



PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM

Sediment Augmentation – January 2024 TAC Meeting

There will be two discussion items for the upcoming TAC meeting regarding sediment augmentation. First, ***the TAC will discuss where and how much sediment to augment next year.*** As shown in Figure 1, currently permitted locations include Jeffreys Island (red) and Plum Creek (yellow). We visited both locations during the October TAC/ISAC meeting and there was interest in using the Plum Creek sites for the first time as they are closer to the habitat we are trying to maintain at Cottonwood Ranch. One of the principal weaknesses of the Program's evaluation of effectiveness of sediment augmentation is the lack of topobathymetric LiDAR information on rate of incision and progression downstream prior to full-scale augmentation for comparison. Augmentation at Plum Creek allows quantification of rate of incision and downstream progression below Jeffreys without augmentation. Unfortunately, permitted sites at Plum Creek overlap with 28 of 52 phragmites patches that are currently being studied to address Phragmites response to river flow and herbicide application ([Extension Science Plan Big Question #2, pg 50](#)), so potential tradeoffs in learning need to be weighed. The other variable at play for next year is augmentation volume, which could be increased or decreased from our typical annual volume of 40,000 to 60,000 yd³. Our location and volume choices provide options for 2024 augmentation. **Attachment A** contains preliminary designs and cost estimates for three of these scenarios to help with our discussion. Given the information presented for making a plan for augmentation in 2024, the TAC should also discuss ideas for a 3-5 year plan for sediment augmentation in the future.

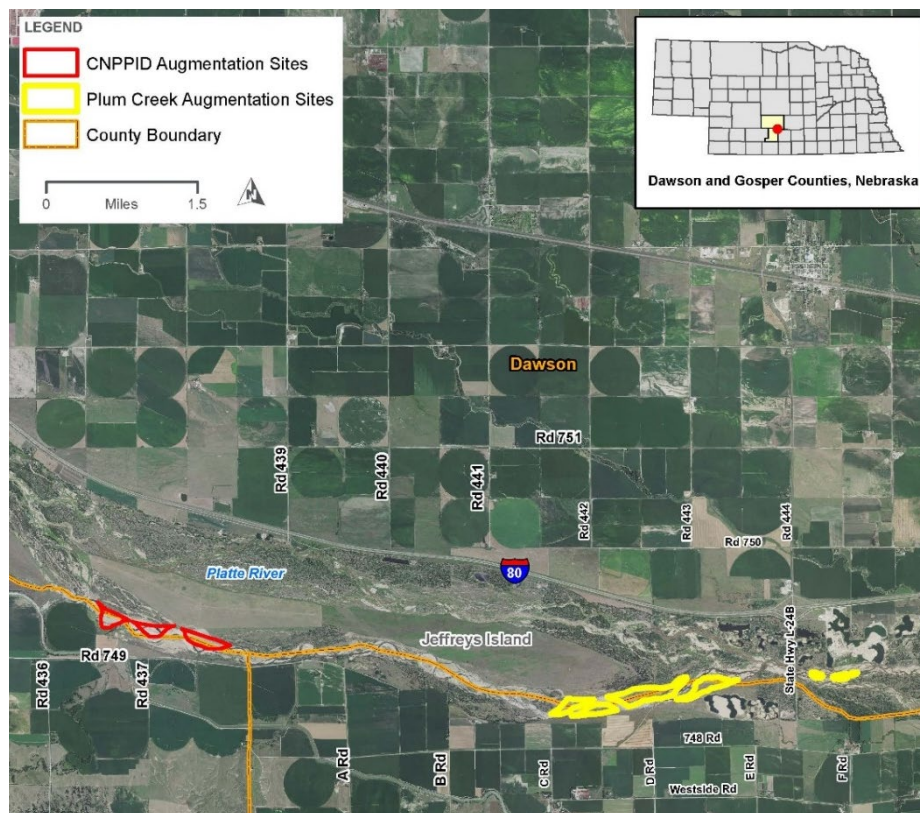
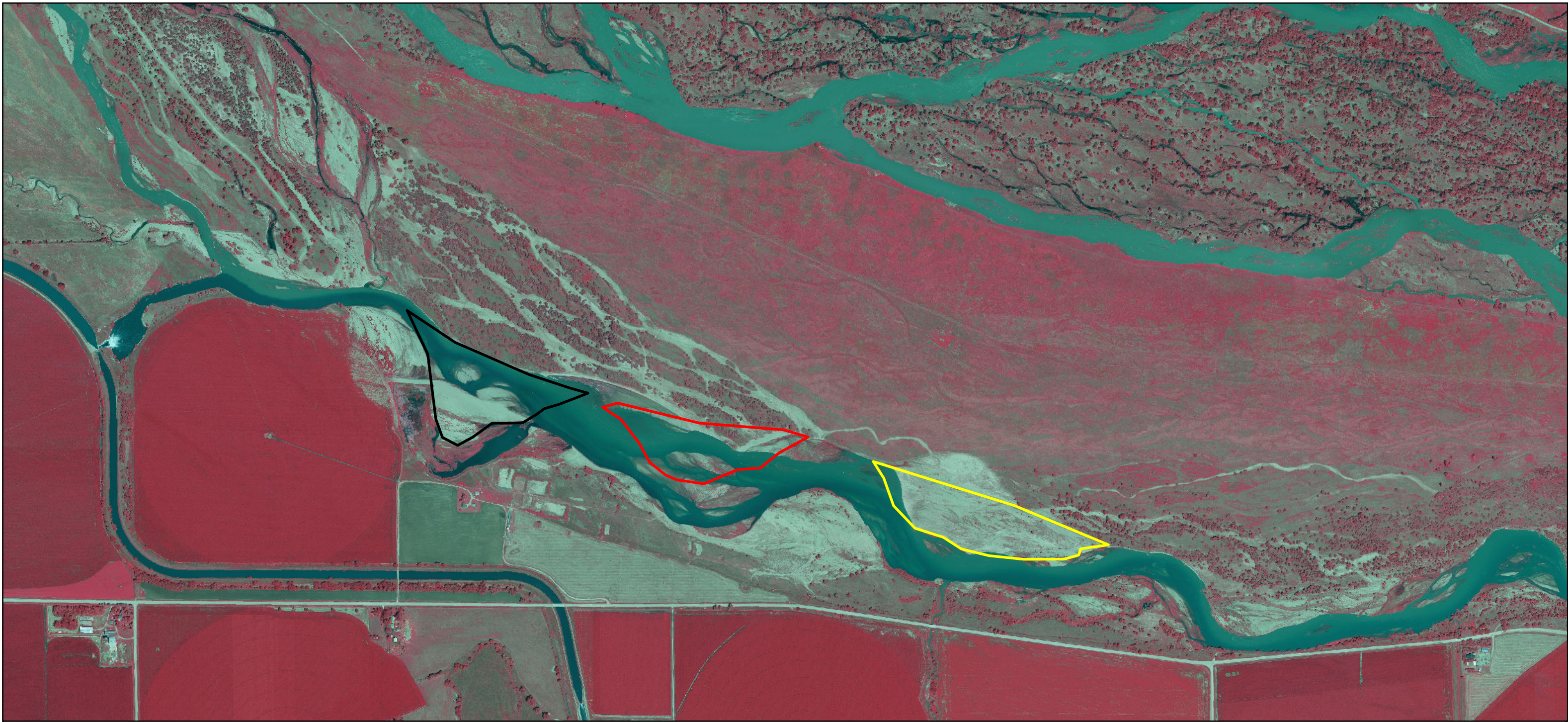


Figure 1. Permitted augmentation locations.

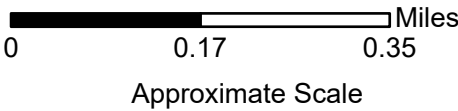
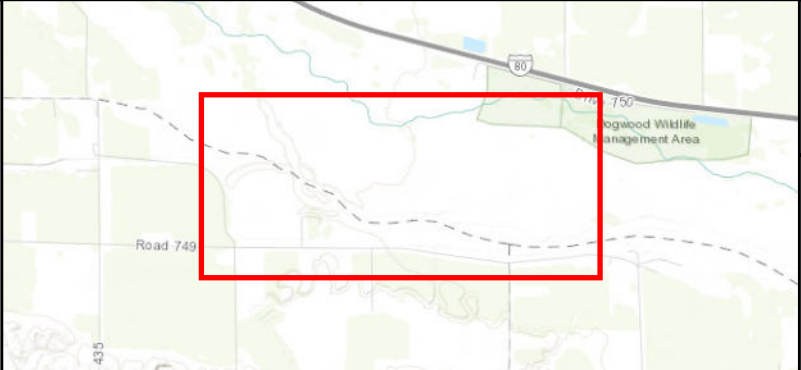
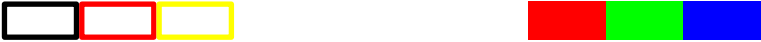


The second item for TAC discussion will concern how we could more effectively and sustainably augment sediment in the future. There was a lot of good conversation around this topic at the October meeting which helped to generate the ideas in **Attachment B**. ***The EDO is asking the TAC to consider the options presented in Attachment B, suggest additional options of interest, discuss which merit further consideration, and develop a plan for moving forward with those ideas.*** If the TAC decides that options requiring sediment modeling, like 5 and 6 in Attachment B, are of further interest, the EDO suggests an internal pre-feasibility study utilizing the 2D HEC-RAS models that are already being developed for the System Scale Geomorphology and Vegetation Monitoring project. These models should be able to answer some basic questions regarding whether moving flow and sediment from the north channel to the J2 Channel will result in a net loss at Cottonwood Ranch, or other potential impacts to sediment transport capacity. If the TAC agrees that a pre-feasibility study should be conducted, results will be presented at the April TAC meeting at which point members will have more information to decide if these options are viable and merit more detailed study and inclusion in a final RFP. In April of 2024 the TAC will prioritize items for inclusion in a Passive Sediment Augmentation Alternatives Study RFP. The EDO will then draft the RFP for TAC review and recommendation prior to the June GC meeting where we will seek approval by the GC.

Attachment A: Preliminary Designs and Cost Estimates



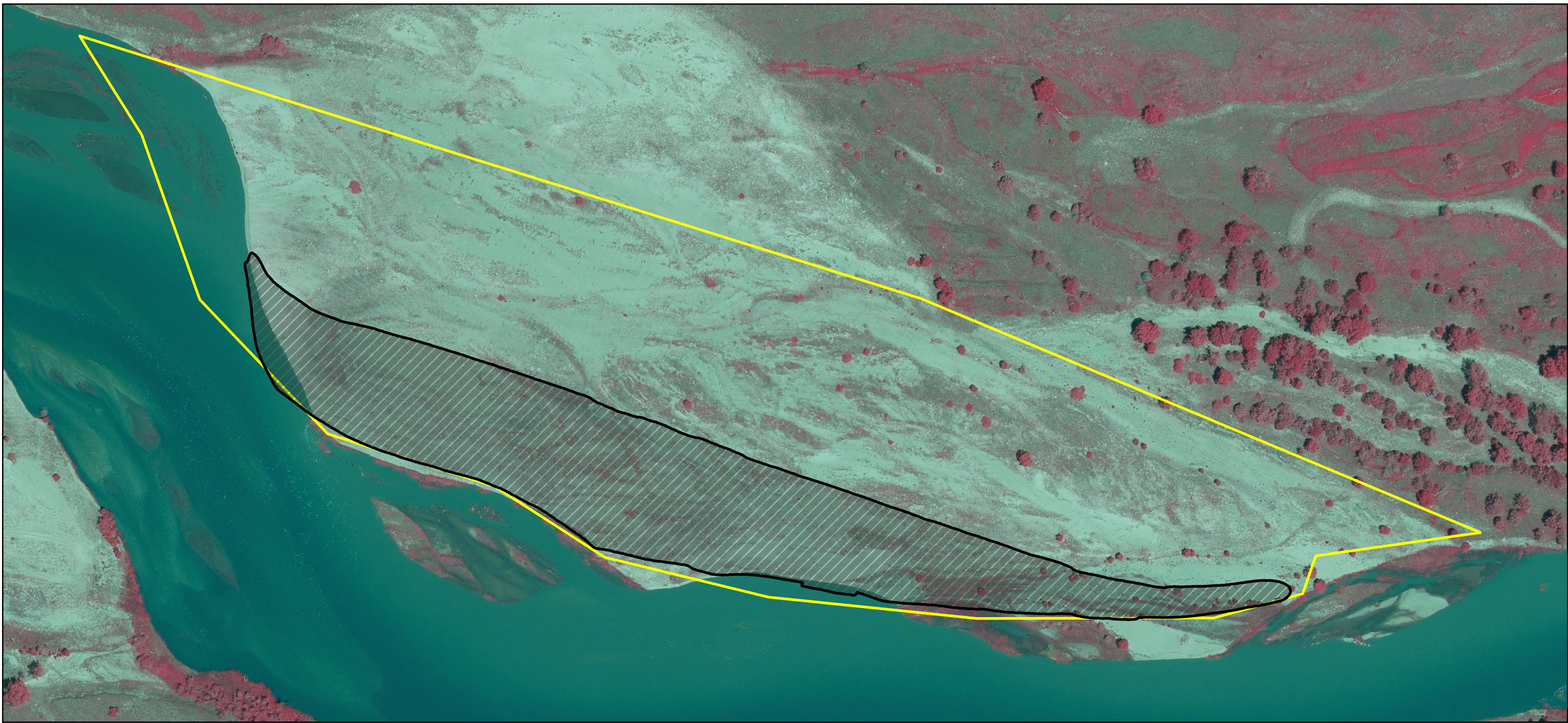
Legend
CNPPID Source Sites July 2023 Imagery



Date: 12 December 2023
Drawn by: Ed Weschler

Figure 2. Permitted Augmentation Sites at Jeffreys Island

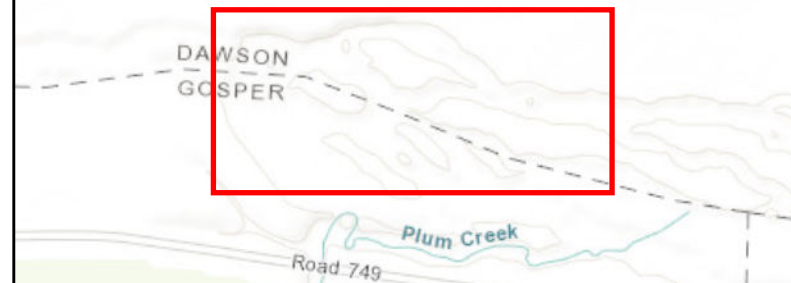
Jeffreys Island, near Overton, NE



Legend

-  Standard Augmentation Footprint
  July 2023 Imagery
- CNPPID Source Sites
 





0 0.03 0.07 Miles

Approximate Scale



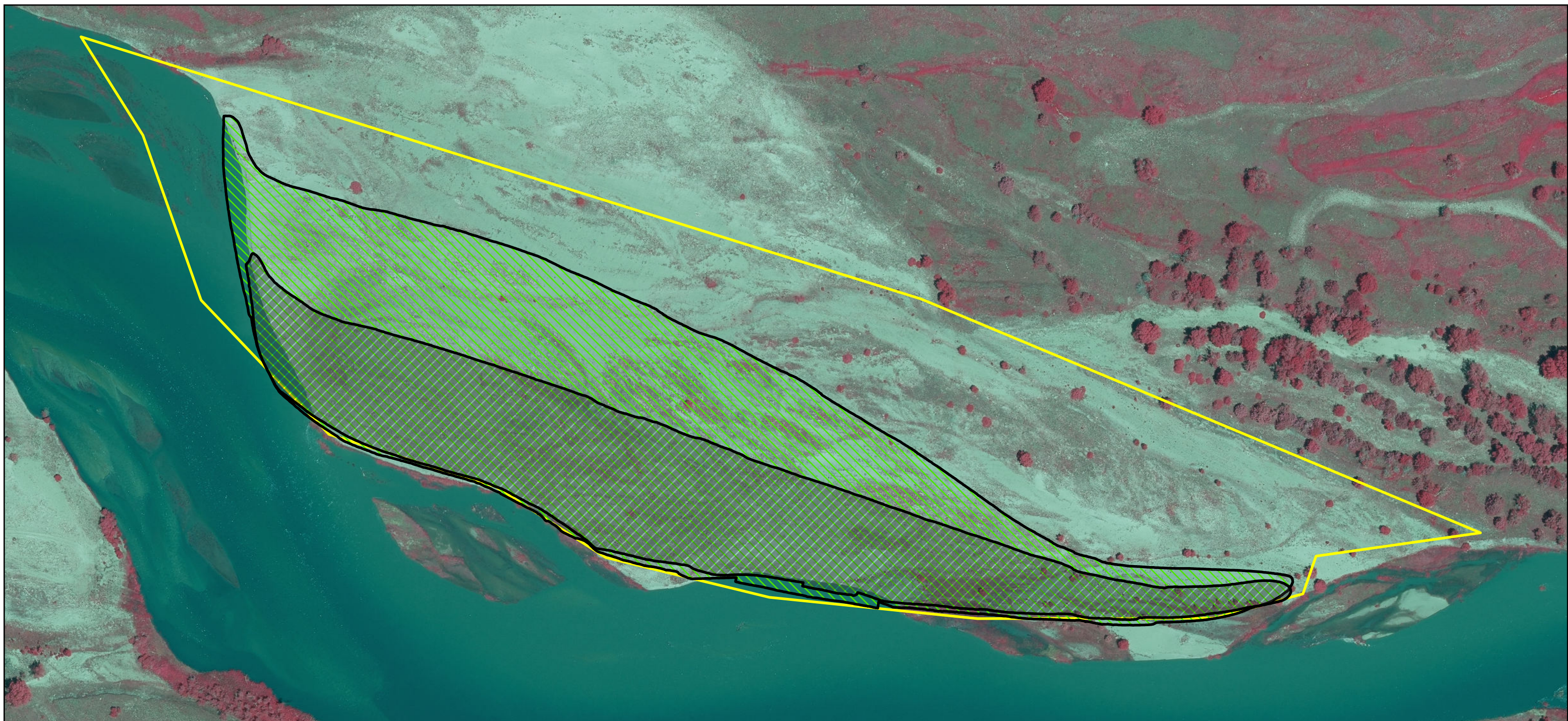
Date: 12 December 2023

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Figure 3. Standard Augmentation at Jeffreys Island

Approximate Augmented Material: 47,000 Cubic Yards

Jeffreys Island, near Overton, NE



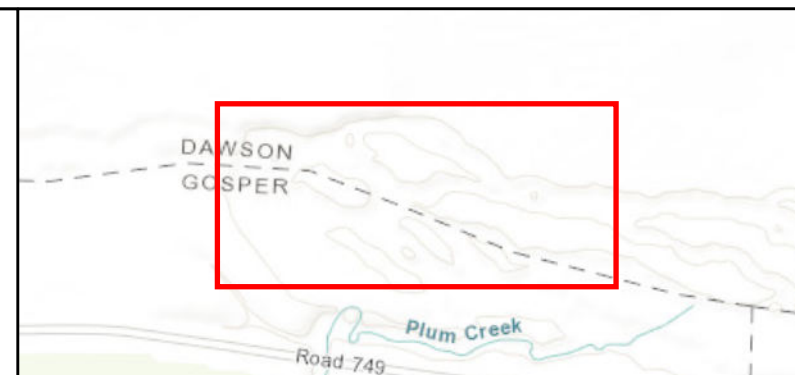
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- Standard Augmentation Footprint
- Doubled Augmentation Footprint

July 2023 Imagery



CNPPID Source Sites



0 0.03 0.07 Miles

Approximate Scale



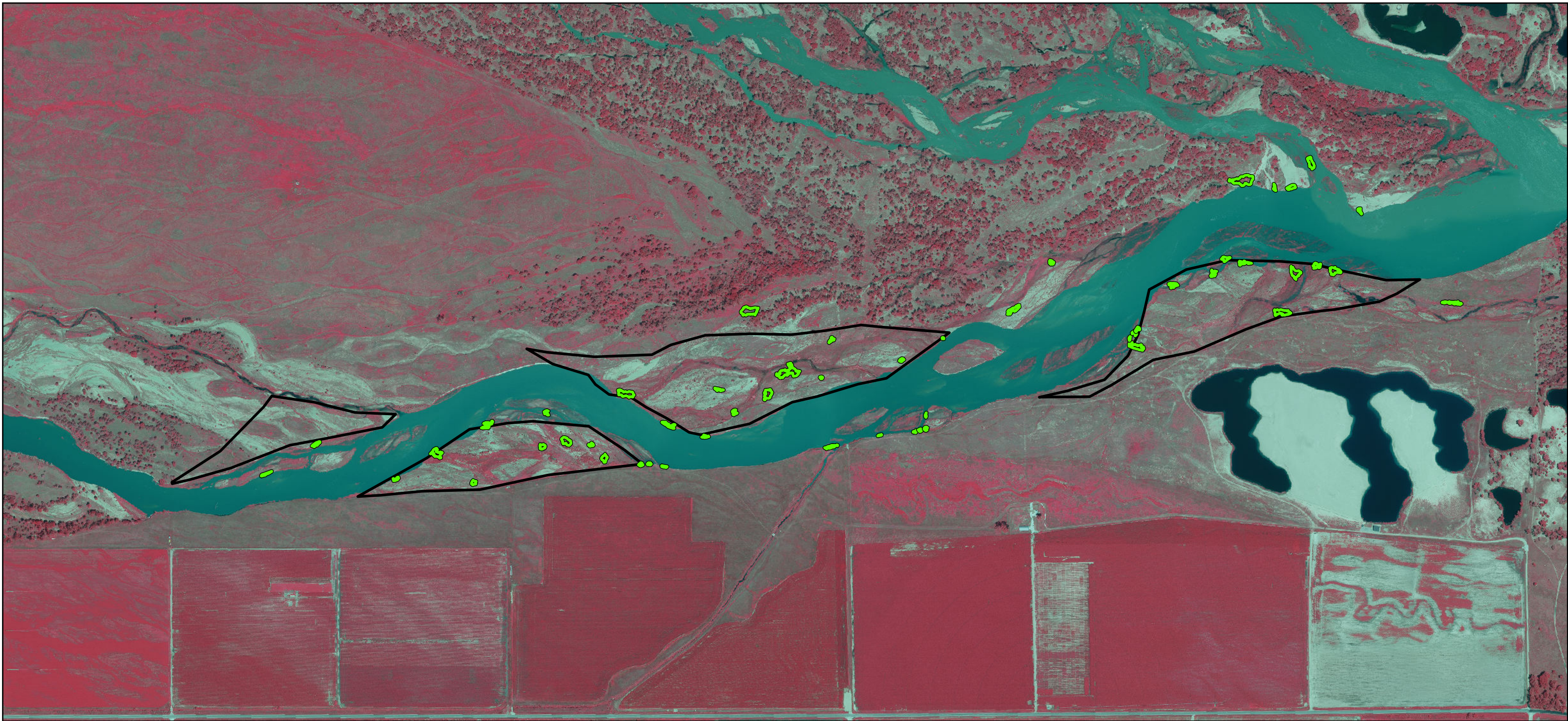
Date: 12 December 2023

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Figure 4. Doubled Augmentation at Jeffreys Island

Jeffreys Island, near Overton, NE

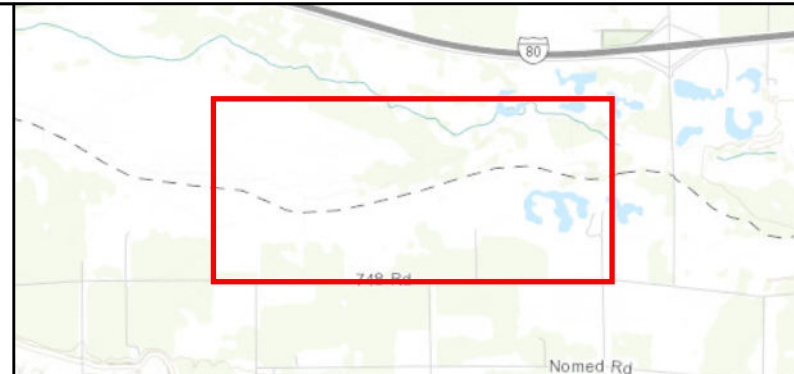
Approximate Augmented Material: 96,000 Cubic Yards



Legend

— Phragmites Patches

CNPPID Source Sites July 2023 Imagery



0 0.15 0.3 Miles

Approximate Scale

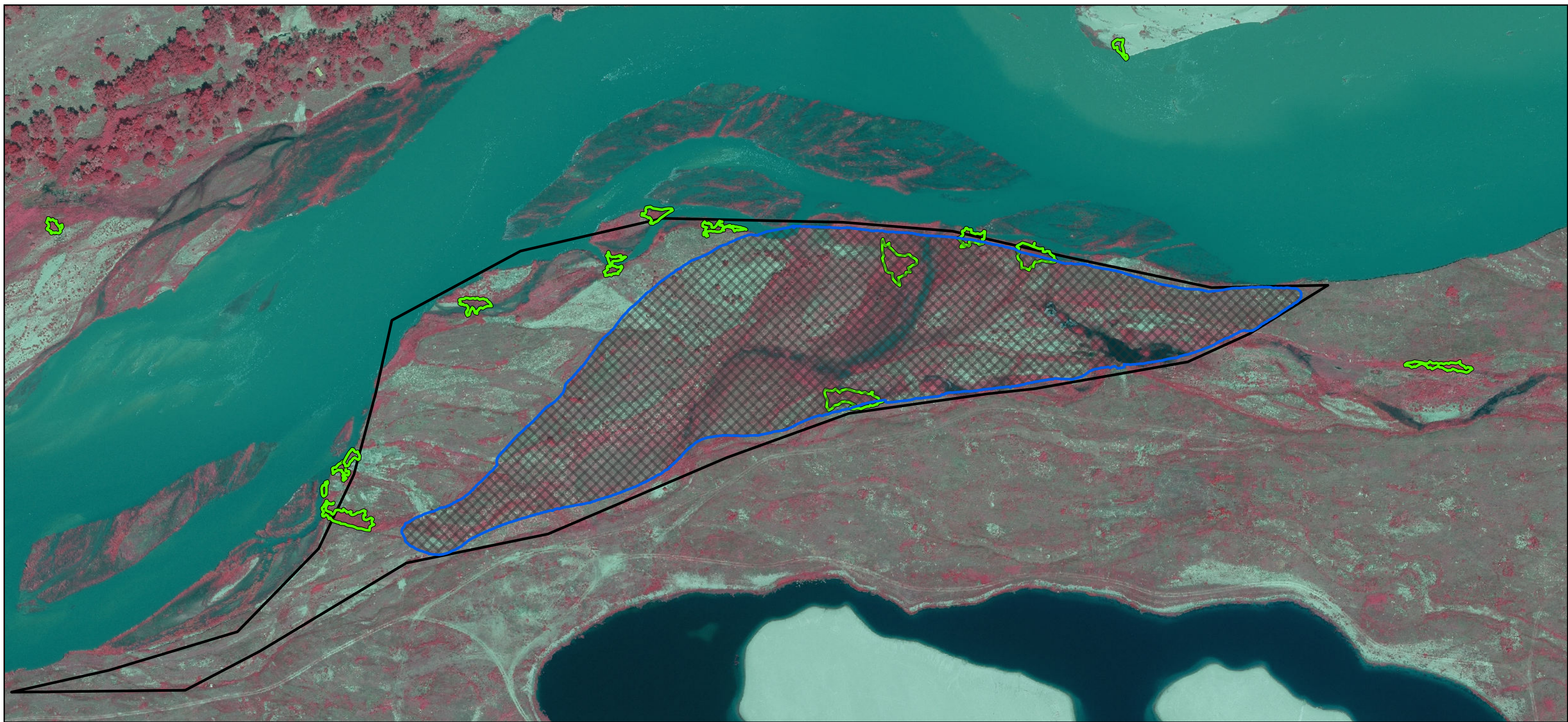


Date: 12 December 2023

Drawn by: Ed Weschler

Figure 5. Permitted Augmentation Sites at Plum Creek

Plum Creek Complex, near Overton, NE



Legend

 Plum Creek Augmentation Footprint

 Phragmites Patches

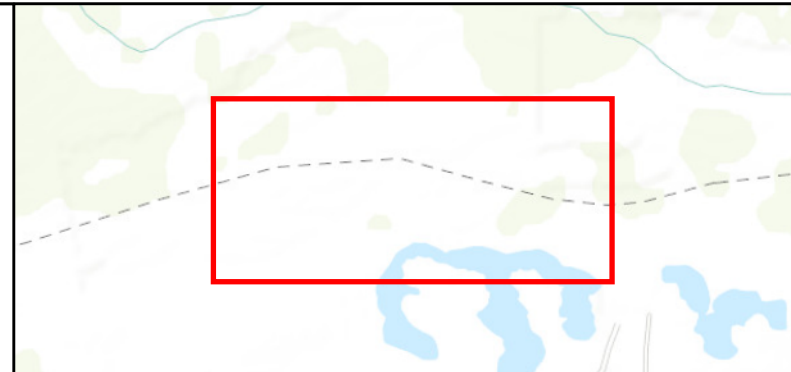
CNPPID Source Sites



July 2023 Imagery



PLATTE RIVER
RECOVERY IMPLEMENTATION PROGRAM



0 0.04 0.09 Miles

Approximate Scale



Date: 12 December 2023

Drawn by: Ed Weschler

Figure 6. Augmentation at Dyer Property

Plum Creek Complex, near Overton, NE

Approximate Augmented Material: 44,000 Cubic Yards

Item	Description	Unit	Qty.	Unit Price	Extended Total
1	Normal Augmentation - Jeffreys	CY	47,000	\$ 4.04	\$ 189,880
2	Doubled Augmentation - Jeffreys	CY	96,000	\$ 4.04	\$ 387,840
3	Normal Augmentation - Plum Creek	CY	44,000	\$ 4.04	\$ 177,760

Normal Augmentation - Plum Creek	
Pros	Cons
Augmentation closer to Cottonwood Ranch	Disrupts previous sediment augmentation experiments
Allows evaluation of upstream reach incision in absence of augmentation	Likely disrupts Phragmites study patches (Preliminary Design will disturb 4-5)
May require less volume due to lateral erosion upstream	---
Expected Outcome	
Upstream erosion may begin again. Near project site sediment will fill in previously eroded areas along the channel. Incision will not progress downstream of Station 70,000. Possible that results may be visible at Cottonwood Ranch.	

Doubled Augmentation - Jeffreys Island	
Pros	Cons
Provides continuity with previous sediment augmentation experiment	No augmentation at incision zone
Learning Potential with increased volume	Far upstream from Cottonwood Ranch
Unlikely to disturb Phragmites study patches	\$\$\$
Expected Outcome	
Sediment will continue filling in previously eroded areas along the channel. Incision will not progress. No result will be visible at Cottonwood Ranch.	

Attachment B: Possible Actions for post-2024 Augmentation

#	Idea	Pro	Con	Analysis needed
1	Continue mechanical augmentation	Has been shown to decrease bed erosion on J2 channel.	Annual project.	Continued monitoring.
2	Use lateral erosion volumes to predict the J2 channel sediment deficit on a yearly basis	Helpful in dialing in necessary volume. Save money in years when deficit is lower.	Estimate would be 1 year delayed due to LiDAR availability.	Continued monitoring.
3	Encourage lateral erosion via vegetation management, disking, etc. on north and south channels	May reduce the amount of mechanical earthwork required to add sediment to the channel.	Uncertain yield.	Create a work plan or experimental setup. Conduct and monitor.
4	Reconnect the north channel to its upstream sediment supply. (Diversion modification at Dawson Cozad, or others, transport of dredge material with EA water)	Reduce north channel and AHR sediment deficit at source. No annual project.	No reduction to J2 channel deficit. Effects would be gradual, long-term.	Review of current structures and operating practices, data collection and possible sediment modeling.
5	Recruit sediment and flow from the north channel to the J2 channel via the sand dam or breakthrough channel	Hydraulic rather than mechanical conveyance. No annual project.	High up-front cost, potential for an overall decrease to sediment load at CWR or other negative geomorphic affects, structural stability concerns, unknown yield.	Pre-feasibility study. 2 or 3D sediment model. Structural analysis.
6	Reconnect side channels in the J2 reach	May reduce the amount of mechanical earthwork required to add sediment to the channel.	Uncertain yield.	Pre-feasibility study. Incorporate into future sediment augmentation designs and monitor.