Walúula Floodplain Restoration Conceptual Design

CTUIR | W2r | ES Check-in Meeting

January 22, 2024

Agenda:

- Work status
- Conceptual designs
- Stakeholder communication facilitation

WOLF WATER RESOURCES

ECOSYSTEM SCIENCES, LLC

RSI Resource Specialists INC.

Work Status

Task 1 – Survey Project Focus Area – survey and updated topo/bathy surface completed

Task 2 – Wetland Determination and Rating – mapping completed

Task 3 – Hydrologic, Hydraulic, Geomorphic, and Biological Assessment – assessments and modeling in progress

Task 4 – Conceptual (15%) Design – three alternative concepts in progress

Task 5 – Stakeholder Communication Facilitation – to be started

Task 1 – Survey Project Focus Area

RSI surveyed river and pond bathymetry and water control structures during Nov 14–17, 2023

RSI created an updated topo-bathy surface for the project area

W2r performed QA/QC on the surface and is using it for Task 3 assessments and hydraulic modeling and Task 4 conceptual designs

Task 2 – Wetland Determination and Rating

W2r evaluated wetland conditions with desktop and field-based indicators

Walúula Floodplain Restoration
Predicted Wetlands

Cowardin classification

- PEM (404.7 acres)
- PSS (113.4 acres)
- OHW
- PUB (133.8 acres)
- PFO (35.2 acres)

0 2,000 4,000 Feet

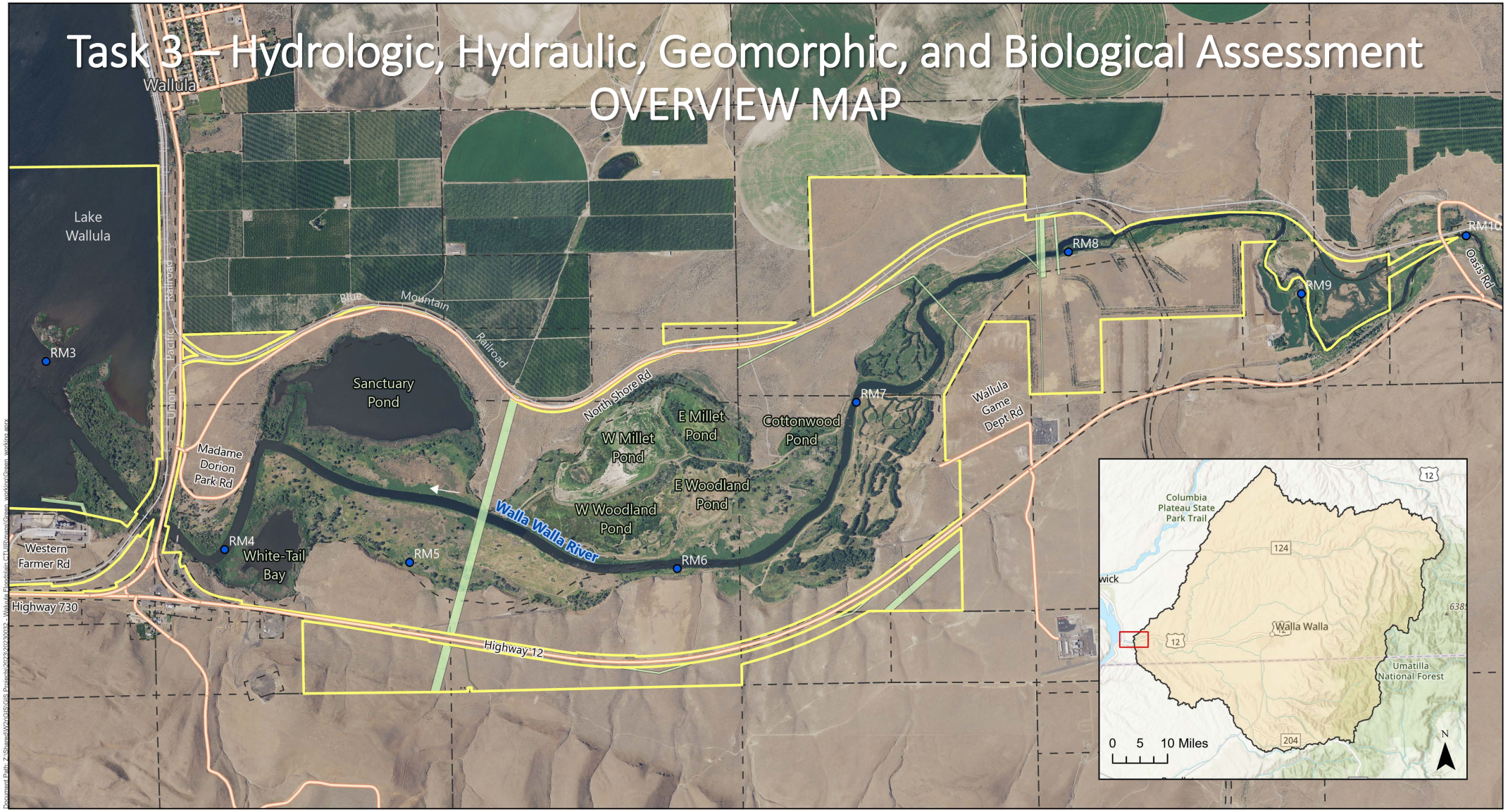
N

Basemap: NAIP imagery (2021)

Task 3 – Hydrologic, Hydraulic, Geomorphic, and Biological Assessment

W2r conducted field reconnaissance Nov 15–17, 2023 and desktop review and synthesis of available information on bio-physical conditions of the project area

Task 3 – Hydrologic, Hydraulic, Geomorphic, and Biological Assessment
OVERVIEW MAP



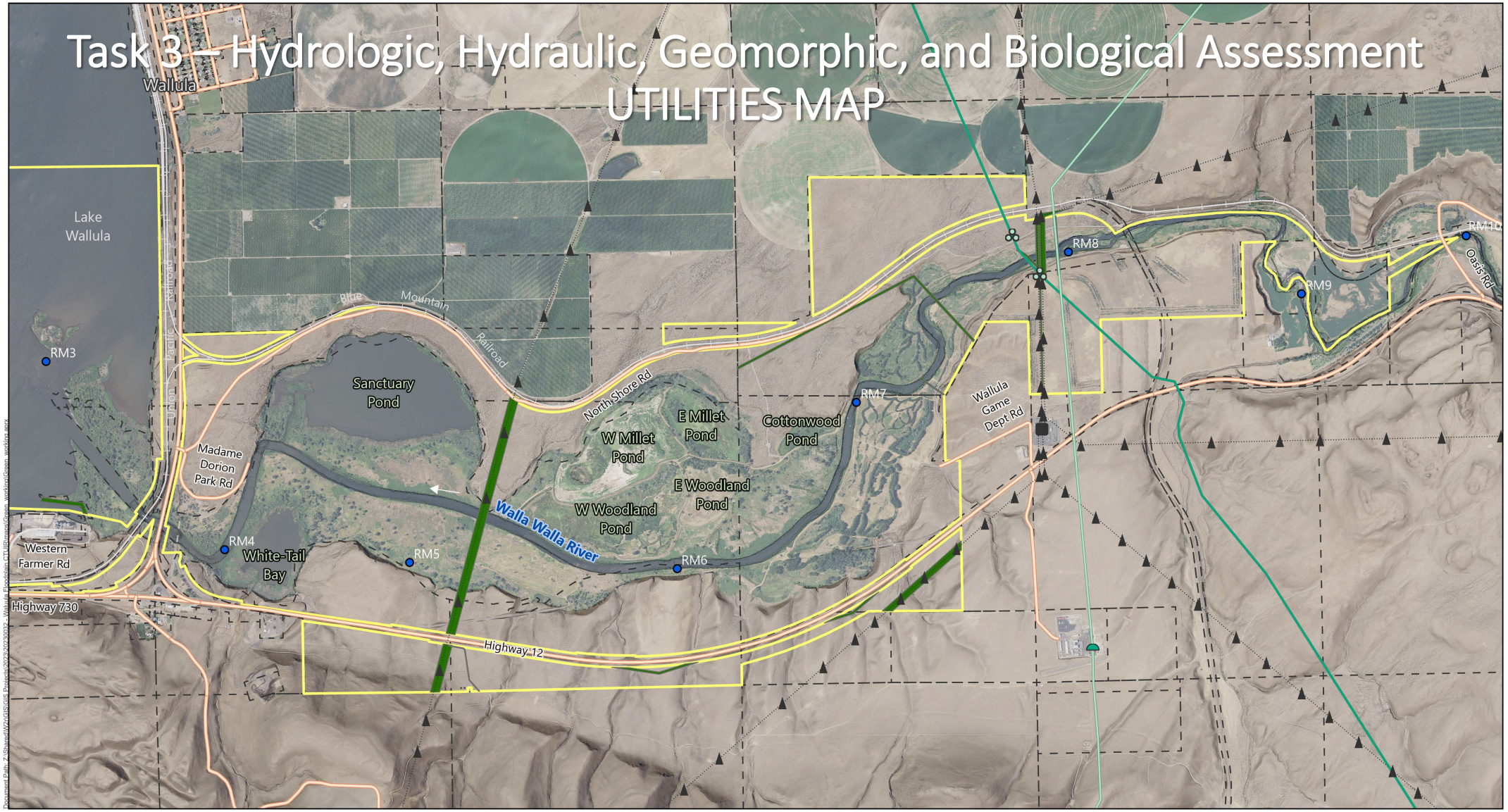
Walúula Floodplain Restoration
Overview Map

NWR Boundary
NWR Easements
Tax lot
Road
Railroad
River mile

0 2,000 4,000 Feet
N

Basemap: NAIP imagery (2021)

Task 3 – Hydrologic, Hydraulic, Geomorphic, and Biological Assessment
UTILITIES MAP



Walúula Floodplain Restoration
Utilities Map

0 2,000 4,000 Feet

N

NWR boundary
NWR ROW easement
Tax lot
Road
Railroad
River mile

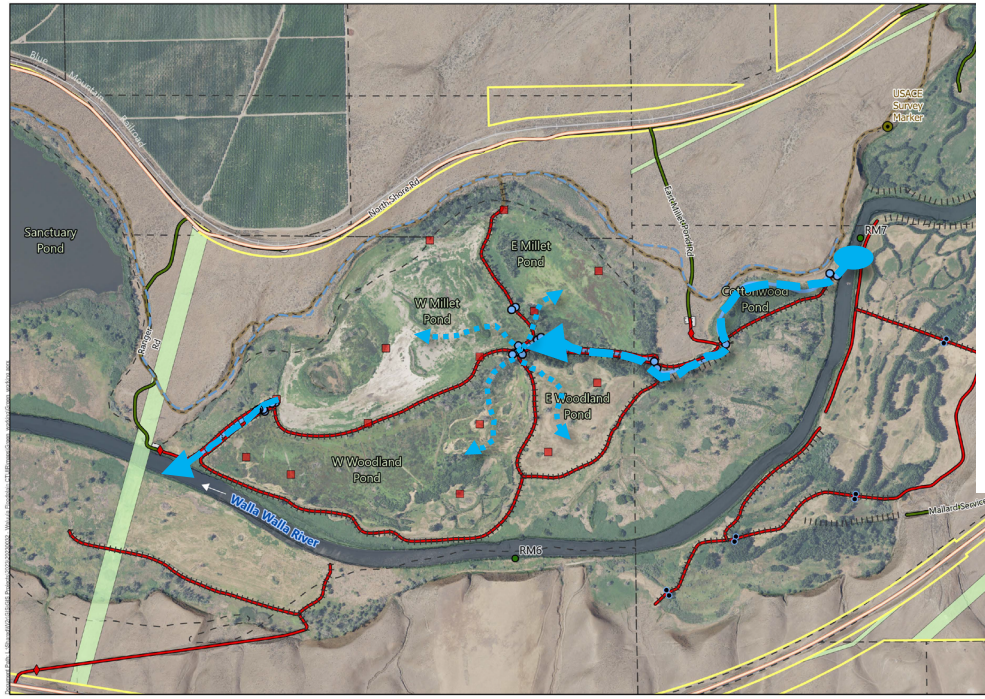
Gas pipeline
Fuel (Multiple)
Natural Gas
Gas Pipeline Substation
Product Pipeline Substation

Electrical power facility
High Voltage Transmission Tower
Power Substation
Electrical powerline

Basemap: NAIP imagery (2021)

Task 3 – Hydrologic, Hydraulic, Geomorphic, and Biological Assessment
FACILITIES MAPS

Seasonal Pumping to Water Duck Hunting Ponds



NWR boundary
NWR easement
NWR hunting blind
NWR other amenity
NWR gate
NWR trail
NWR parking
Tax lot
Berm
Road
Railroad
River mile
Water control canal
Active
Inactive
Water control structure
Active
Inactive
NWR road
Gated
Public

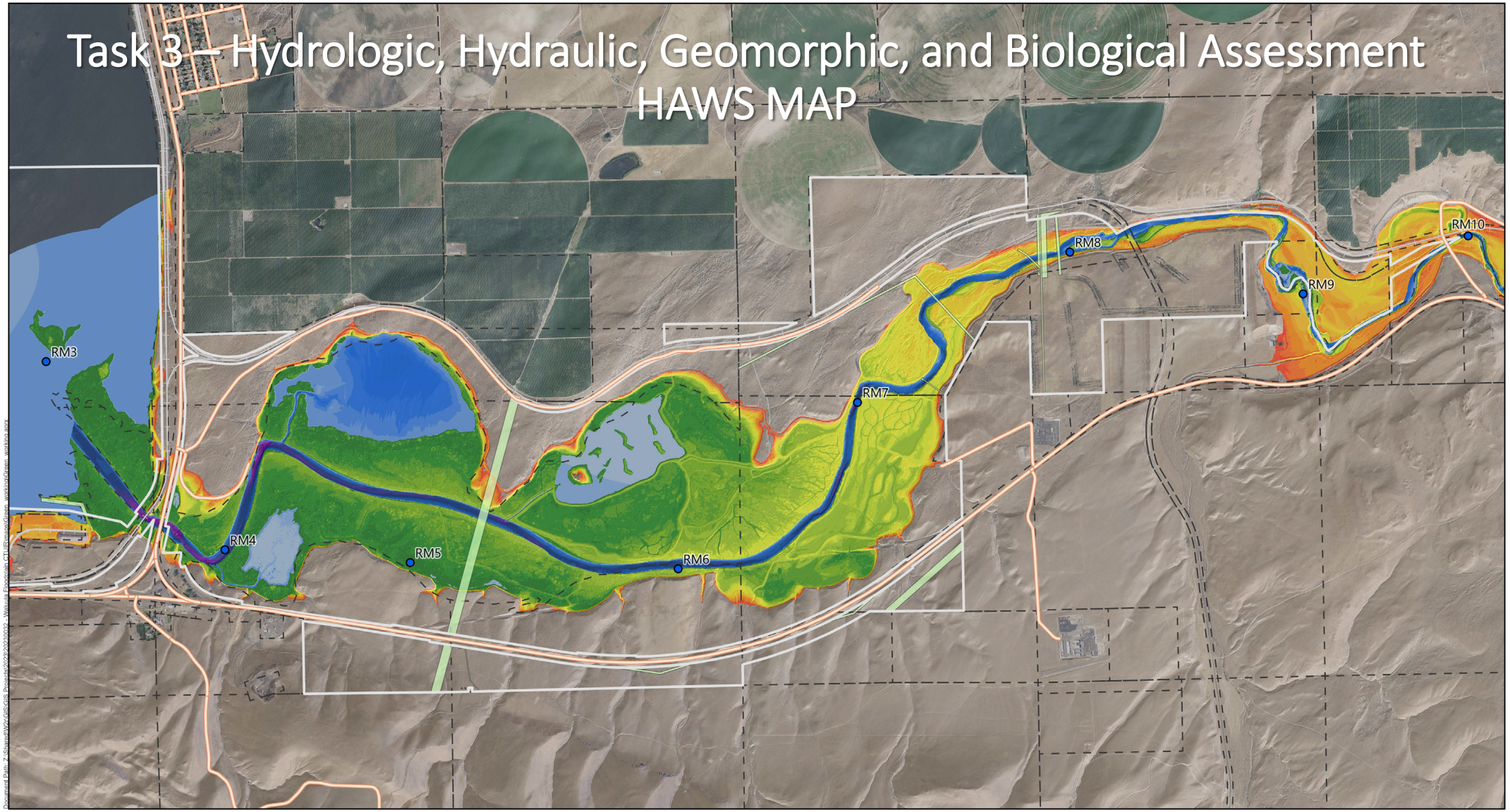
0 500 1,000 Feet

N

Basemap: NAIP imagery (2021)

Walúula Floodplain Restoration
Utilities Map
Page Number: 2

Task 3 – Hydrologic, Hydraulic, Geomorphic, and Biological Assessment
HAWS MAP



0 2,000 4,000 Feet

N

*Height-Above-Water-Surface (HAWS) contours show elevations relative to the water surface associated with the 1.5-year recurrence flood of 1,250 cfs. Topographic/bathymetric data from the 2018 Lidar.

Relative Elevation (ft)*

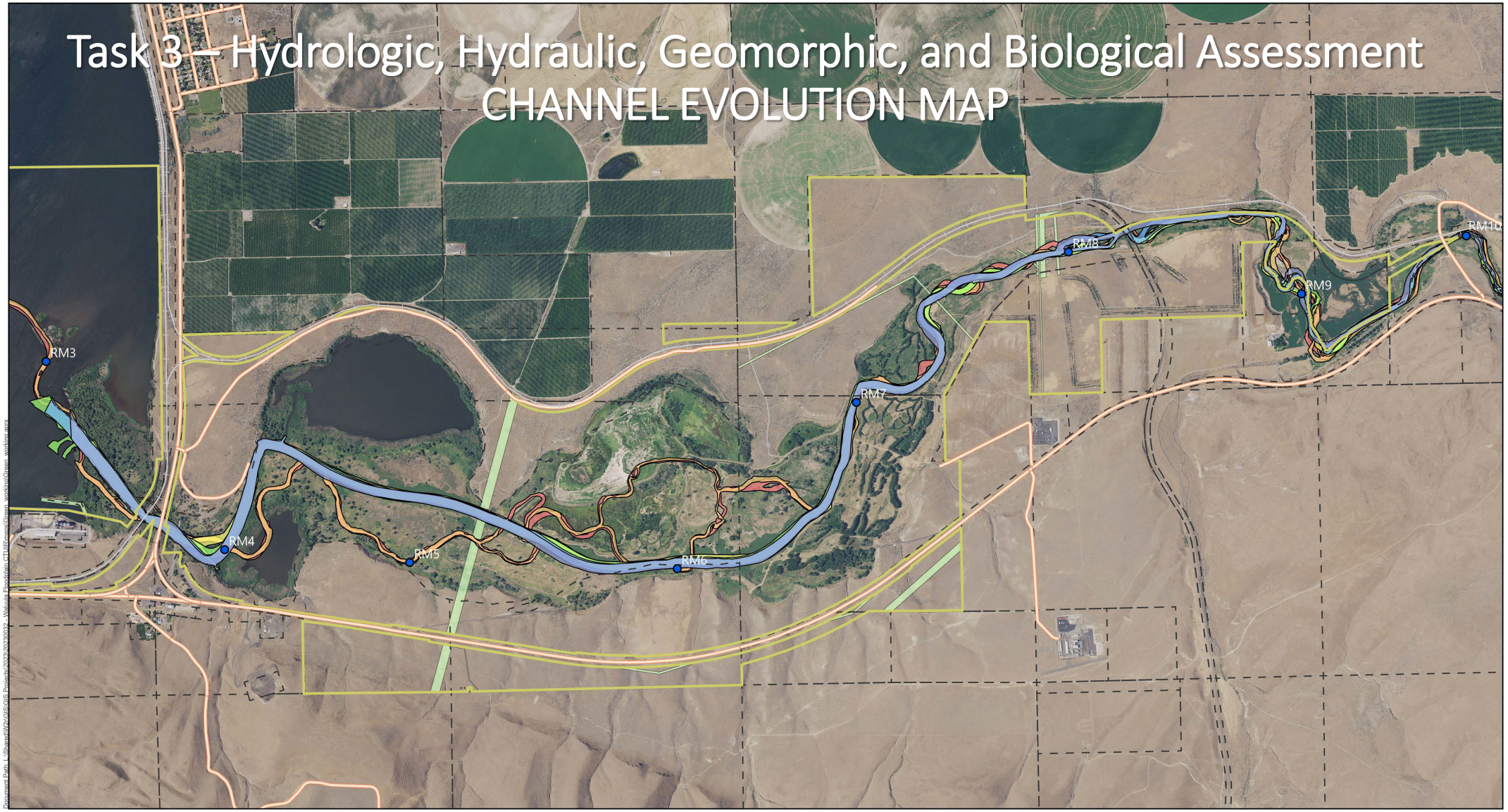
< -22.0	-7.0 - -6.0	-2.0- -1.5	1.5 - 2.0	5.0 - 6.0	12.0 - 13.0
-22.0 - -16.0	-6.0 - -5.0	-1.5 - -1.0	2.0 - 2.5	6.0 - 7.0	13.0 - 14.0
-16.0 - -14.0	-5.0 - -4.0	-1.0 - -0.5	2.5 - 3.0	7.0 - 8.0	14.0 - 15.0
-14.0 - -12.0	-4.0 - -3.5	-0.5 - 0.0	3.0 - 3.5	8.0 - 9.0	15.0 - 16.0
-12.0 - -10.0	-3.5 - -3.0	0 - 0.5	3.5 - 4.0	9.0 - 10.0	16.0 - 17.0
-10.0 - -8.0	-3.0 - -2.5	0.5 - 1.0	4.0 - 4.5	10.0 - 11.0	17.0 - 18.0
-8.0 - -7.0	-2.5 - -2.0	1.0 - 1.5	4.5 - 5.0	11.0 - 12.0	> 18.0

NWR Easements
NWR Boundary
Road
Railroad
Tax lot
River mile

Walúula Floodplain Restoration
HAWS Map

WOLF WATER RESOURCES

Task 3 – Hydrologic, Hydraulic, Geomorphic, and Biological Assessment
CHANNEL EVOLUTION MAP



2021 1988 1952
2006 1976 1940

NWR Boundary
NWR Easements
Tax lot
Road
Railroad
River mile

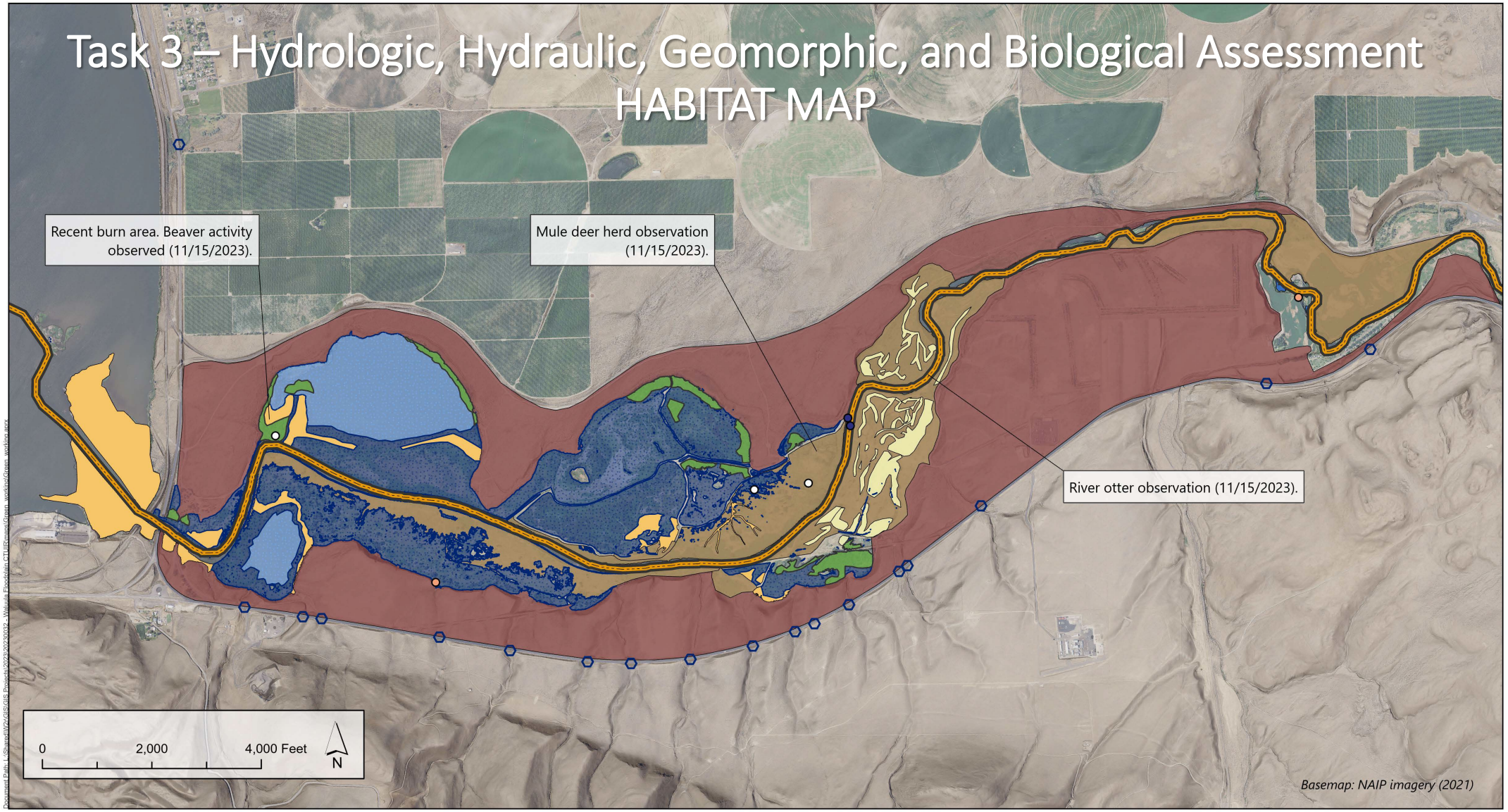
0 2,000 4,000 Feet

N

Walúula Floodplain Restoration
Channel Evolution Map

Basemap: NAIP imagery (2021)

Task 3 – Hydrologic, Hydraulic, Geomorphic, and Biological Assessment
HABITAT MAP



Habitat types November 2023

- Forested wetland
- Potential cold water refugia
- Open shallow water
- Emergent wetland habitat
- Shrub-scrub wetland
- Manipulated cottonwood swale
- Upland predominantly non-native grassland
- Upland shrub-steppe

Nest observations November 2023

- Bald eagle nest
- Cliff swallow nest

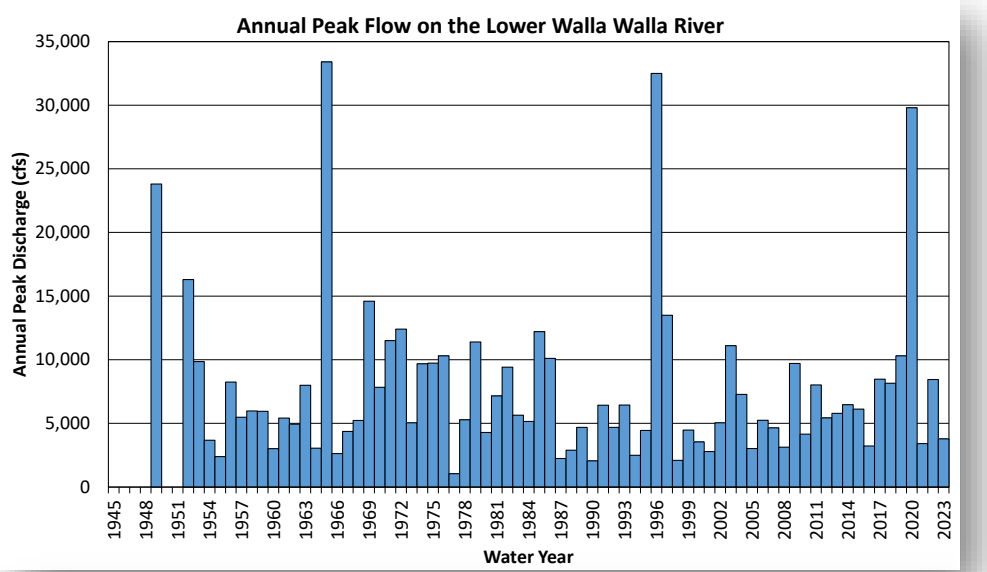
Fish distribution

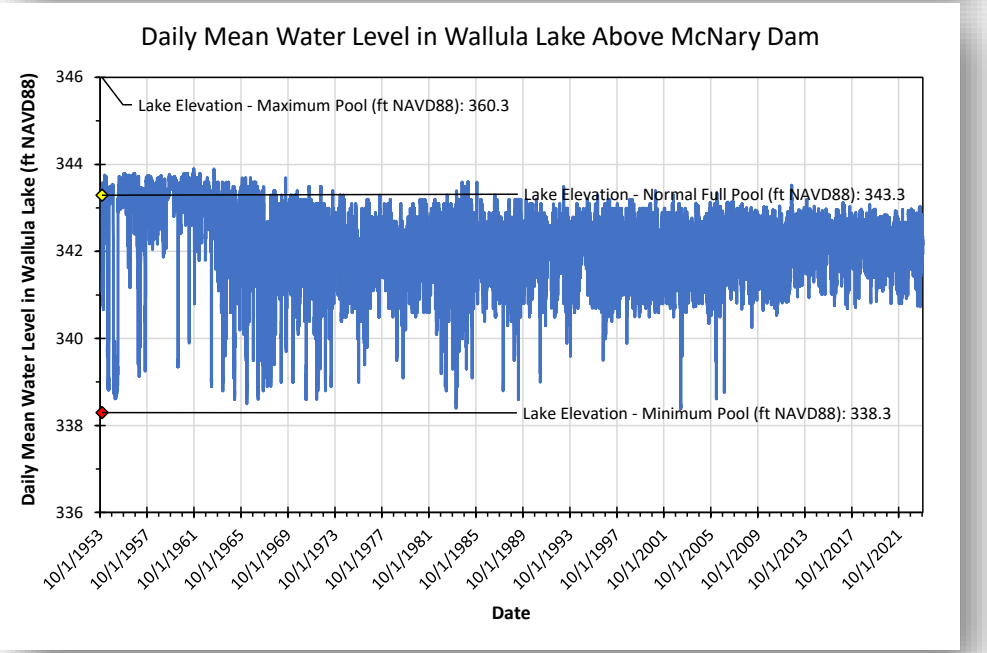
- Chinook salmon
- Bull trout
- Steelhead
- Culvert
- CTUIR PIT array

Walúula Floodplain Restoration
Habitat Map

WOLF WATER RESOURCES

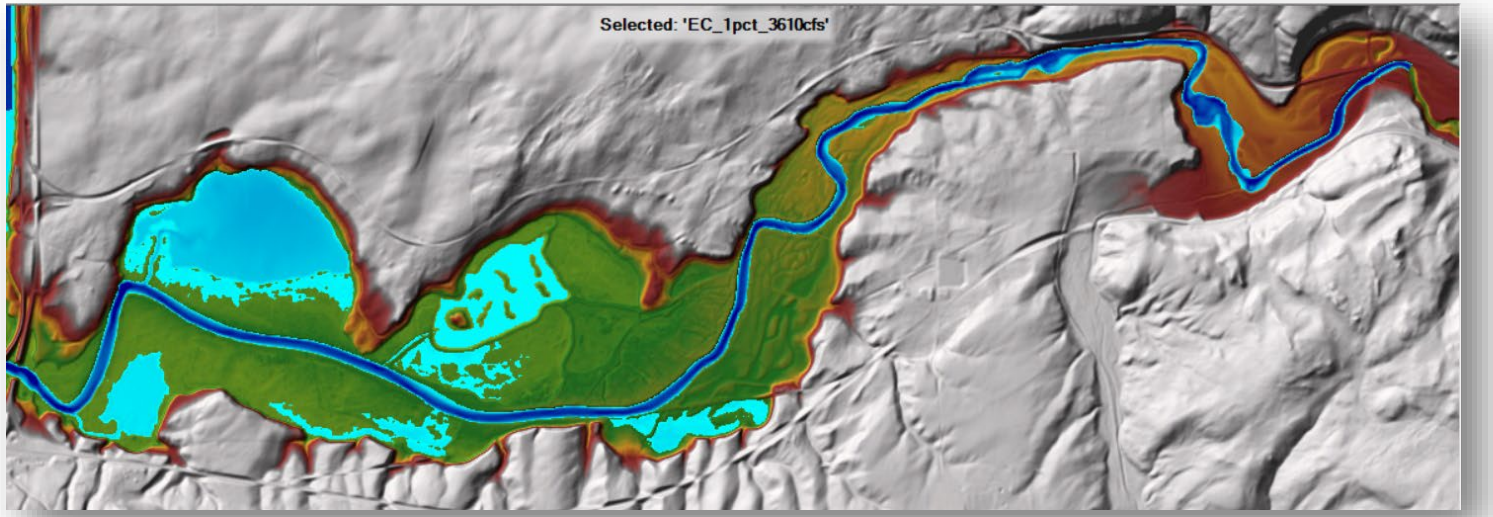
Task 3 – Hydrologic, Hydraulic, Geomorphic, and Biological Assessment
HYDROLOGY & HYDRAULICS



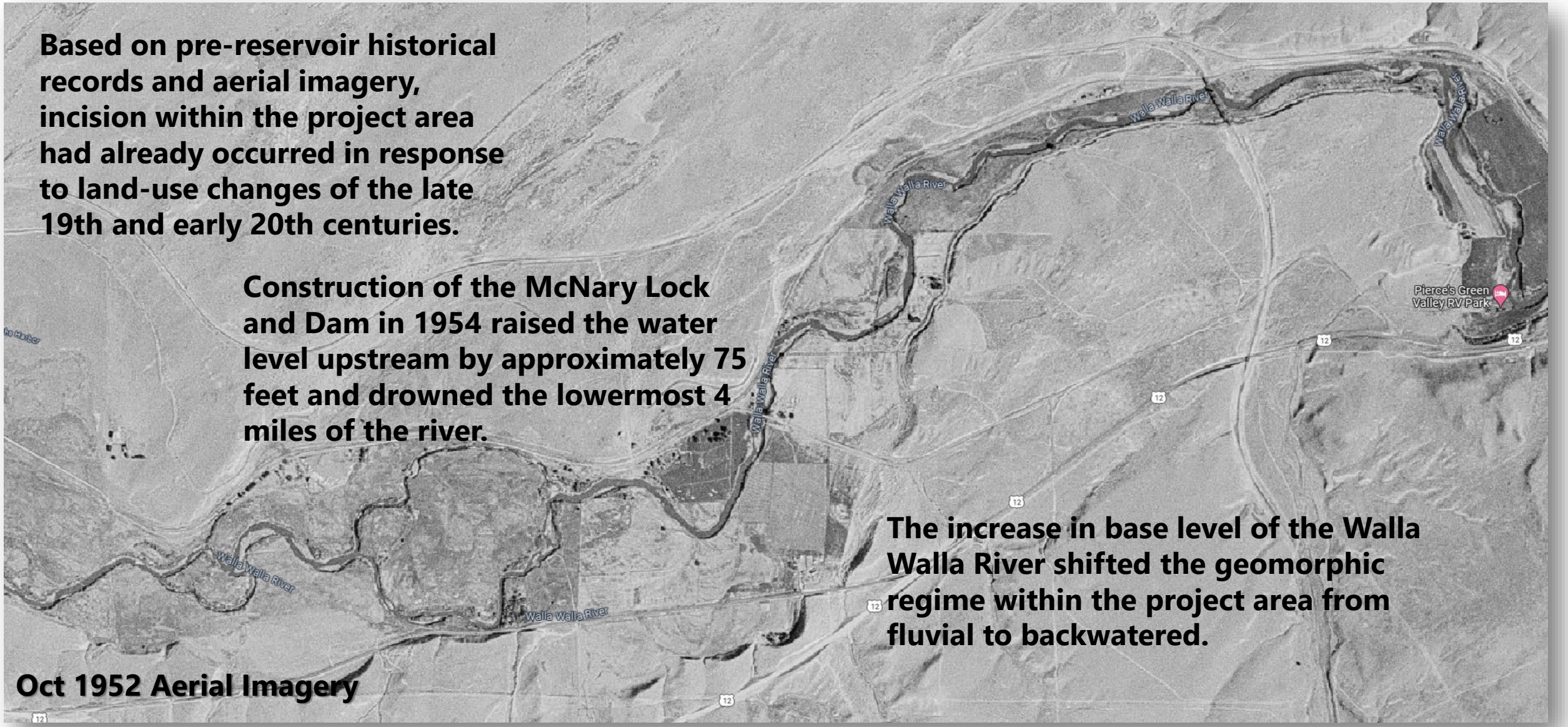


Modeled Flows:

Daily exceedance flows = 20–80% (i.e., low flows 40–1,000 cfs)
14-day Duration = 1,250 cfs
1% exceedance flow = 3610 cfs
2 yr Flood freq = 5,690 cfs
10 yr Flood freq = 13,850 cfs
50 yr Flood freq = 23,440 cfs
100 yr Flood freq = 28,330 cfs



Task 3 – Hydrologic, Hydraulic, Geomorphic, and Biological Assessment
GEOMORPHOLOGY



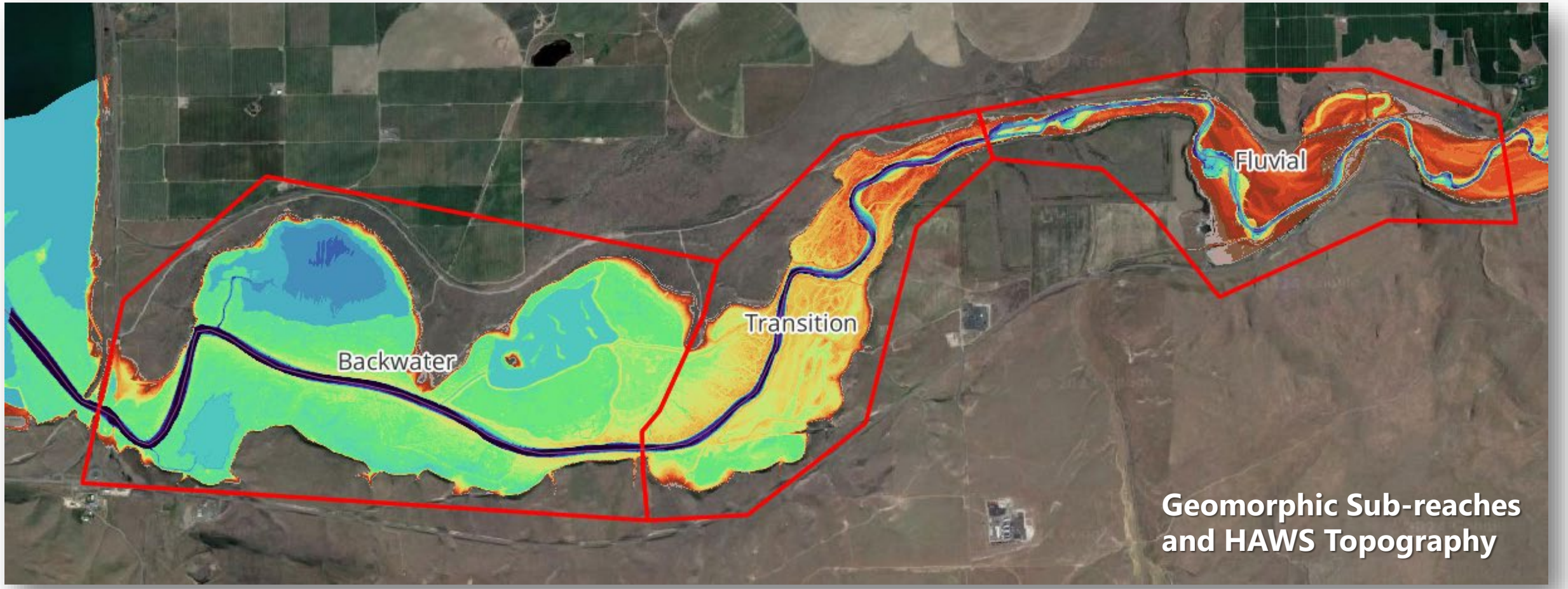
Based on pre-reservoir historical records and aerial imagery, incision within the project area had already occurred in response to land-use changes of the late 19th and early 20th centuries.

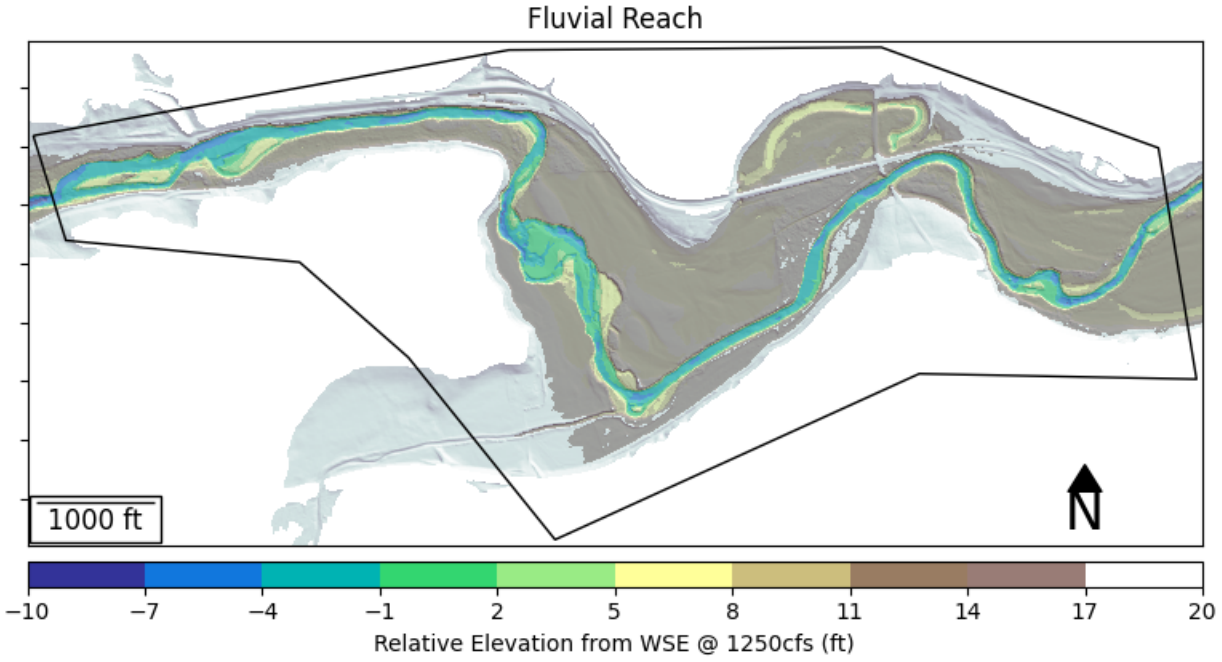
Construction of the McNary Lock and Dam in 1954 raised the water level upstream by approximately 75 feet and drowned the lowermost 4 miles of the river.

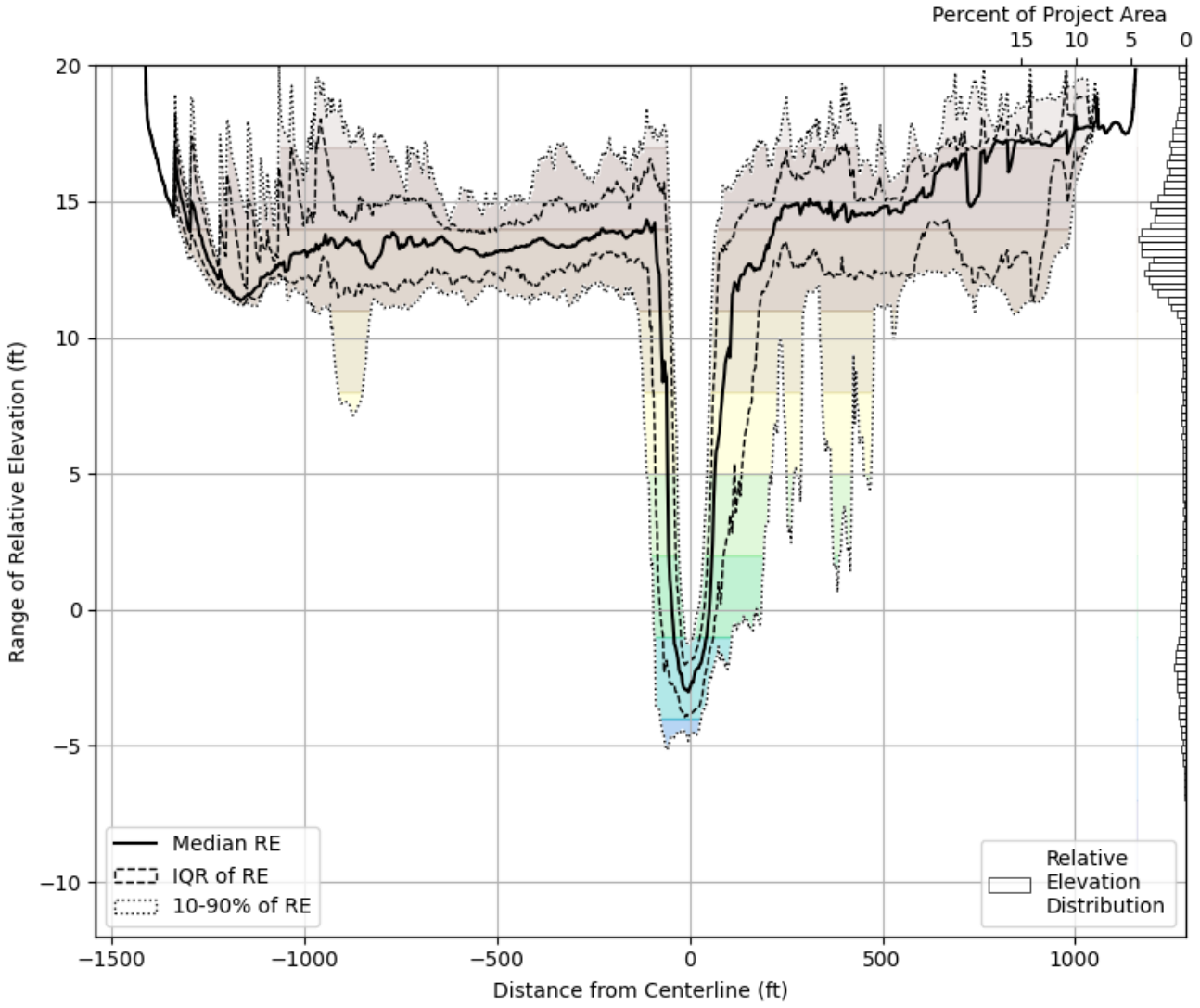
The increase in base level of the Walla Walla River shifted the geomorphic regime within the project area from fluvial to backwatered.

Oct 1952 Aerial Imagery

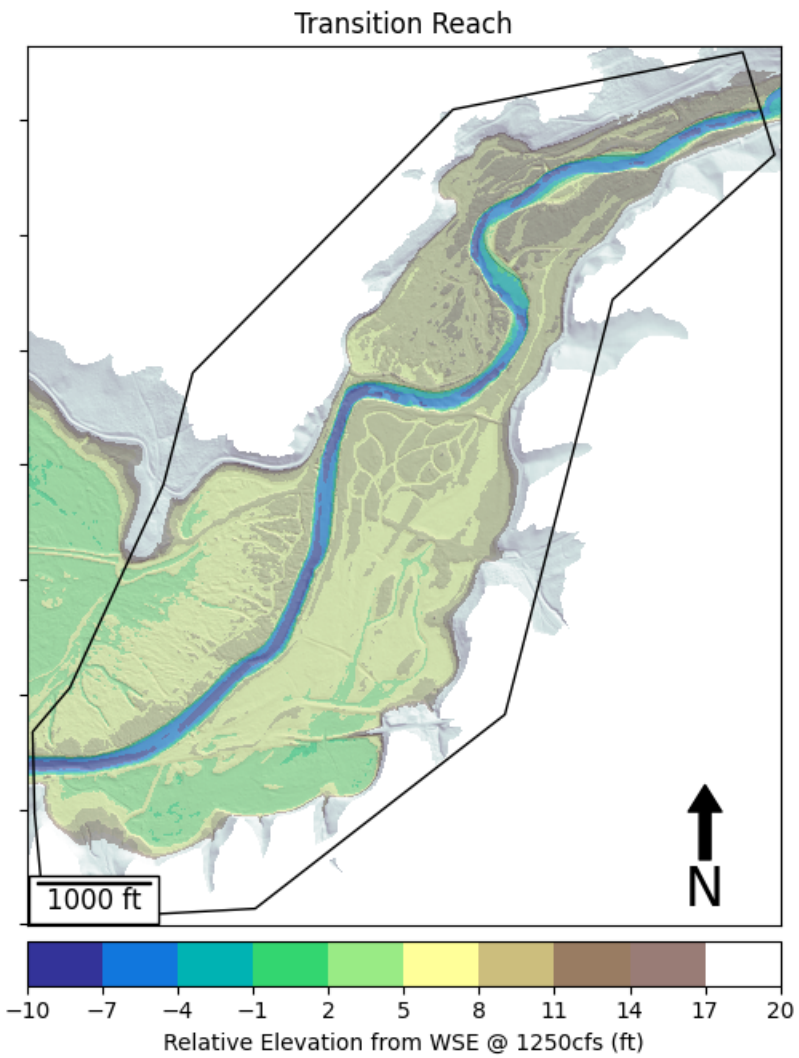
Task 3 – Hydrologic, Hydraulic, Geomorphic, and Biological Assessment
GEOMORPHOLOGY

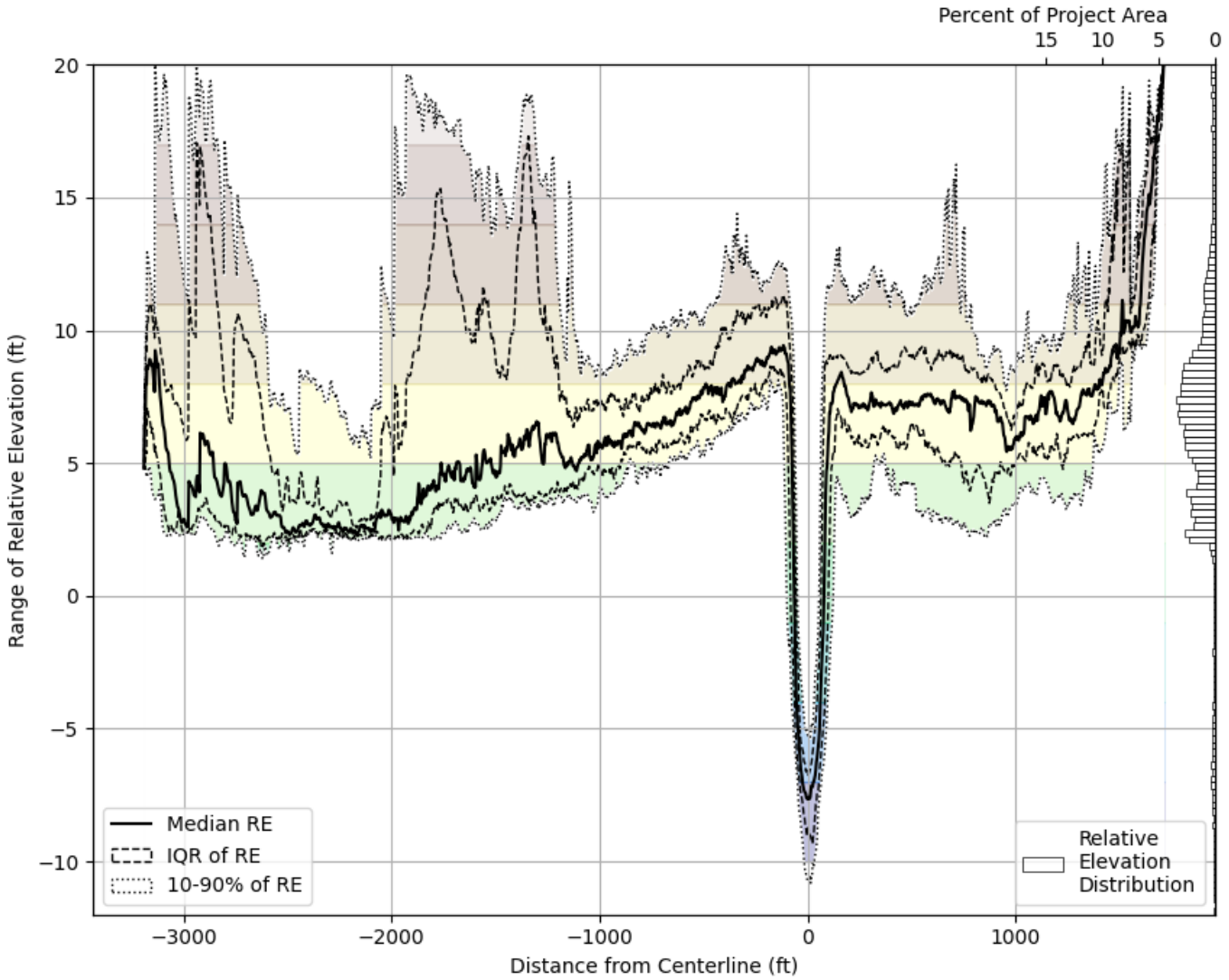




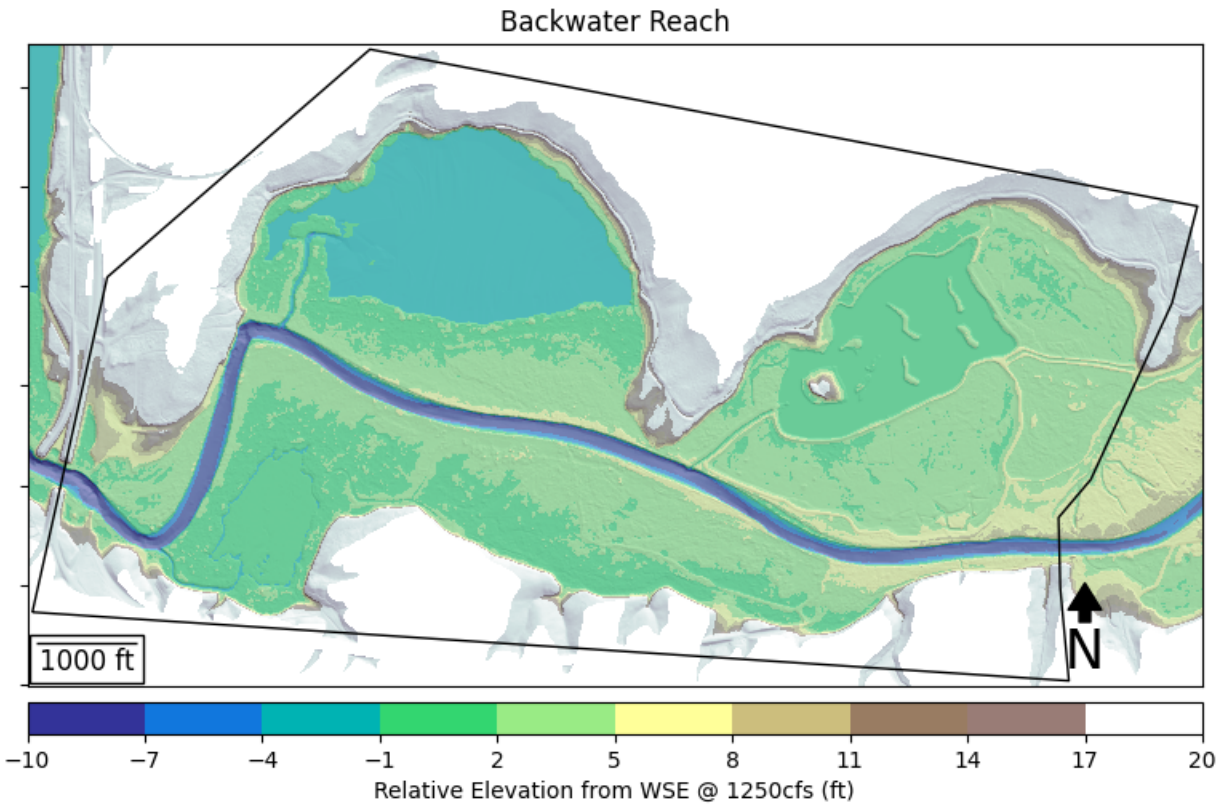


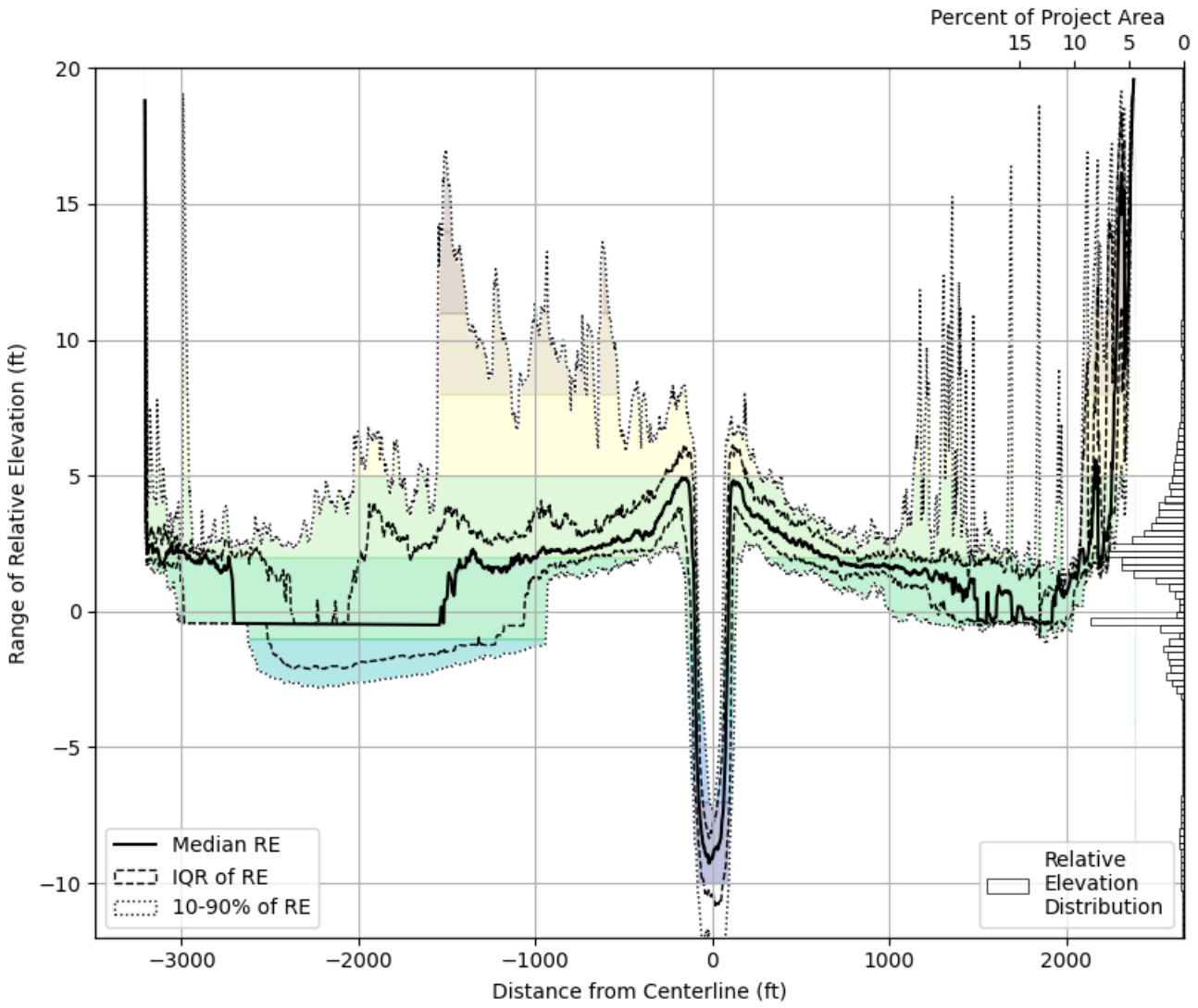
Abandoned terrace 12–15 feet above the 1,250cfs WSE. A new 500-foot-wide inset floodplain is forming. Bankfull channel width is approximately 90 feet.





Floodplain is 5–10 feet above the 1,250cfs WSE.
Large natural levees 9–12 feet above the WSE.
Bankfull channel width is approximately 75 feet.





Floodplain is 0–5 feet above the 1,250cfs WSE.
Smaller natural levees 5–8 feet above the WSE.
Bankfull channel width is approximately 90 feet.

Task 3 – Hydrologic, Hydraulic, Geomorphic, and Biological Assessment
HABITAT

~1,200 acres of river and floodplain within Project area

~690 acres of estimated wetlands (PEM, PSS, PFO, PUB)

Landscape is dominated by non-native, invasive wetland, riparian, and upland plants (e.g., false indigo bush, common reed, reed canarygrass, kochia)

Native vegetation includes narrowleaf willow and black cottonwood

Limited nesting opportunities for yellow warbler

Overwintering habitat for mallards is high

Low habitat suitability for juvenile summer steelhead and juvenile Chinook salmon

Aquatic habitat complexity increases in the upstream direction

Non-native smallmouth bass are prevalent during warmer months

Other terrestrial wildlife occur seasonally (e.g., bald eagles, river otters, beaver, blacktail deer, cliff swallows)

Restoration Goals and Metrics

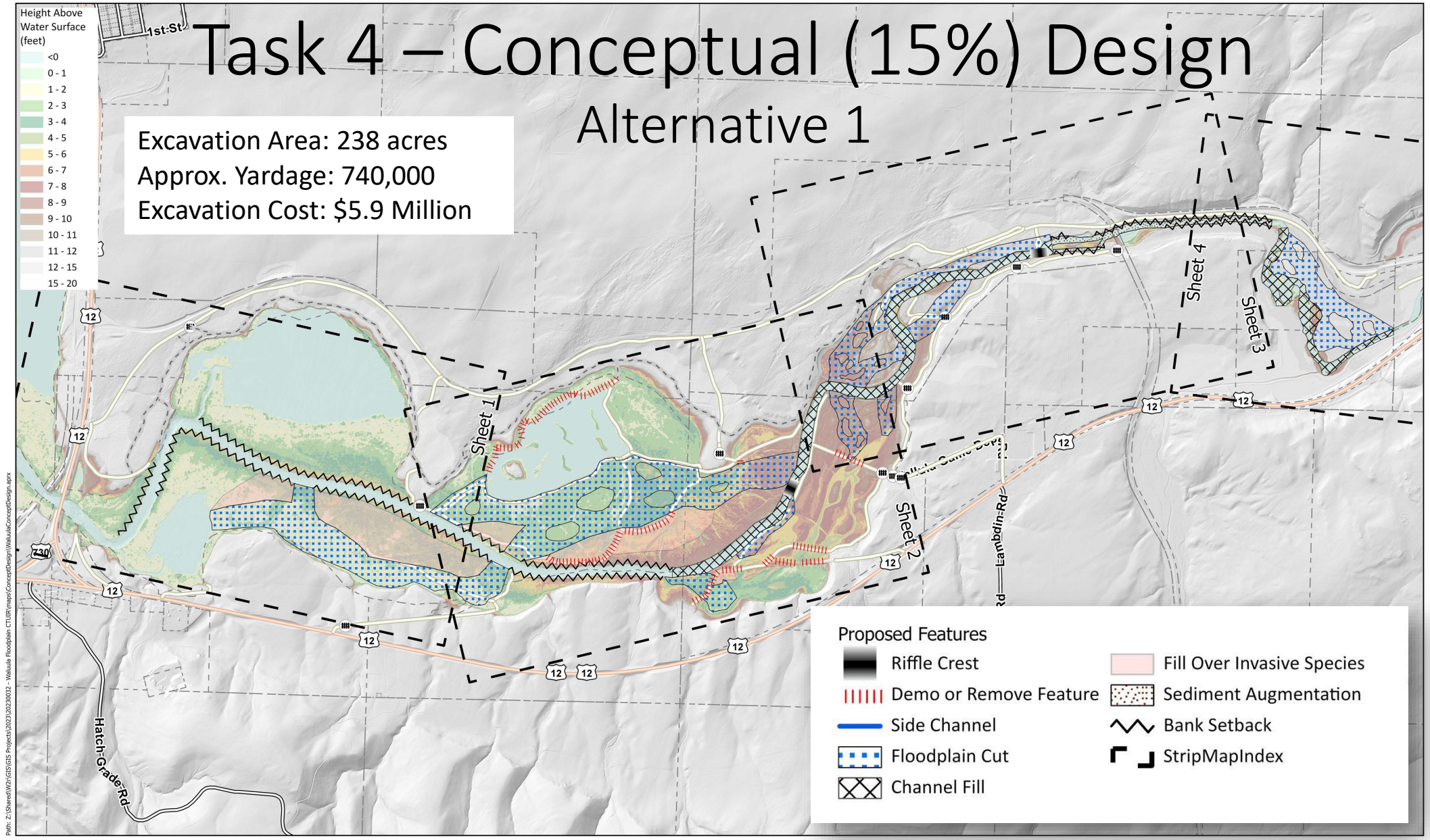
- Water Quality—buffer water temperatures and provide sediment capture
- Geomorphology—restore natural river-wetland corridor complexity
- Connectivity—restore connectivity with the historic floodplain and alluvial aquifer
- Riparian Vegetation—protect and enhance riparian vegetation and enhance to improve geomorphic function and water quality
- Aquatic Biota—increase quality, quantity, and diversity of native fish habitat

- Raise the floodplain water table to an average of 1 meter (~3 feet) or less below floodplain surface between the months of July–October by 10 years after project completion.
- Increase the river complexity index (Brown 2002) to at least 25 at the 1250 cubic feet per second (cfs) flow.
- Decrease the floodplain activation flow to at least 1,250 cfs.
- Increase Expected Annual Habitat (Matella and Jagt 2014) by at least 25%.
- Plant site-appropriate native riparian vegetation on at least 200 acres of floodplain.
- Plant at least 25 acres of site-appropriate First Foods species.
- Remove at least 25 acres of invasive riparian vegetation.
- Increase suitable winter rearing habitat for Chinook salmon and steelhead at the floodplain activation flow by at least 150%.
- Increase seasonally inundated wetland by at least 100 acres.
- Increase shallow marsh habitat by at least 15 acres.
- Increase suitable tree-dominated nesting habitat by at least 50 acres by 20 years after project completion.
- Increase suitable shrub-dominated nesting habitat by at least 50 acres by 20 years after project completion.
- Maintain boating safety in the main channel of the Walla Walla River.
- Enhance interpretive signage.

Task 4 – Conceptual (15%) Design

Alternative 1

Excavation Area: 238 acres
Approx. Yardage: 740,000
Excavation Cost: $5.9 Million



US Feet
0 500 1,000 2,000

N

Existing Features
- FWS Trails
- FWS Road Gate
- FWS Refuge Roads
- Tax Parcels

Proposed Features
- Riffle Crest
- Demo or Remove Feature
- Side Channel
- Floodplain Cut
- Channel Fill
- Fill Over Invasive Species
- Sediment Augmentation
- Bank Setback
- StripMapIndex

Notes:
1. The detailed restoration plans can be viewed in sheets 1 through 4 whose extents are shown here.

Waluula Floodplain Reconnection
Conceptual Design
Alternative #1 Overview Sheet

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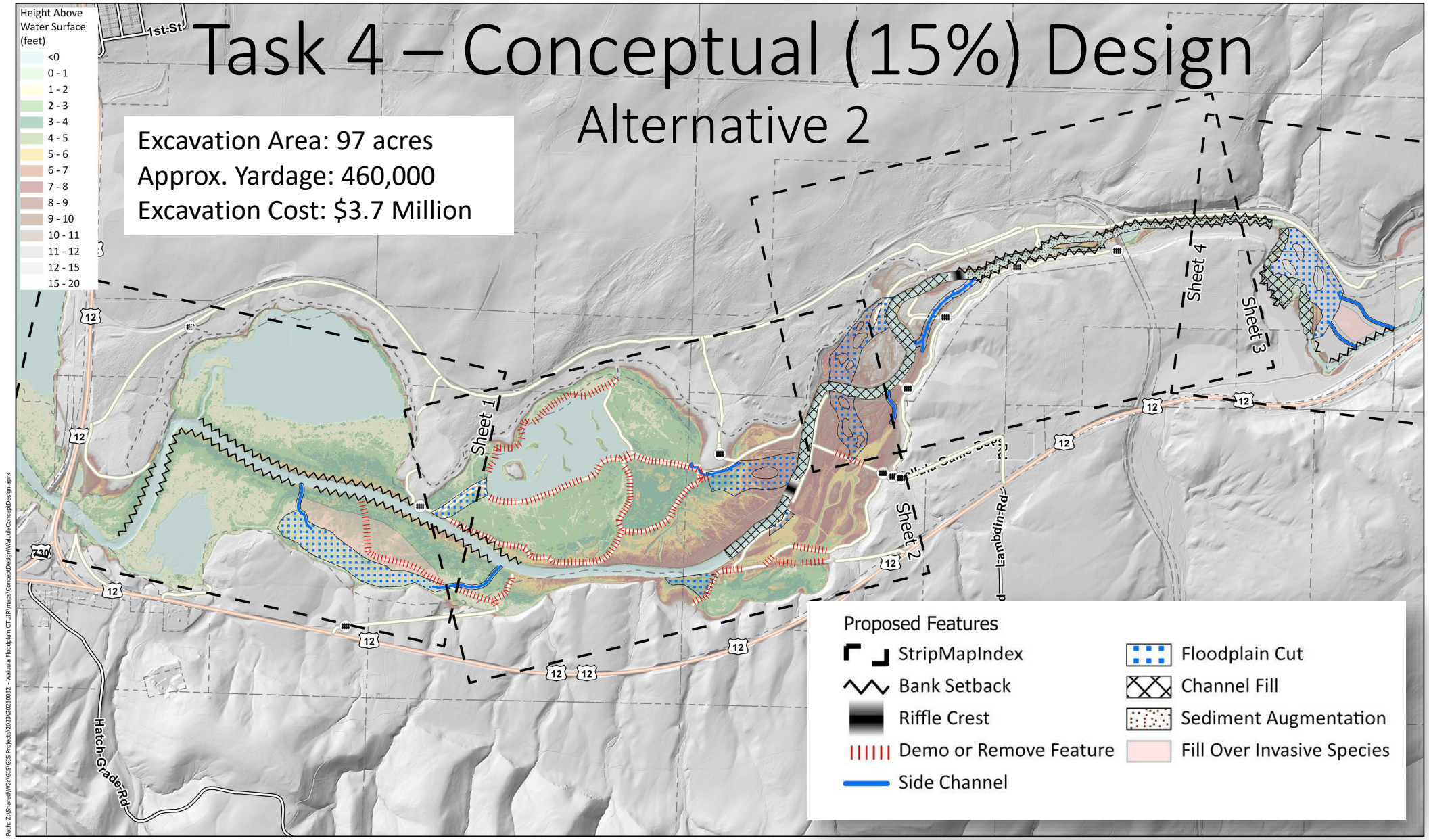
Task 4 – Conceptual (15%) Design

Alternative 2

Excavation Area: 97 acres
Approx. Yardage: 460,000
Excavation Cost: $3.7 Million



US Feet
0 500 1,000 2,000

N

Existing Features
- FWS Trails
- FWS Road Gate
- FWS Refuge Roads
- Tax Parcels

Proposed Features
- StripMapIndex
- Bank Setback
- Riffle Crest
- Demo or Remove Feature
- Side Channel
- Floodplain Cut
- Channel Fill
- Sediment Augmentation
- Fill Over Invasive Species

Notes:
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Waluula Floodplain Reconnection
Conceptual Design
Alternative #2 Overview Sheet

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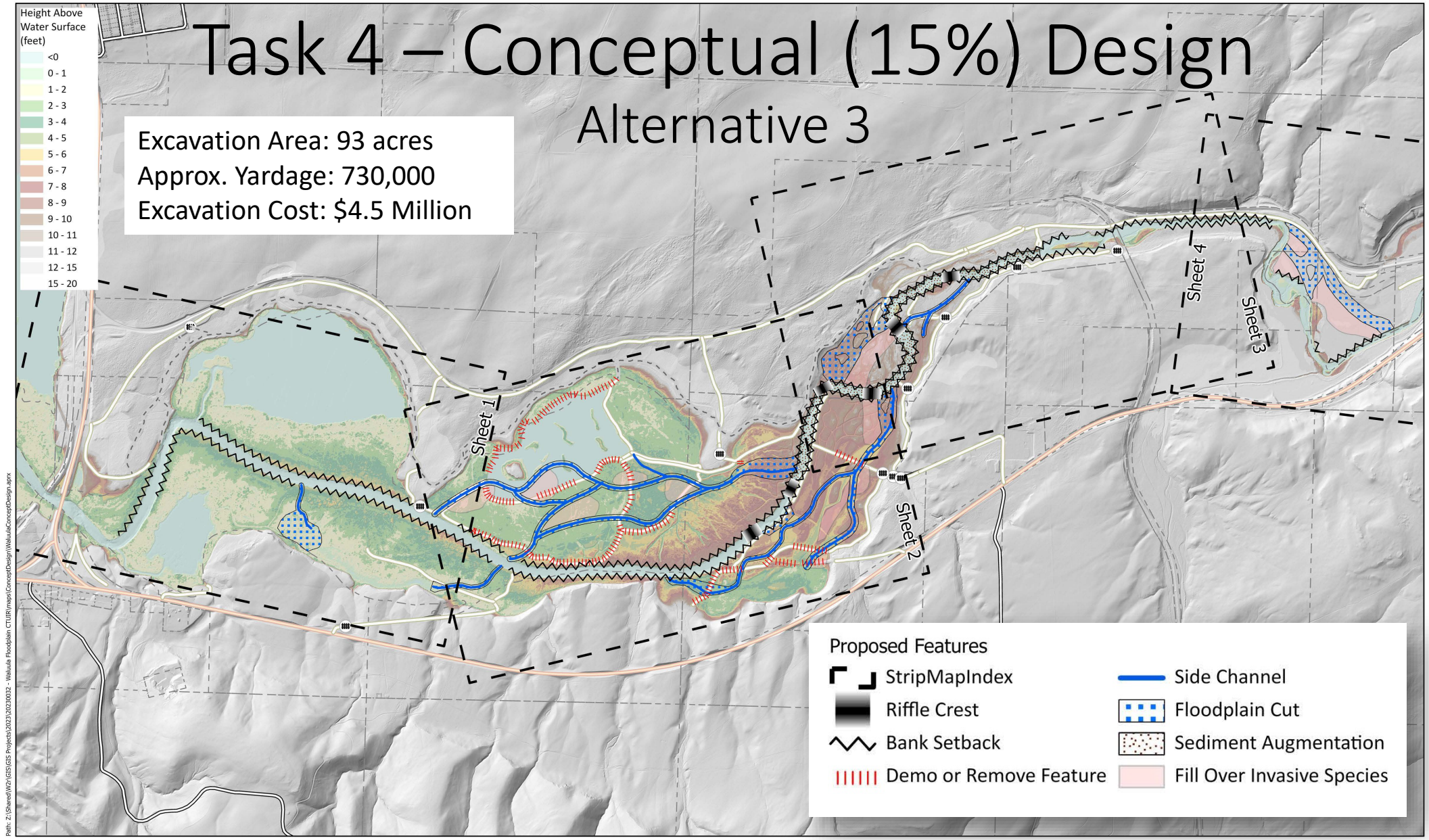
Task 4 – Conceptual (15%) Design

Alternative 3

Excavation Area: 93 acres
Approx. Yardage: 730,000
Excavation Cost: $4.5 Million



US Feet
0 500 1,000 2,000

N

Existing Features
- FWS Trails
- FWS Road Gate
- FWS Refuge Roads
- Tax Parcels

Proposed Features
- StripMapIndex
- Riffle Crest
- Bank Setback
- Demo or Remove Feature
- Side Channel
- Floodplain Cut
- Sediment Augmentation
- Fill Over Invasive Species

Notes:
1. The detailed restoration plans can be viewed in sheets 1 through 4 whose extents are shown here.

Waluula Floodplain Reconnection
Conceptual Design
Alternative #3 Overview Sheet

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Task 5 – Stakeholder Communication Facilitation

- Communications Plan Development
- Facilitation of Public Meetings
- Vision, Goals, Objectives, and Communication Design Materials Development

Schedule

	Task	2023				2024								
		S	O	N	D	J	F	M	A	M	J	J	A	S
Current RFP Phase	Project Initiation	✓												
	Task 1 - Survey Project Focus Area													
	Field Survey Topography and Bathymetry													
	Data Processing and Terrain Surface Generation													
	Site Map Integration													
	Task 2 - Wetland Determination and Rating													
	Desktop Review and Analysis													
	Field Investigation													
	Technical Memorandum Preparation			✓										
	Task 3 - Hydrologic, Hydraulic, Geomorphic, and Biological Assessment													
	Field Reconnaissance in Support of Assessments													
	Hydrology Assessment (desktop analysis)													
	Hydraulics Modeling (desktop analysis)													
	Geomorphology Assessment (desktop analysis)													
	Biology Assessment (desktop analysis)													
	Synthesis and Site Map Production					✓								
	Task 4 - Conceptual (15%) Design													
	Restoration Alternatives Development and Conceptual Graphics								✓					
	Conceptual (15%) Design Plan-set (draft and final)											✓		✓
	Basis of Design Report (draft and final)											✓		✓
	Conceptual (15%) Design Review Meeting (virtual) by PROJECTS Team													
	Task 5 - Stakeholder Communication Facilitation													
	Communications Plan Development		✓											
	Public Outreach and Scoping Meetings Facilitation (Richland and Walla Walla)								✓					
	Vision, Goals, Objectives, and Communication Design Materials Development												✓	
	Task6 - Project Management, Team Meetings, and Coordination													
	Kickoff Meeting (virtual)													
	Ongoing Project Management, Client Communications, Invoicing, & Progress													
	Remote Meetings with Client and Project Team (quarterly)													

✓ *Deliverable Submittal*