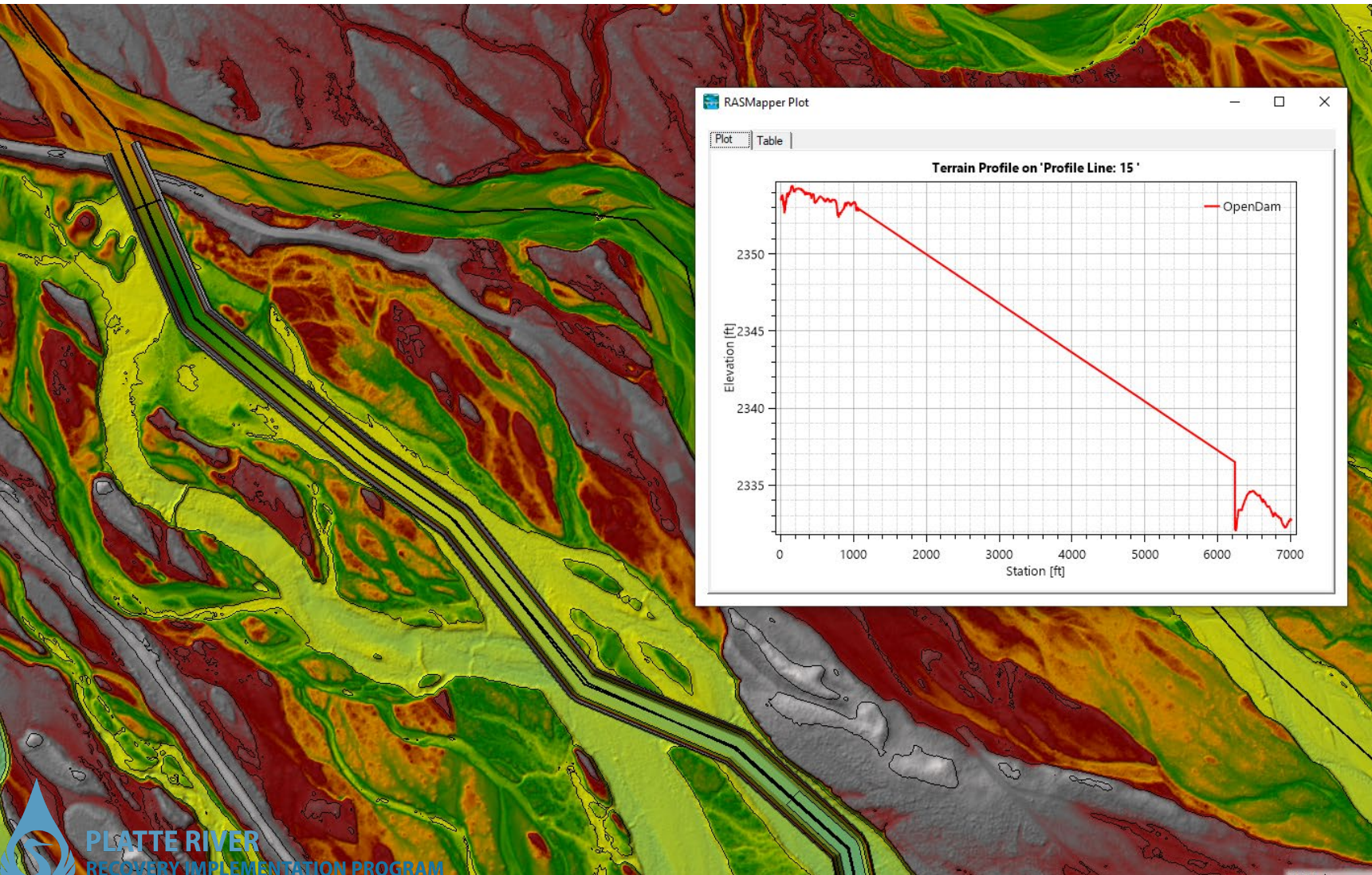
Breakthrough + Lateral Erosion + Augmentation + Bed Erosion \approx Total Sediment Transported

Setting desired Bed Erosion = 0

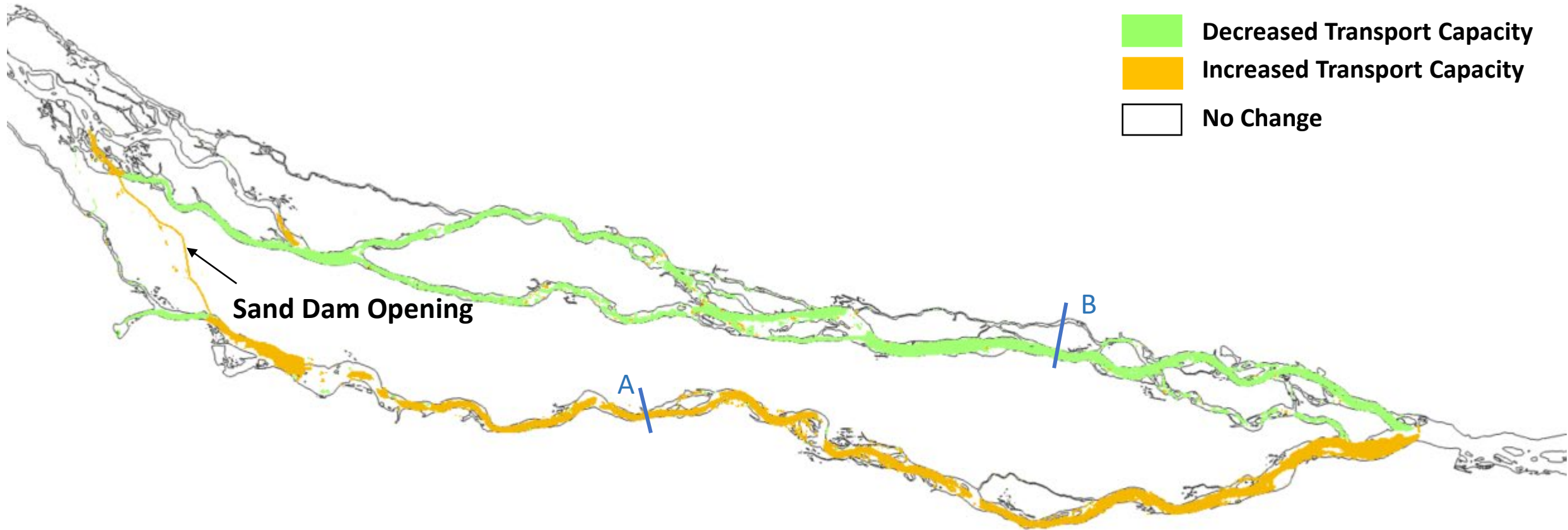
Total Sediment Transported - Breakthrough - Lateral Erosion \approx Est. Augmentation Need

Sand Dam Pre-feasibility Analysis Plan:

1. HEC-RAS 2D model w/ and without sand dam modification
2. Observe overall change in sediment transport capacity

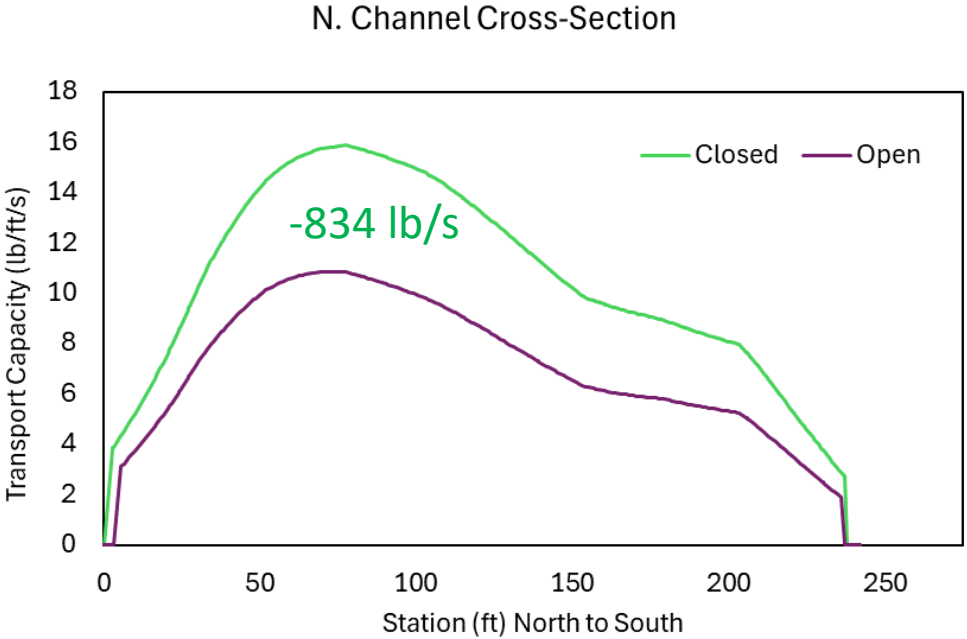
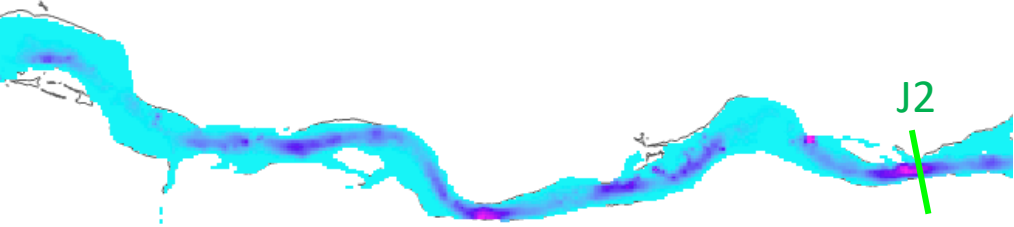
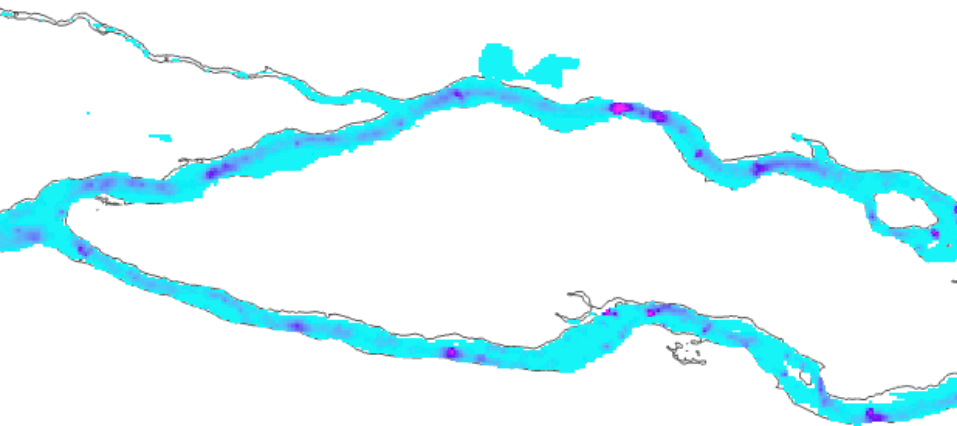


Sand Dam Pre-feasibility Analysis

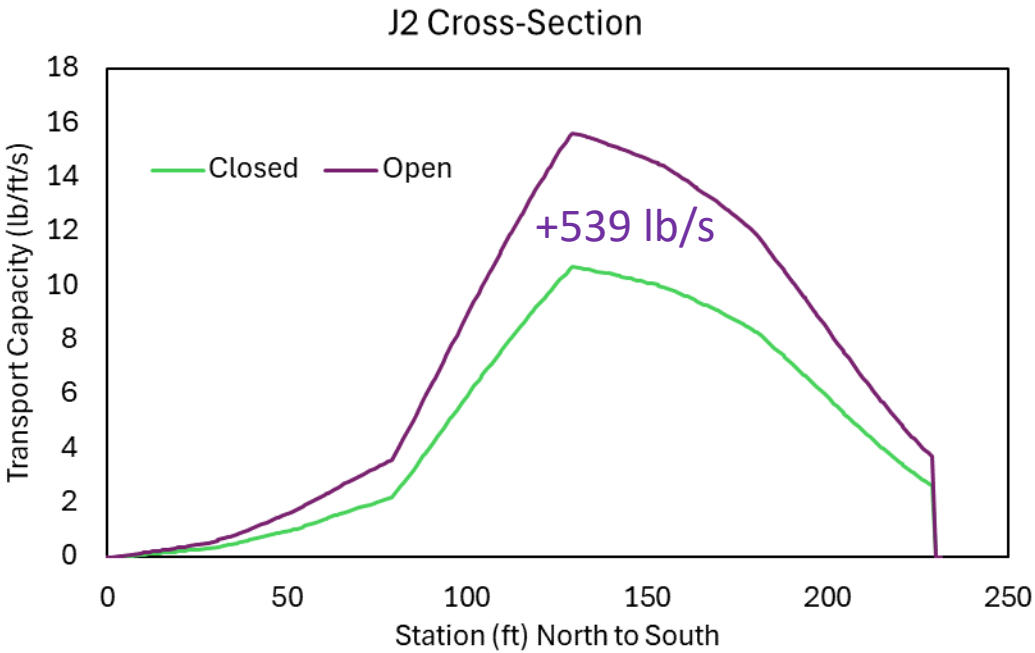
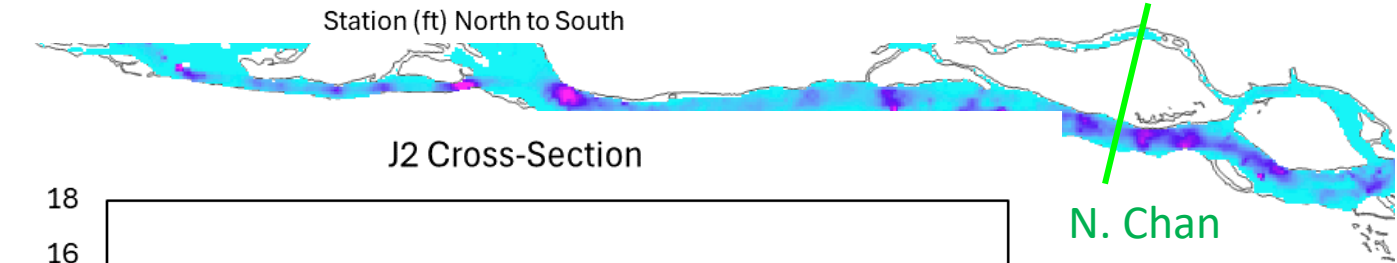


If we sum the areas of decrease and areas of increase, we find a **net decrease in sediment transport capacity**.

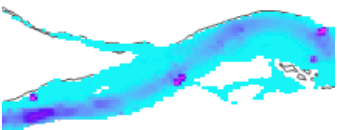
Sand Dam Pre-feasibility A



Cell-Face Total Sediment
Transport Load Capacity
(lb/ft/s)



N. Chan



Questions?

