



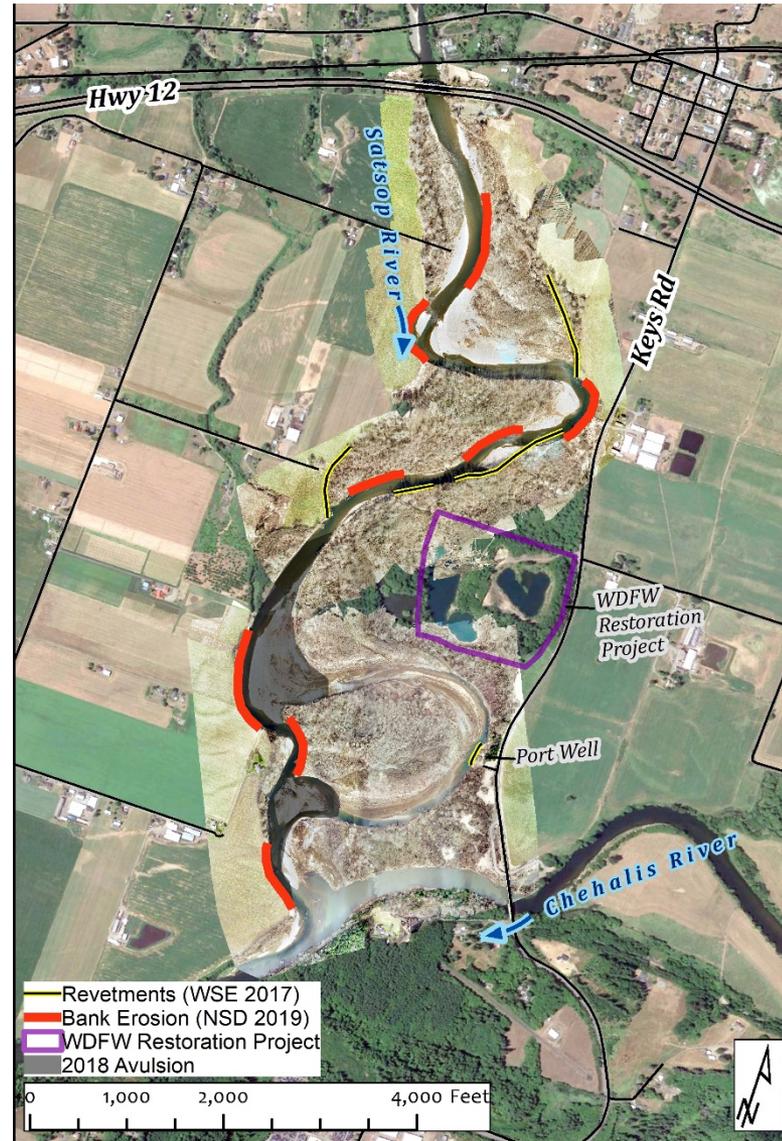
LOWER SATSOP PROTECTION PROGRAM ASSESSMENT, DESIGN, ACTION

Protect, Preserve, Restore

- * Farmland
- * Essential Infrastructure
- * River/Floodplain Functions & Habitat

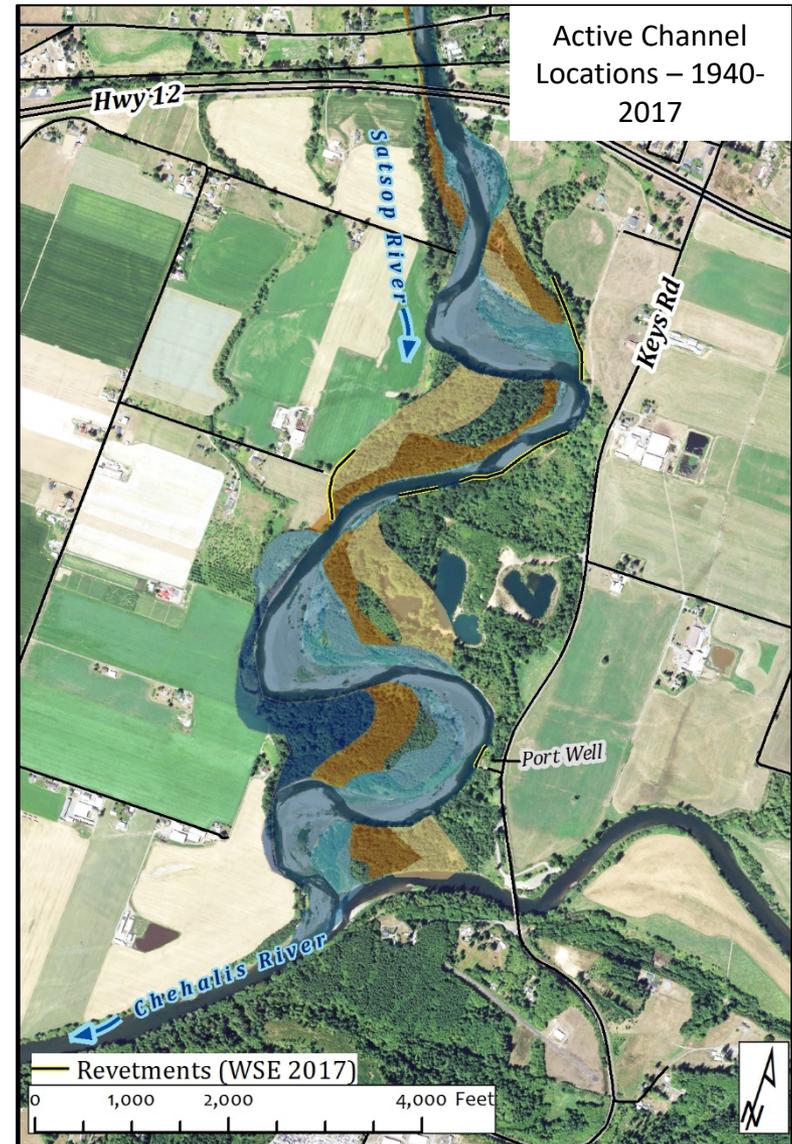
Existing Conditions

- Bank Erosion
- Revetments
- Keys Road
- Port Well
- WDFW Restoration Project
- 2018 Avulsion

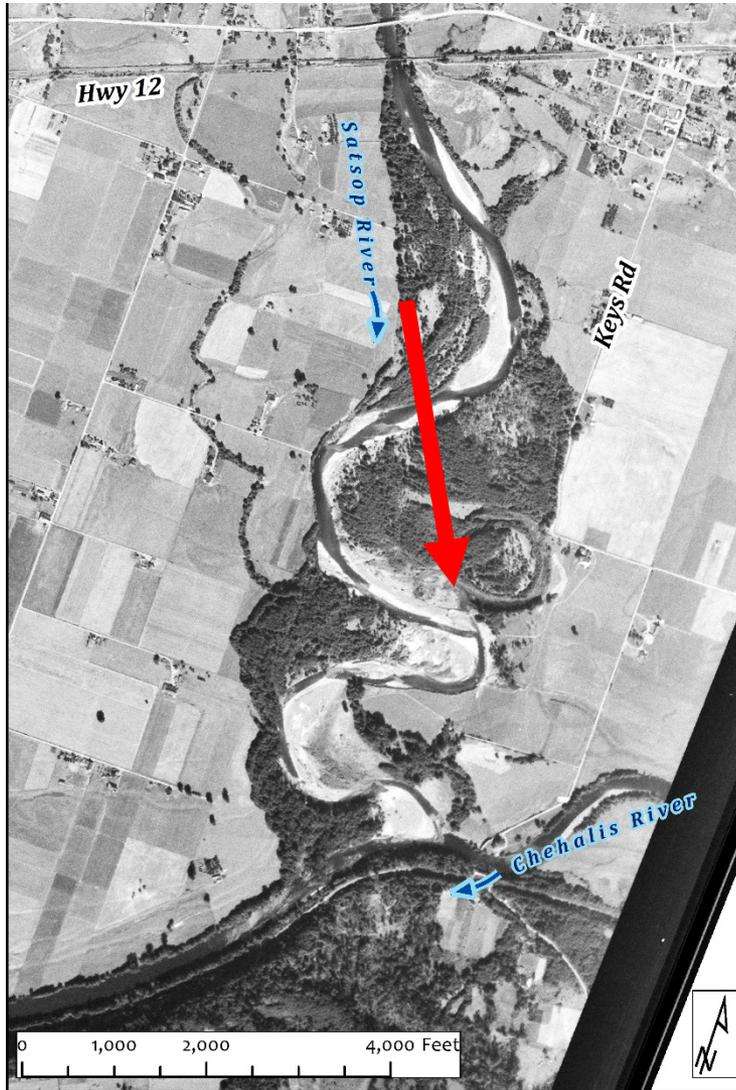


Erosion Risks – Historical occupation zone

- Areas where the river has already been pose the highest erosion risk because we know that they are capable of being eroded
- Delineated river locations for period of aerial photography record from 1940-2017
- Combined locations to form **Historical River Occupation Zone**

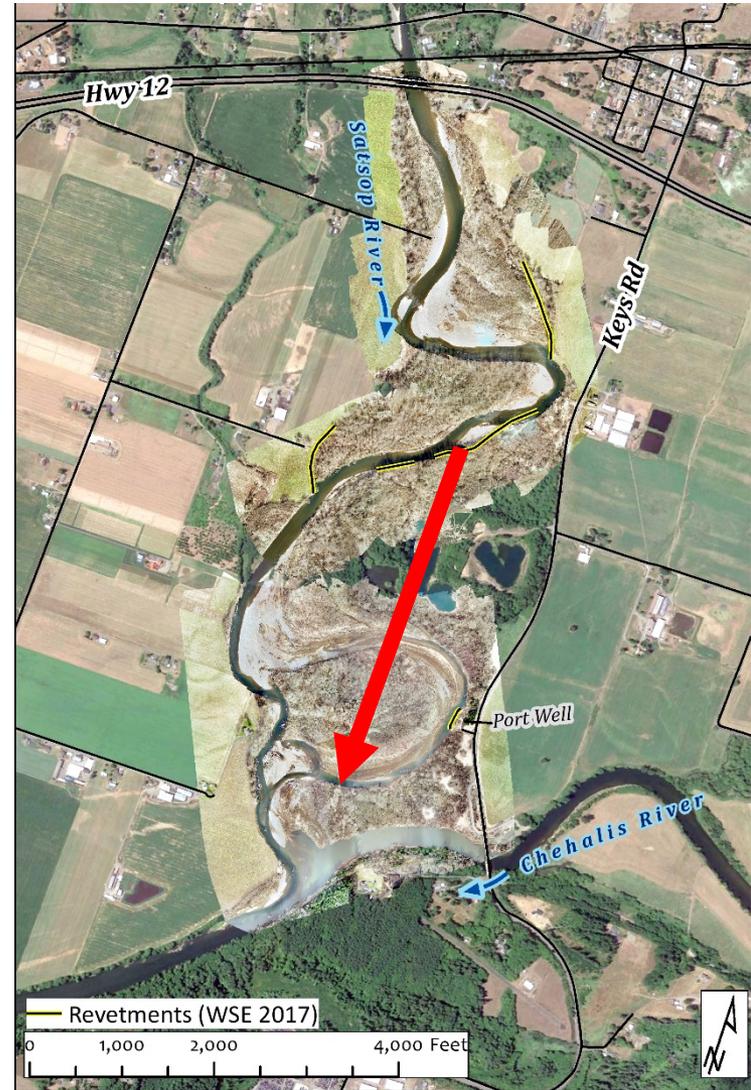


Historic Context



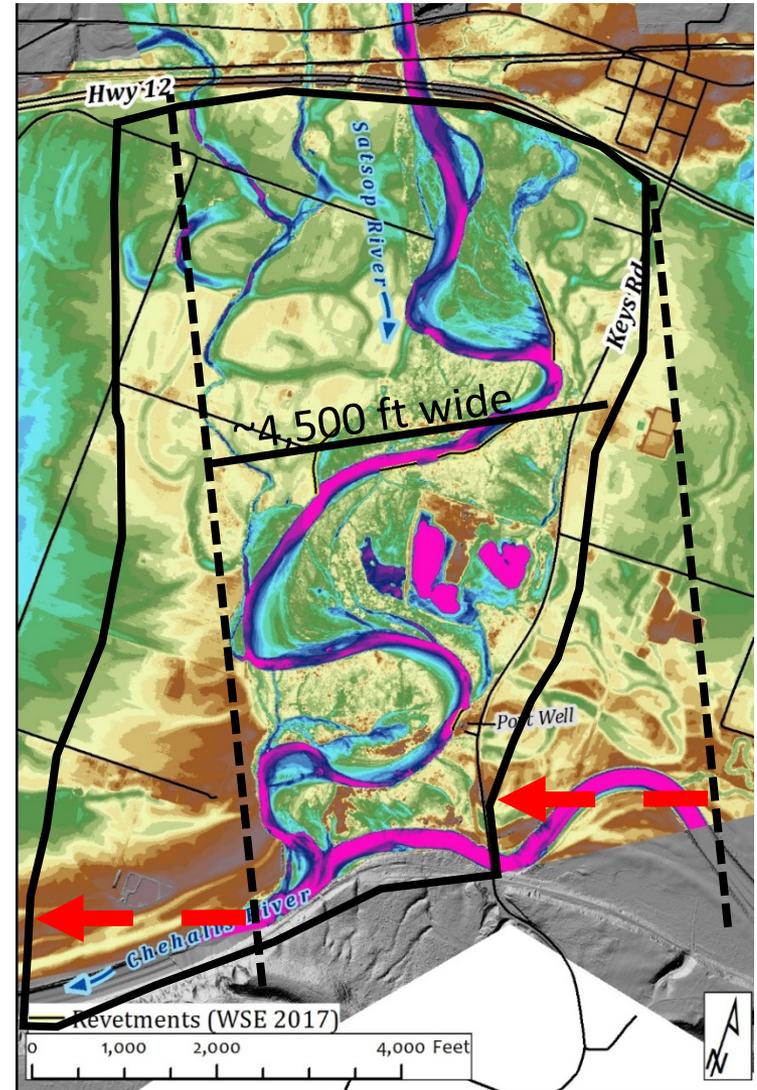
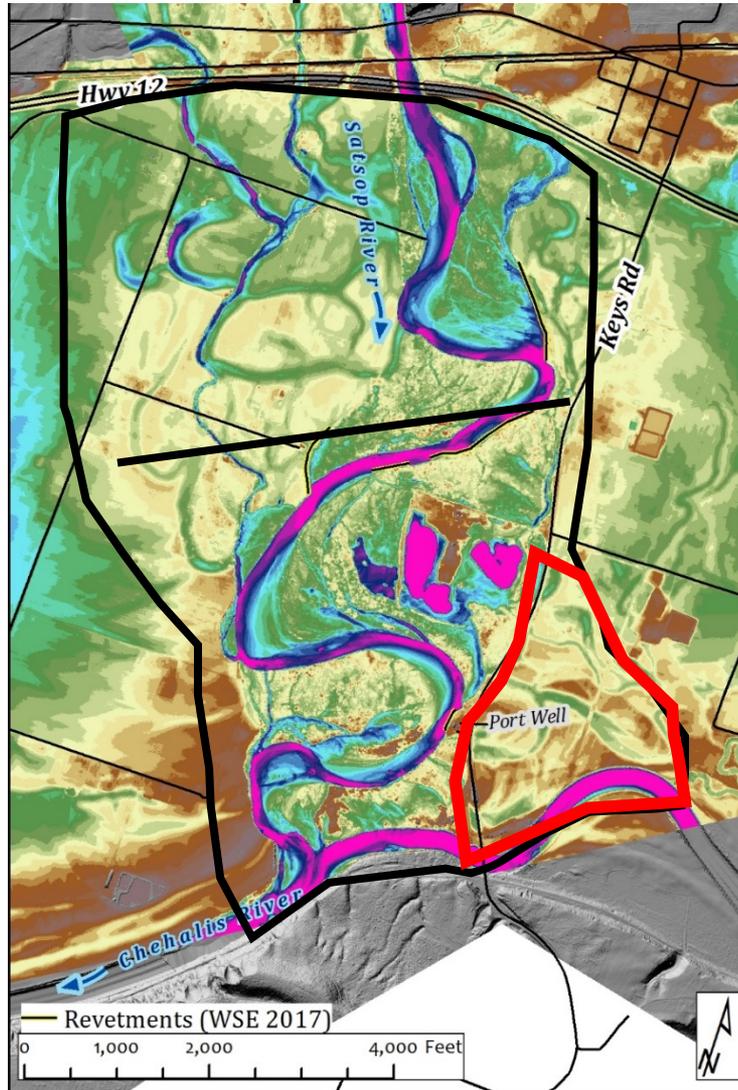
3

1953



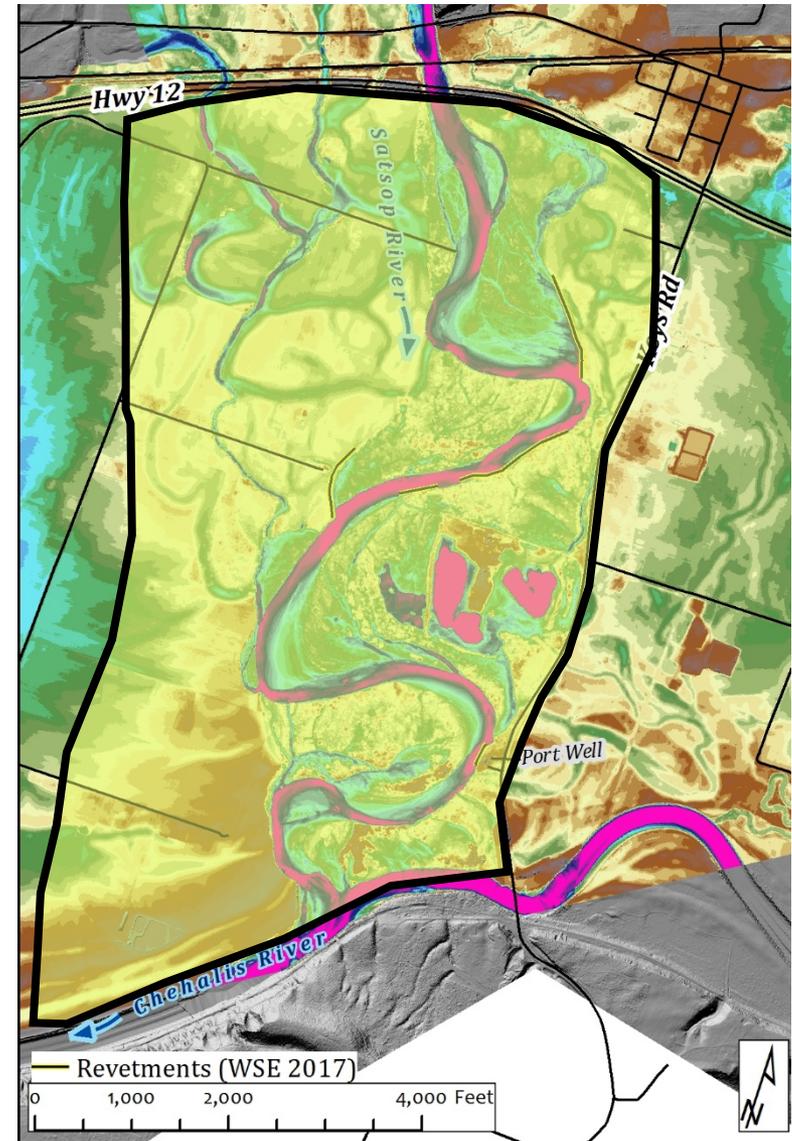
2019

Geomorphic Context

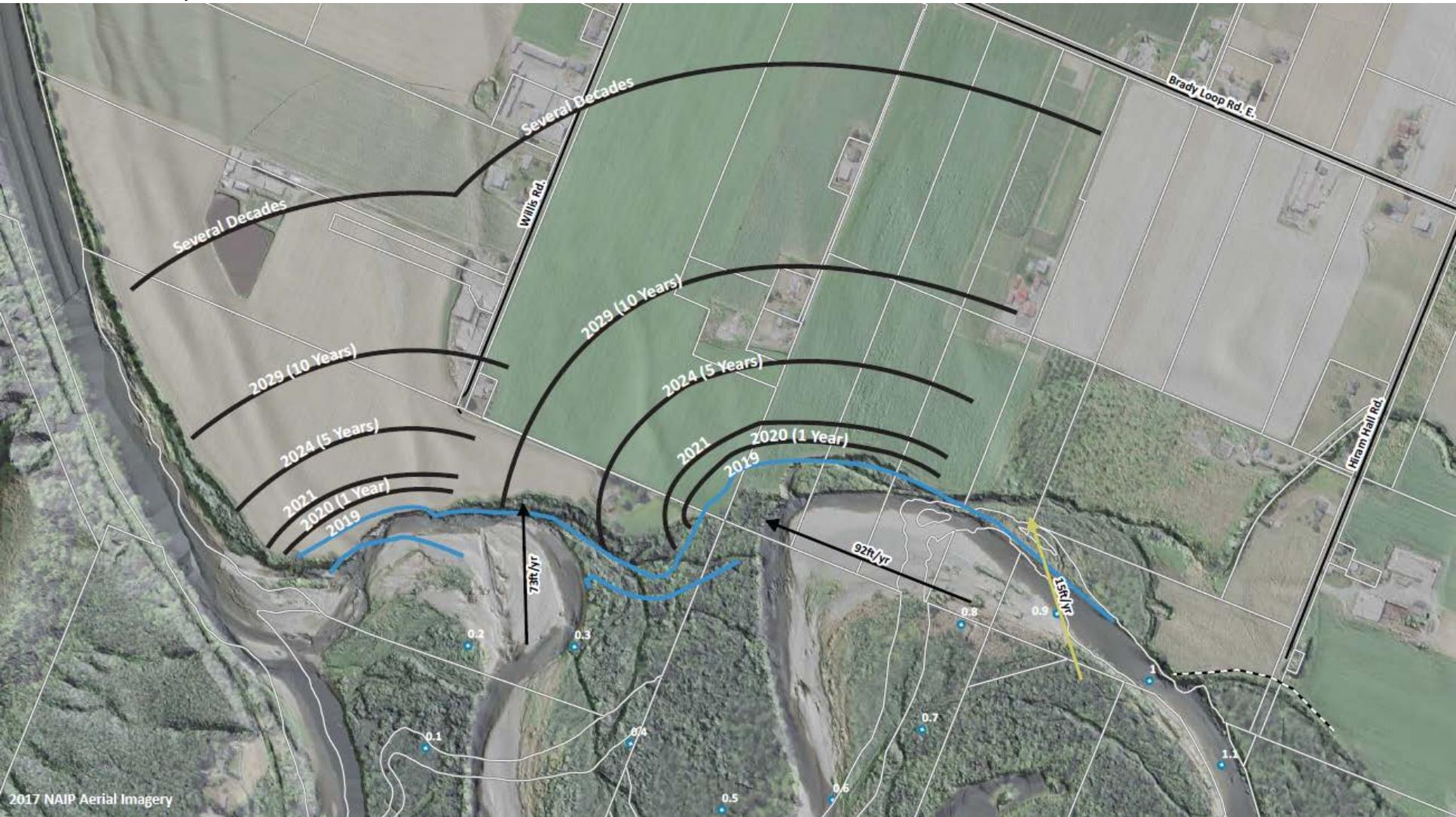


Geomorphic Context

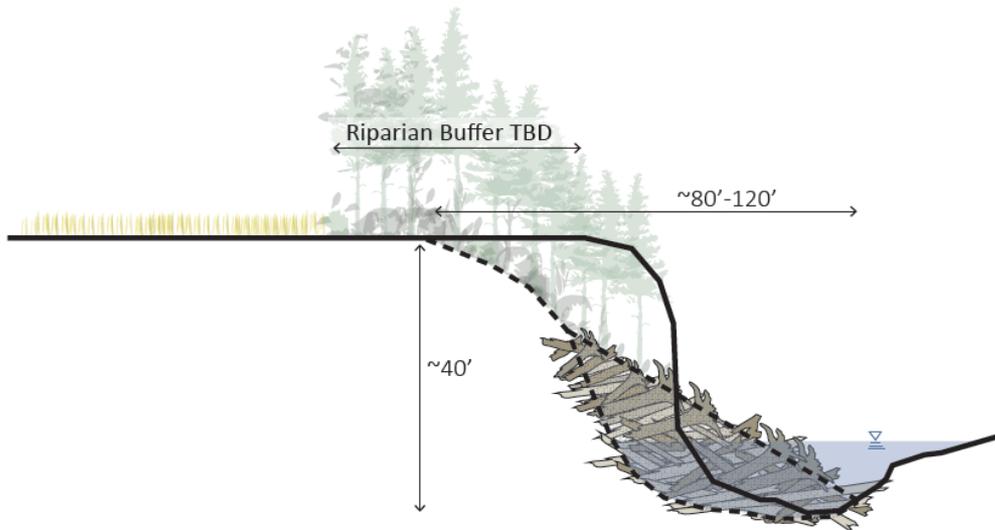
- Meander belt is moving west.
- Erosion hazard zone includes lands not occupied by the river in thousand years or more.



Projected Erosion without Treatment



Bank Stabilization – Why Not?

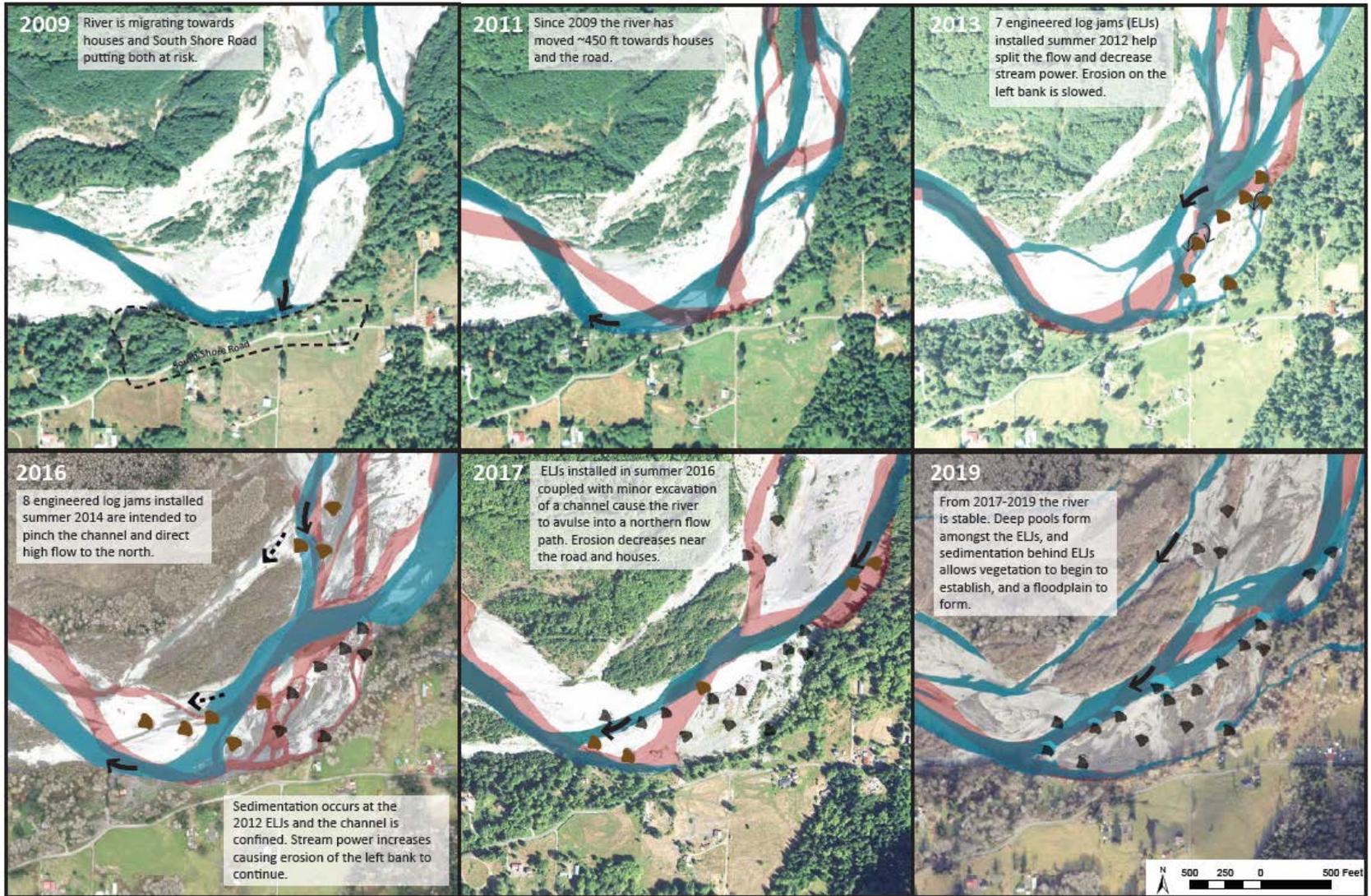


Source: Pierce County Dolosse & Dolotimberstm fact sheet

- Prohibitively Expensive > 2MM/bank
- Does it improve aquatic habitat?
- Does it support geomorphic process?

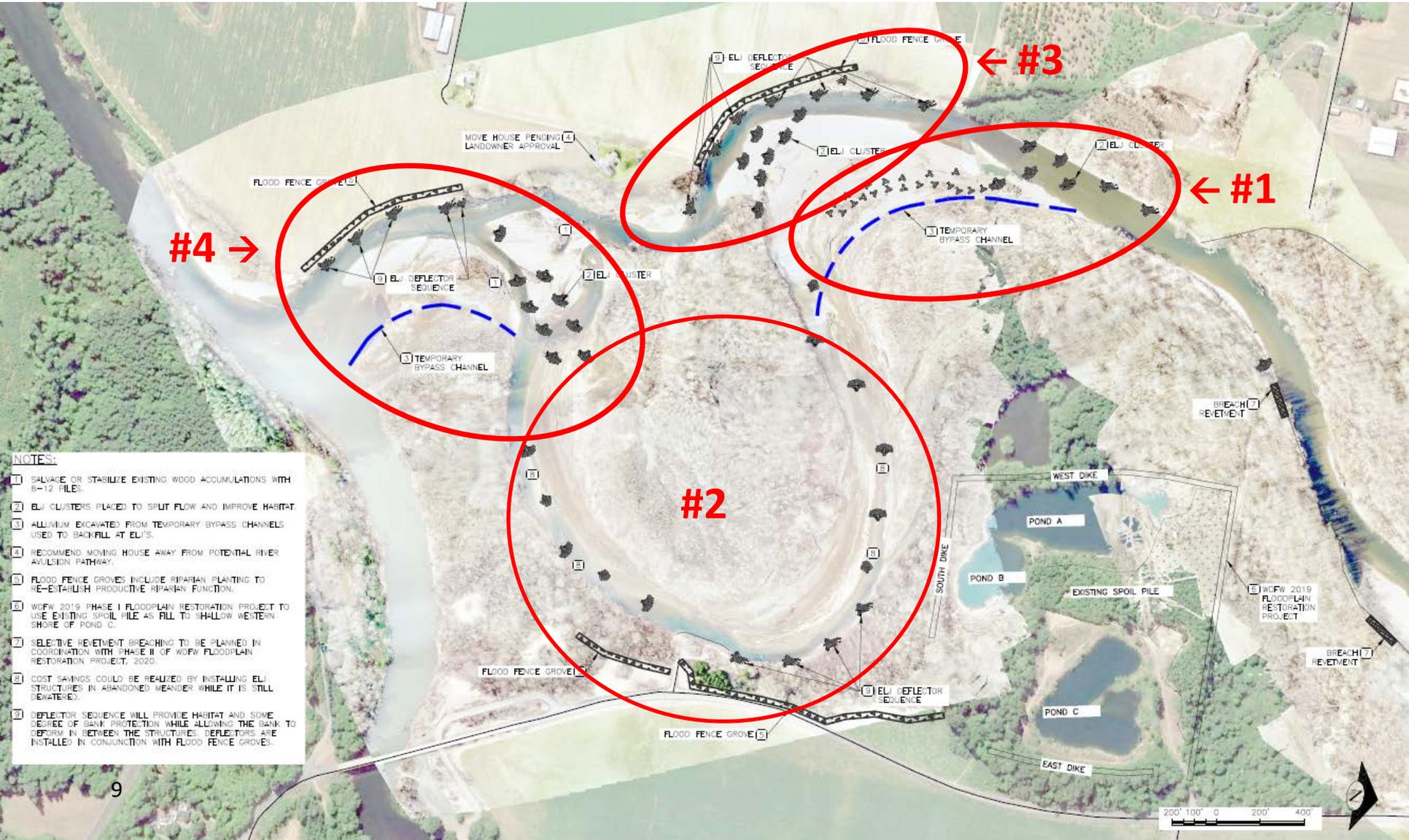


Upper Quinault Channel Migration Lower PA5

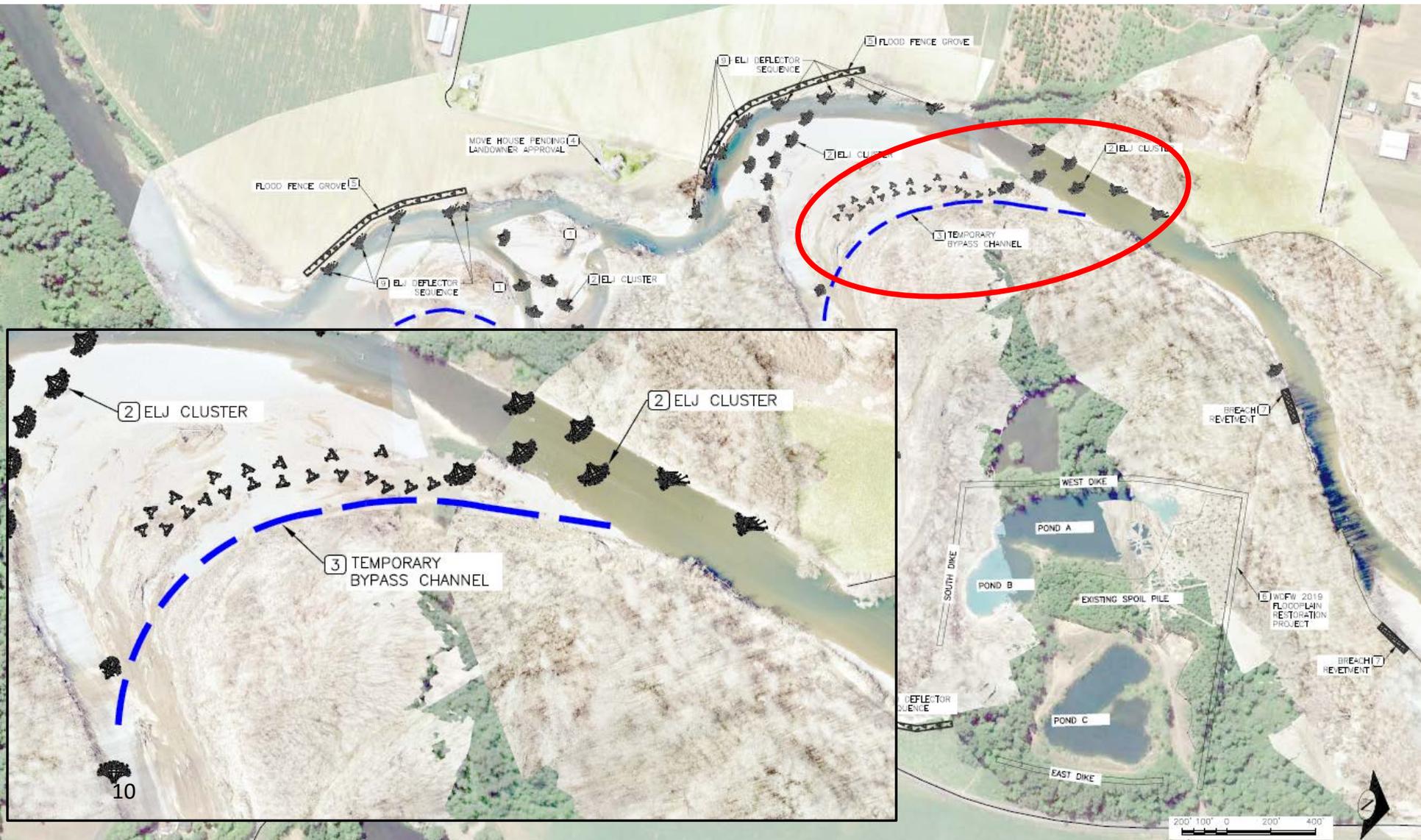


- Key:**
- Existing Channel Location
 - Previous Channel Location
 - Design Intent
 - Actual Flow Path
 - Most Recently Built ELJs
 - Past Built ELJs

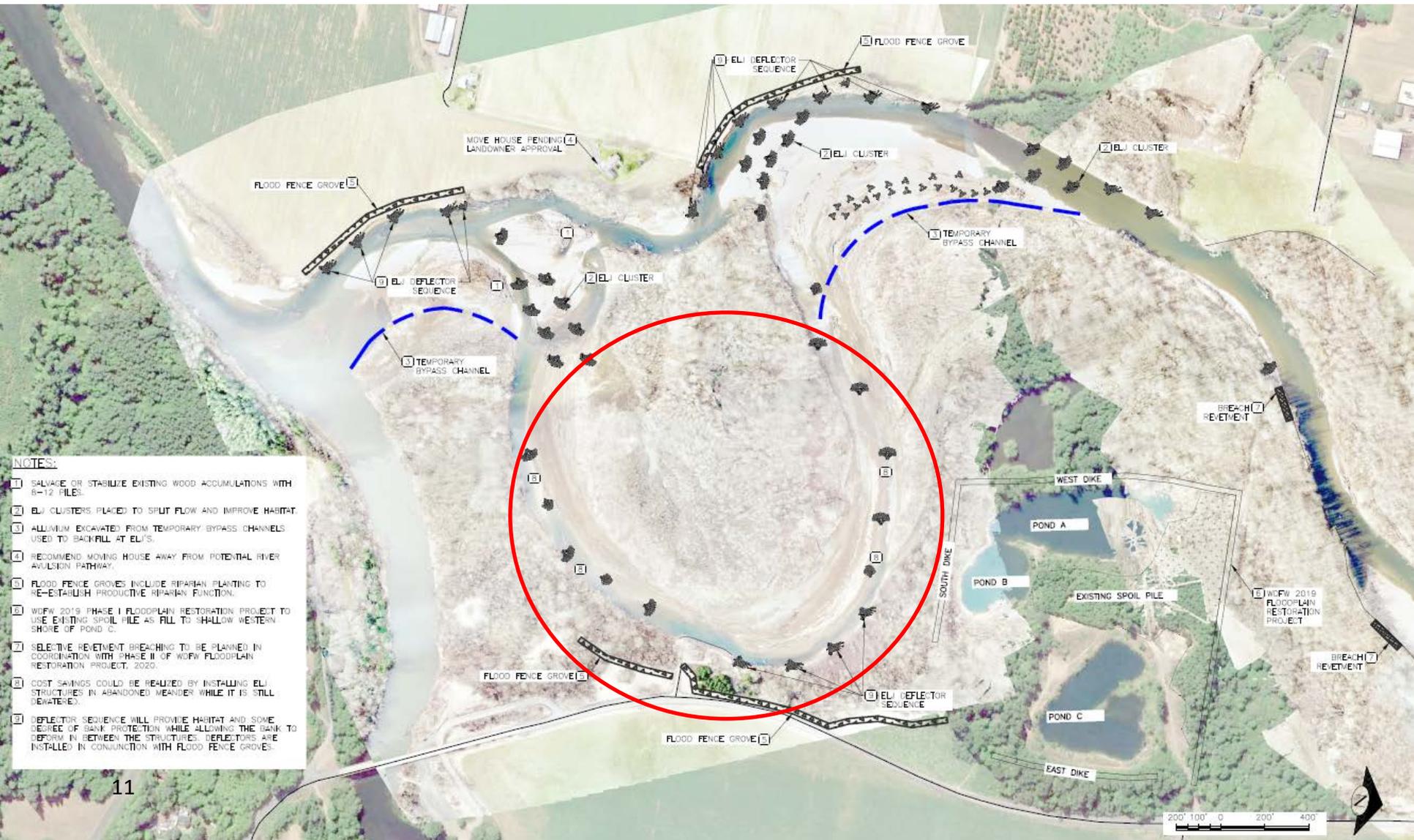
Preliminary Design (Geomorphic Action Groups)



Preliminary Design (Geomorphic Action Group #1)

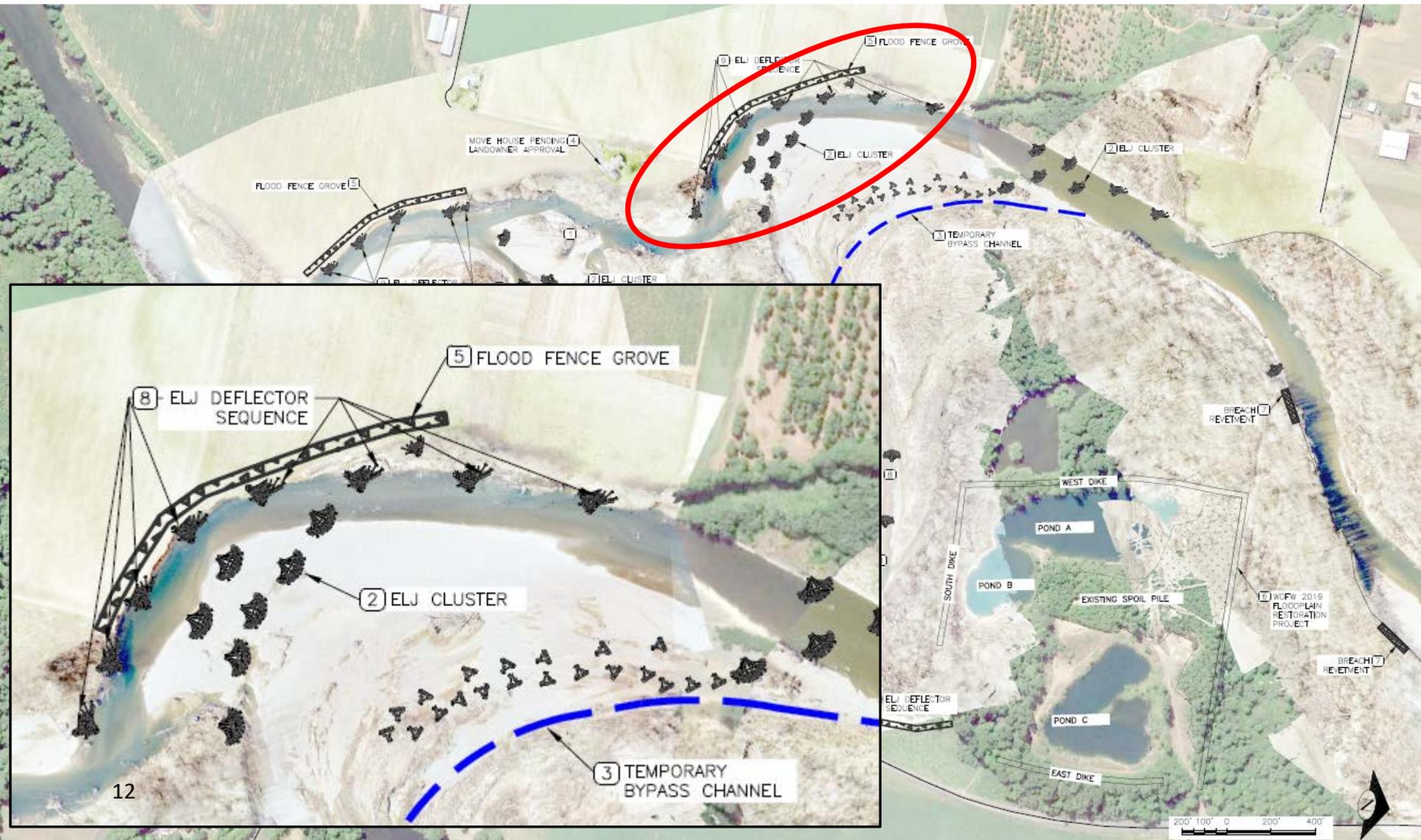


Preliminary Design (Geomorphic Action Group #2)

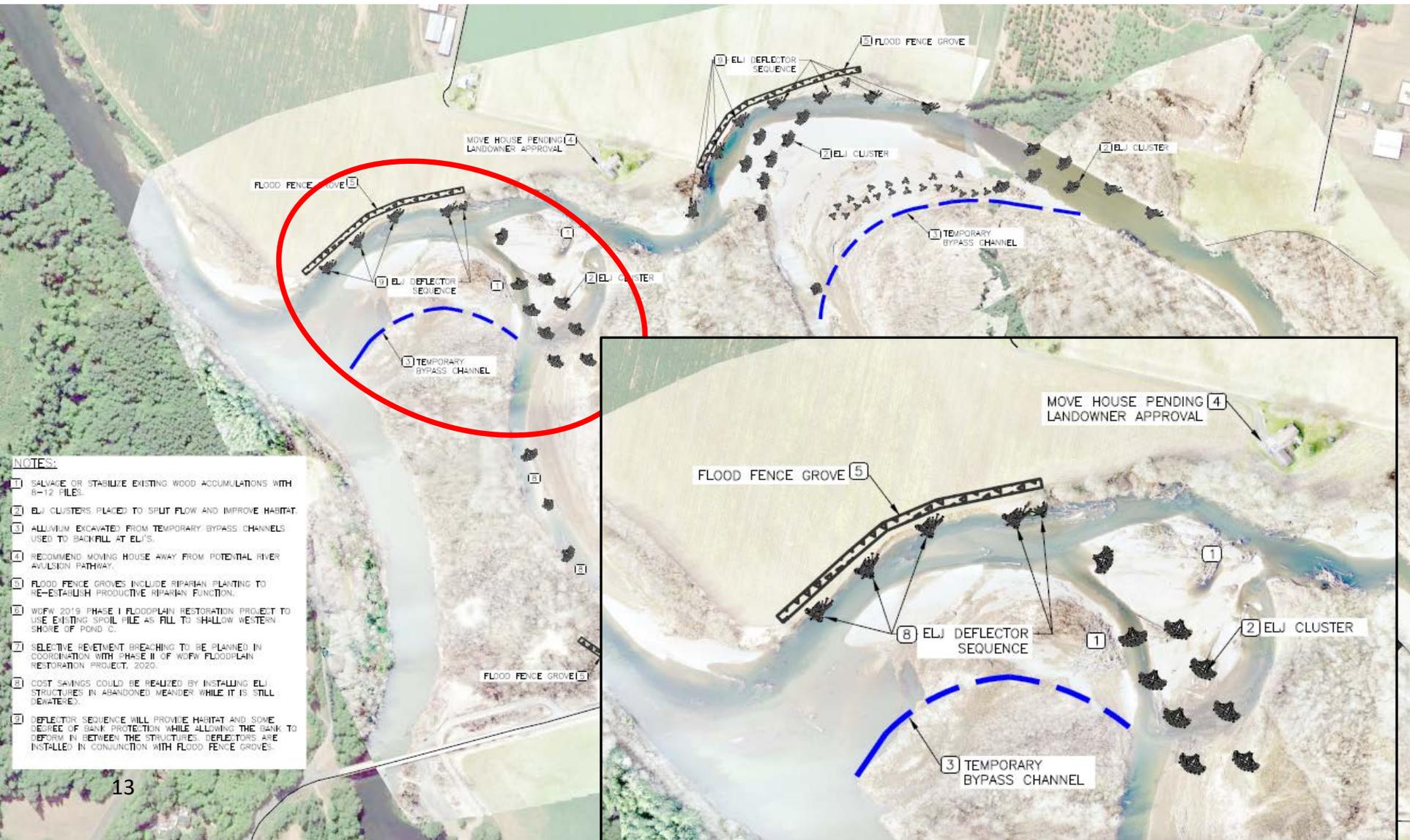


- NOTES:**
- 1 SALVAGE OR STABILIZE EXISTING WOOD ACCUMULATIONS WITH 8-12 PILES.
 - 2 ELU CLUSTERS PLACED TO SPLIT FLOW AND IMPROVE HABITAT.
 - 3 ALLUVIUM EXCAVATED FROM TEMPORARY BYPASS CHANNELS USED TO BACKFILL AT ELU'S.
 - 4 RECOMMEND MOVING HOUSE AWAY FROM POTENTIAL RIVER AVULSION PATHWAY.
 - 5 FLOOD FENCE GROVES INCLUDE RIPARIAN PLANTING TO RE-ESTABLISH PRODUCTIVE RIPARIAN FUNCTION.
 - 6 WDFW 2019 PHASE I FLOODPLAIN RESTORATION PROJECT TO USE EXISTING SPOIL PILE AS FILL TO SHALLOW WESTERN SHORE OF POND C.
 - 7 SELECTIVE RETIEMENT BREACHING TO BE PLANNED IN COORDINATION WITH PHASE II OF WDFW FLOODPLAIN RESTORATION PROJECT, 2020.
 - 8 COST SAVINGS COULD BE REALIZED BY INSTALLING ELU STRUCTURES IN ABANDONED MEANDER WHILE IT IS STILL DEWATERED.
 - 9 DEFLECTOR SEQUENCE WILL PROVIDE HABITAT AND SOME DEGREE OF BANK PROTECTION WHILE ALLOWING THE BANK TO DEFORM IN BETWEEN THE STRUCTURES. DEFLECTORS ARE INSTALLED IN CONJUNCTION WITH FLOOD FENCE GROVES.

Preliminary Design (Geomorphic Action Group #3)



Preliminary Design (Geomorphic Action Group #4)

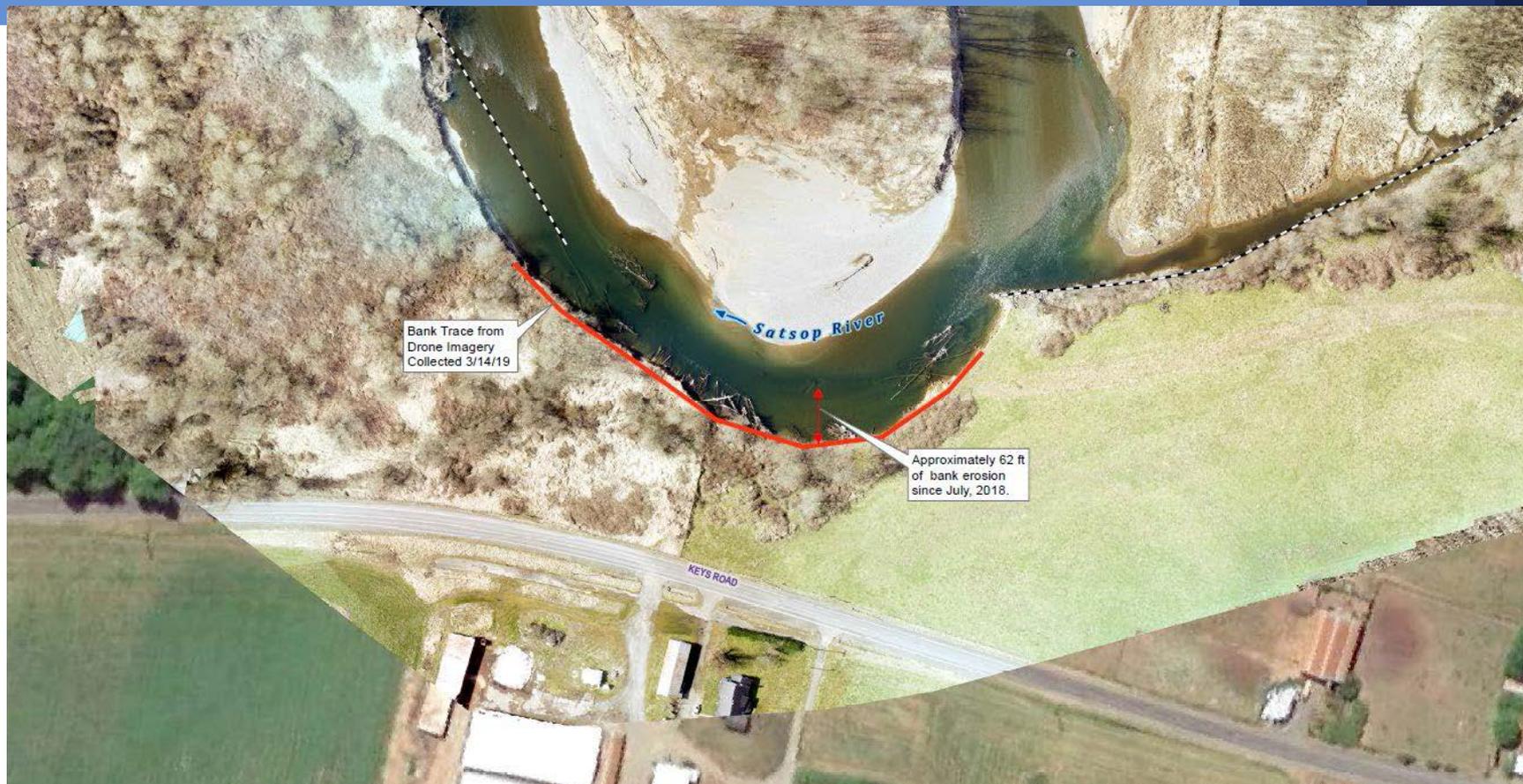


Action Now: Lower WDFW Revetment Removal



- Phase I (7/15-19/2019):** Lower 200' (remove rock toe, excavate 20' x 85' flow channel).
- Phase II (2020?):** Design underway to remove remainder of
14 revetment and protect Keys Rd. & Port well.

Action Now: Keys Road Protection



- 2019-21 Capital Budget:** \$185K “Keys Road Flood Protection.”
- Design, Engineering, Permitting:** Contracting underway for 2020 (hopefully) construction season.

Action Now: WDFW Habitat, Floodplain Restoration



- Phase I (now):** Remove spoils piles, shallow out ponds.
- Phase II (2020):** Remove levees/dikes, reconnect floodplain.

Action Now: WDFW Habitat, Floodplain Restoration



Action Phases

Phase I

2020

- Flow deflection to abandoned meander.
- Partial removal of WDFW left bank revetment.
- Installation of ELJ's to improve fish habitat and deflect flows from property and infrastructure.

Phase II

2021

- Install Deflector jams along eroding banks in conjunction with flood fencing
- Coordinate with WDFW on possible side channel enhancement based on river evolution.

Phase III

2030...

- Install setback revetments to establish protected forest buffer along Keys Road.
- Setback infrastructure restricting Lower Satsop meander belt, Keys Road and Port Well.

Lower Satsop Protection Program Prioritized Investment Areas (and Actions)

	Cost	Status
2019:		
1. WDFW -- Construct Habitat Restoration Project (Phase I)	Funded	Underway
2. WDFW -- Construct Lower Revetment Removal (Phase I)	Funded	Underway
3. GHC – Complete permitting for 2020 construction activities.	\$100 to \$160K **	Planned
2020:		
1. GHC -- Construct geomorphic group #1 and #2	\$1.5M to \$1.8M	Planned
2. GHC -- Construct Lower Satsop infrastructure protections (e.g., Keys Road, Port Well)	\$2.5 to \$4.0M **	Planned
3. WDFW -- Construct Habitat Restoration Project (Phase II)	Funded	Planned
4. GHC – Complete permitting for 2021 construction activities.	\$400K to \$600K	
2021:		
1. GHC -- Construct geomorphic group #3 and #4	\$2.5M to \$3.0M	Planned
2. WDFW -- Construct Lower Revetment Removal (Phase II)	Funded	Planned

¹⁹ **NOTE (1):** Costs are high-level estimates (indicators of scale, order of magnitude) to be refined in weeks ahead.
NOTE (2): ** \$185K in 2019-21 State Capital Budget funding secured for Keys Road Protection will be applied here.



Contacts:

Organization	
Grays Harbor County	Rob Wilson 360/249-4222 RWilson@co.grays-harbor.wa.us
Grays Harbor Conservation District	Anthony Waldrop 360/249-8532 ghcdwater@gmail.com
WA Department of Fish and Wildlife	Michelle Cramer 360/902-2610 Michelle.Cramer@dfw.wa.gov Doris Small 360/902-2258 doris.small@dfw.wa.gov
Natural Systems Design	Miranda Smith 206/480-1127 miranda@naturaldes.com
Chehalis River Basin Flood Authority	Scott Boettcher 360/480-6600 scottb@sbgh-partners.com

Resource –

https://www.ezview.wa.gov/site/alias__1973/37263/DesktopDefault.aspx?alias=1973&PageID=37263

The screenshot shows a web browser window displaying the EZview portal. The page title is "Grays Harbor County - Lower Satsop Planning, Visioning, and Priority Setting Project". The URL is https://www.ezview.wa.gov/site/alias__1973/37263/DesktopDefault.aspx?alias=1973&PageID=37263. The page features a navigation menu with "Overview", "Contacts", "Events", and "Library" (selected). Below the menu is a "Documents" section containing a table of files.

File Name	File Size	Category	Date Added
Lower_Satsop_Update_7-25-2019.pptx	18 MB	None	07/25/19 11:17 AM
Lower_Satsop_Update_7-25-2019.pdf	7.2 MB	None	07/25/19 11:17 AM
Lower_Satsop_Funding_2019-2021.pdf	151.4 KB	None	05/25/19 08:07 AM
Keys_Road_Threat_Mile_1.5_to_1.6_(5-25-2019).pdf	14.7 MB	NSD	05/25/19 07:27 AM
Preliminary_DRAFT_Cost_Estimates_Action_Areas_I-IV_(5-25-2019).pdf	107.1 KB	NSD	05/25/19 07:26 AM
L_Satsop_Geomorphic_Action_Areas_(5-25-2019).pdf	12.8 MB	NSD	05/25/19 07:25 AM
PROPOSED-CONDITIONS-v2_5-16-2019.pdf	8.8 MB	5-16-2019 Flood Auth...	05/20/19 09:47 AM
NSD_Chehalis_Basin_Flood_Authority_Meeting_5-16-19.pdf	6 MB	5-16-2019 Flood Auth...	05/20/19 09:47 AM
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