



BUREAU OF RECLAMATION



Salmon Recovery Funding Board

WASHINGTON STATE RECREATION AND CONSERVATION OFFICE



RM 16-21 Middle Entiat Habitat Restoration: Process-Based Restoration at the Reach Scale

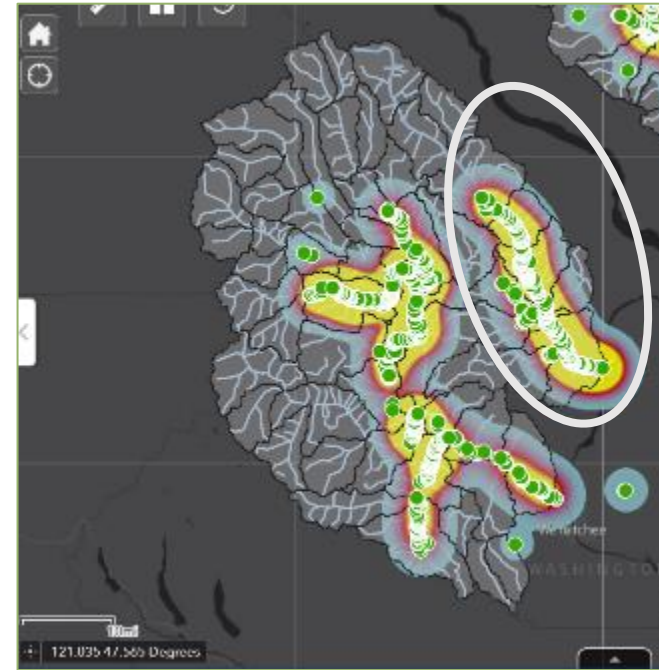
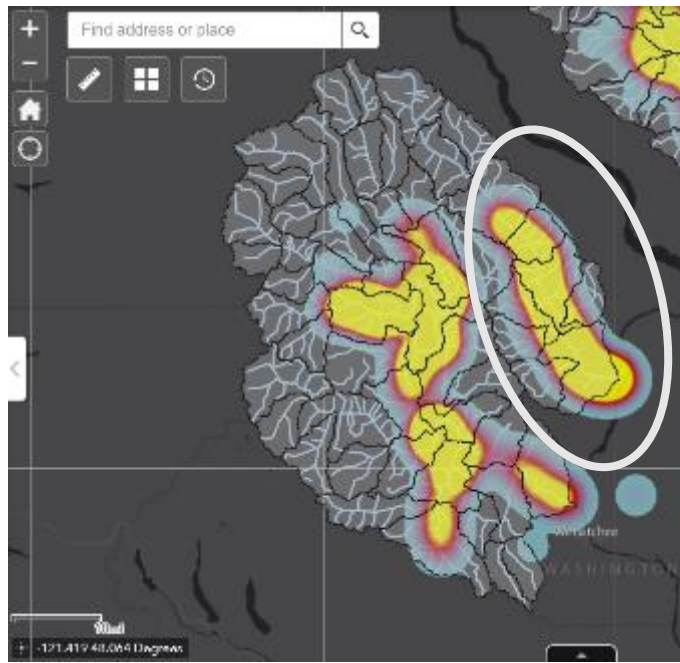


Reach Based Restoration: Why and Where?

“Entiatqua” – Place of Grassy Water (Moses-Columbia Salish Peoples)



The four subbasins: Entiat, Okanogan, Methow and Wenatchee



Species	Water Year											
	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug	Sept
Spring Chinook												
migration												
spawning												
incubation												
emergence												
rearing												
downstream migration												
Steelhead												
migration & holding												
spawning												
incubation												
emergence												
rearing												
downstream migration												

Spring Chinook spawning redd heat map-
Wenatchee and Entiat Rivers

Steelhead redd heat map-
Wenatchee and Entiat Rivers

1997- 1999

ESA Listing of Upper Columbia Spring Chinook, bull trout and Steelhead

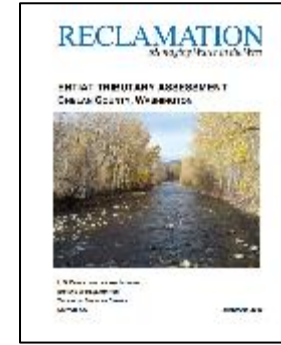
1999

Formation of Salmon Recovery Regions and Entiat Planning Unit



2007

Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan



2009

Bureau of Reclamation Tributary and Reach Assessments



State of Washington Governor's Salmon Recovery Office

1999

'Washington Way' Watershed Management Act for Salmon Recovery

2004

Entiat Watershed Plan Adopted



2008

Federal Columbia River Power System Columbia Basin Fish Accords



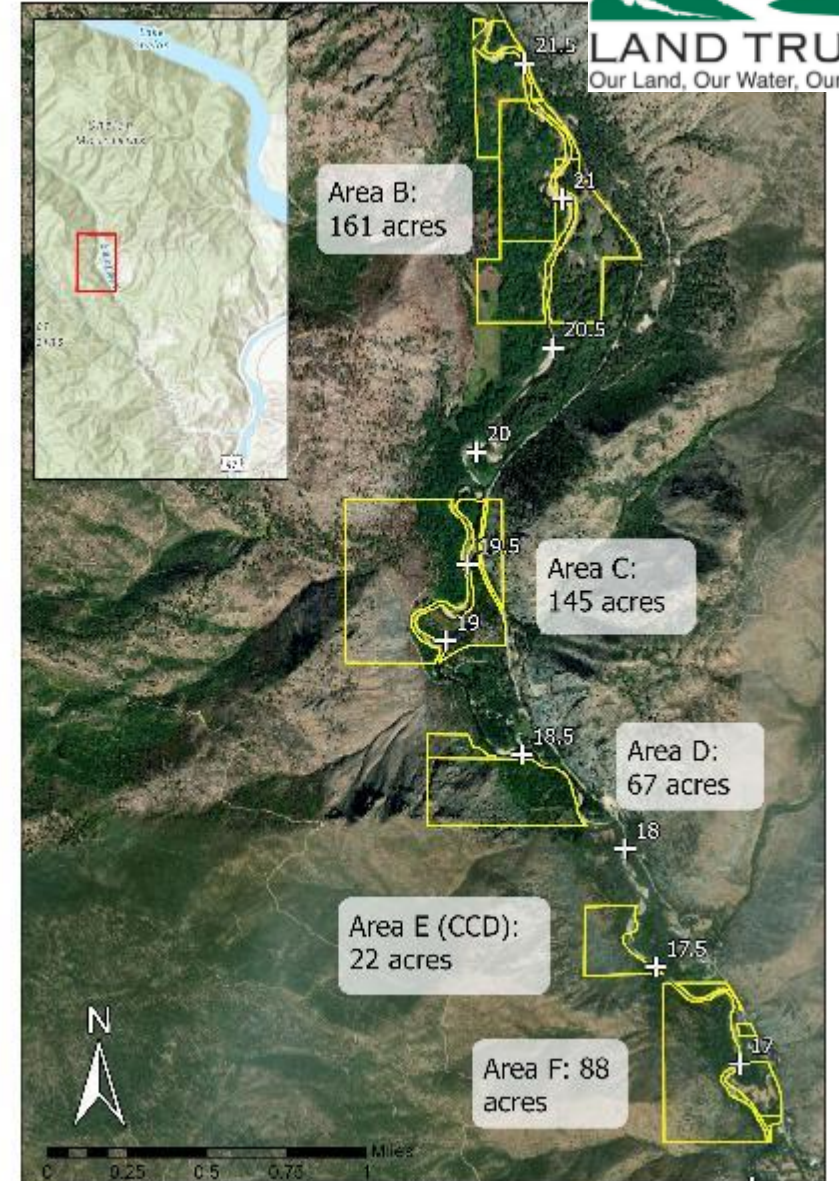


Conservation Property Acquisitions RM 16-26

2001 – 2018 Chelan Douglas Land Trust acquired 536 acres and 5.2 miles of the highest priority spawning and rearing habitat for spring and summer chinook, steelhead, and bulltrout.



Middle Entiat Restoration Projects (2019/2020): Chelan-Douglas Land Trust



Project Components

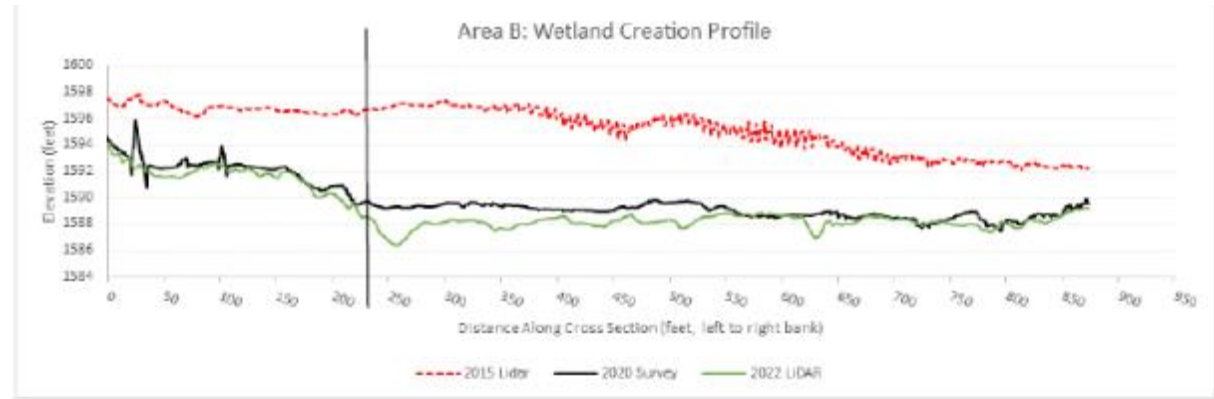


Figure 16- Topographic elevation cross-section through the wetland creation zone showing 2015 LIDAR data, 2020 survey data and the 2022 LIDAR data.



2011: Before Levee Removal



2019: Immediately Post Construction



2022: Active Floodplain

Side Channel Design



River Mile 16: Floodplain location of house removal and multi-thread side channel complex

Future LWD



RM 18 Reedcanary grass meadow treatment and planting



Deep planting pots



RM 21 Mechanical Planting in gravel bars with Stinger at former levee

Apex Jam



Channel inlet Jam



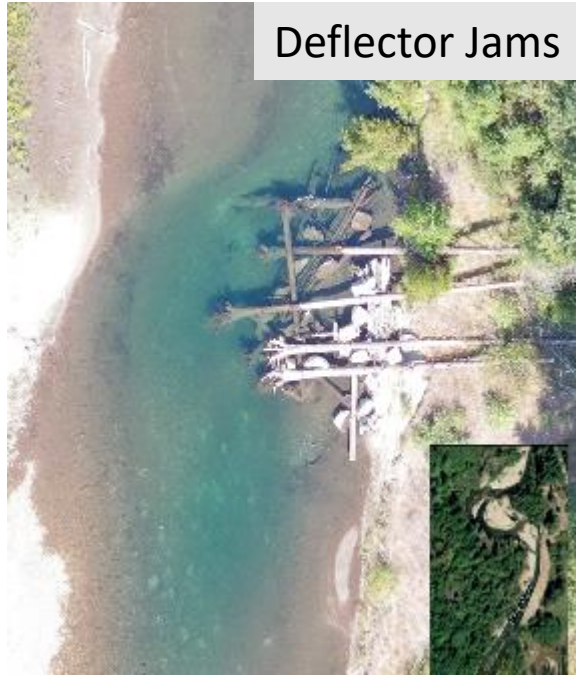
Meander Jam



Bank Enhancement



Deflector Jams



Side channel structures



Lessons Learned: Landowner Agreements and Civil Liability



Chelan County tag

Liability issues:

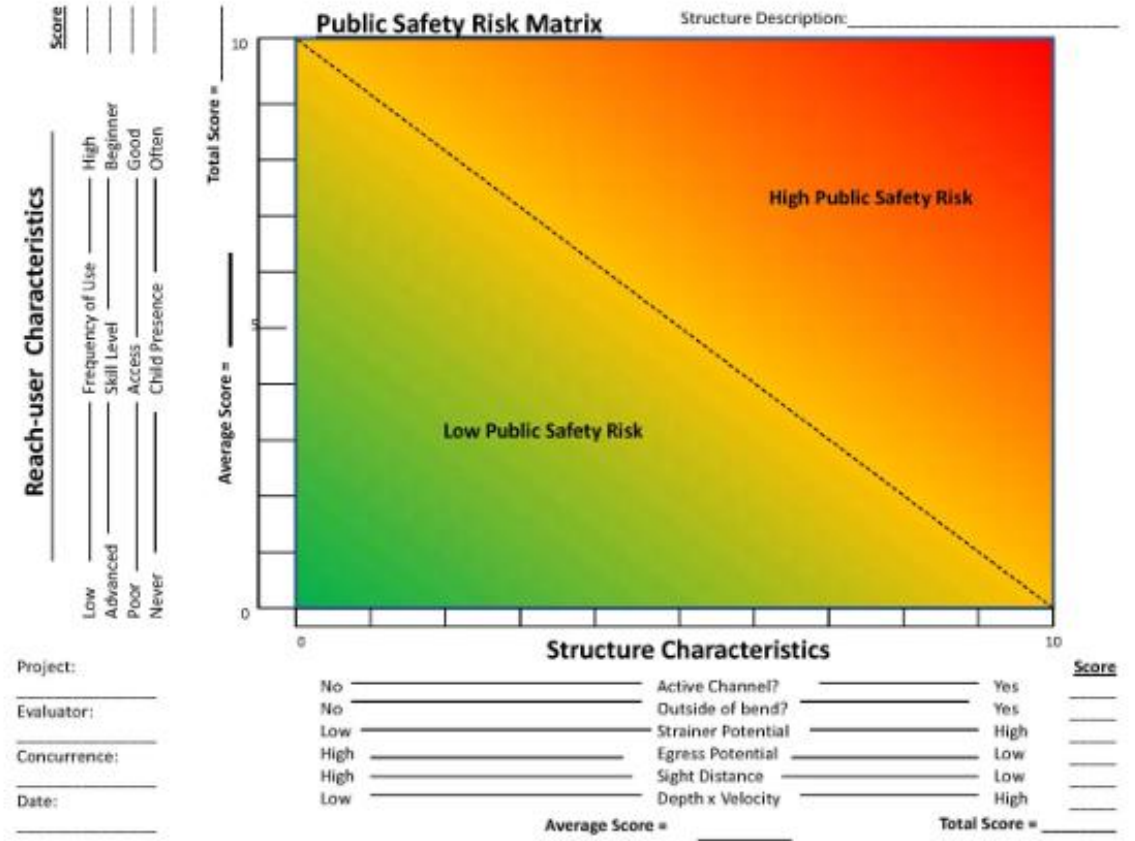
Landowner Agreement provisions:

- 9. Repair or remove elements of the project if, in CDLT's sole discretion, determination of the Chelan County Commissioners, or order of a court of competent jurisdiction, the project or any part thereof is adversely affecting public safety or habitat conditions.. The project and project components remain the property of Chelan County Natural Resources.
- 10. Comply with any and all applicable federal, state, and local laws, regulations and/or policies.
- 11. Hold Landowner, its officers, directors, agents and employees harmless for all claims and liability arising from actions by CCNRD, its agents and employees, and for an injury to persons or property resulting from CCNRD's activities on Landowner's property.

Recreational immunity Statute

Proposed Landowner Immunity Legislation (property damage)

Revised Code of Washington (RCW) 77.85.050,



BOR- Large Woody Material Risk Based Design Guidelines

Lessons Learned: Log Procurement and Sorting

2,200 logs and 350+ tons of slash
DBH 12 – 24”
25- 80 feet in length



Lessons Learned: Pile Driving and Bolted Connections



Lessons Learned: Isolations



Lessons Learned: Post-Project Monitoring

<https://arcg.is/109uXb0>

