



Draft Lower Elwha River Channel Migration Zone October 29, 2024

This project is funded in part by WA Dept. of Ecology (Grant # SEASPC-2325-CLoCD-00006)





Channel Migration Zones (CMZ) are areas in a floodplain where a river or stream channel can be expected to move naturally over time.

- Overall goal is to better understand the current and future patterns of erosion and flooding along the Lower Elwha River, Indian Creek, and Little River systems to incorporate risk-informed decisions into various planning processes to benefit public safety, infrastructure, and aquatic and riparian ecology.
- The Elwha River is a shoreline of statewide significance under the Shoreline Management Act (SMA).
- The removal of two dams in the Elwha River has affected the river environment downstream and at the delta.
- A CMZ delineation gives planners and resource managers science-based reach scale information necessary to establish jurisdictional boundaries; better protect people, development, and natural resources from flood and erosion hazards.
- Shoreline use and development activities are regulated locally by the Clallam County Shoreline Master Program (SMP), which establishes limitations and requirements specific to CMZs.

Delineate a detailed CMZ for the Lower Elwha River, Indian Creek, and Little River to provide a better understanding of flooding and erosion hazards for planners, co-managers, landowners, and conservation partners.

➤ Predict areas that are at risk of future erosion along creeks and rivers

- Project Background
- Introduction to CMZs
- Study Methods
- Example CMZ delineation
- Q&A and discussion

Study Area

Elwha River

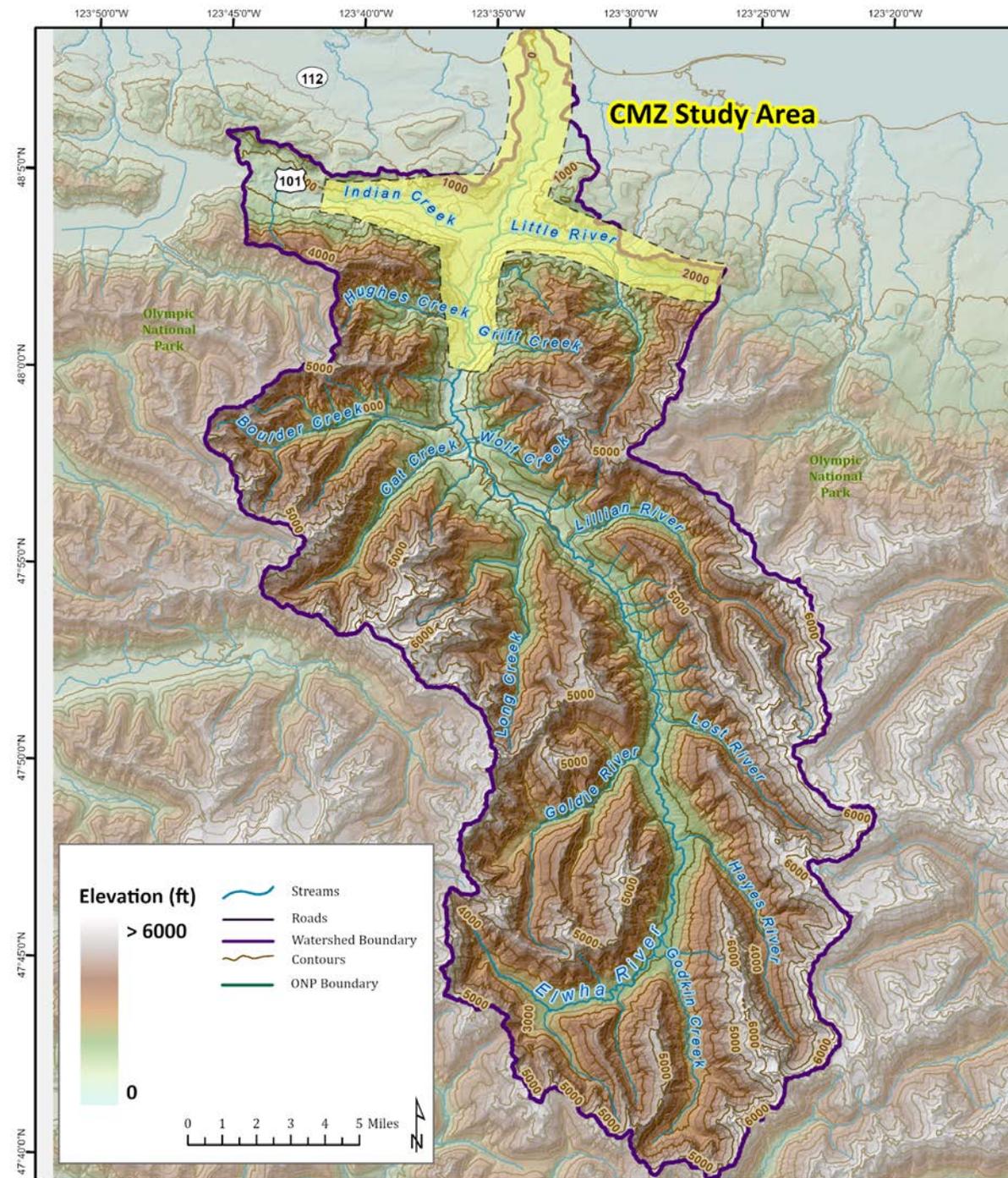
- ▶ ONP to Strait of Juan de Fuca
- ▶ 12.5 RM

Indian Creek

- ▶ Lake Sutherland to Elwha River
- ▶ 6 RM

Little River

- ▶ ONP to Elwha River
- ▶ 7 RM



Elwha River – Dam removal



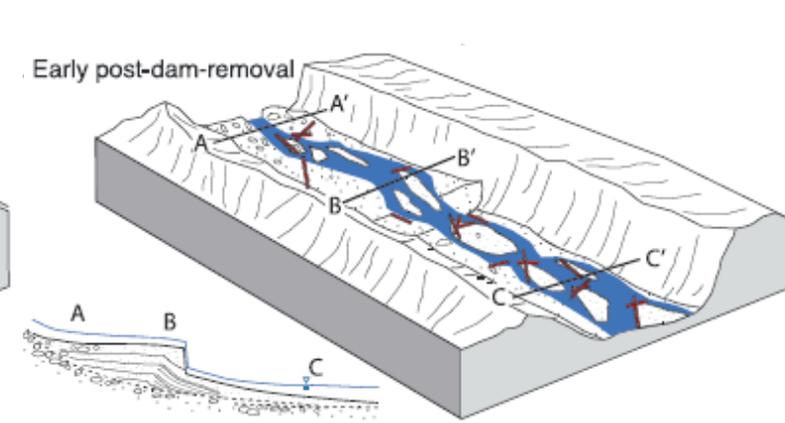
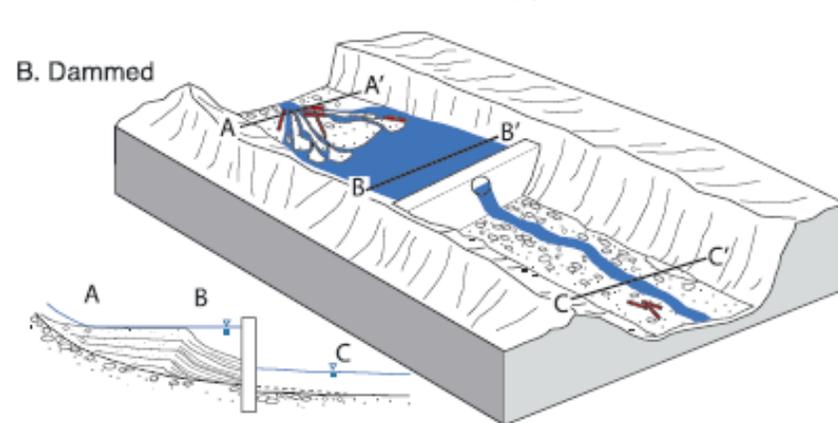
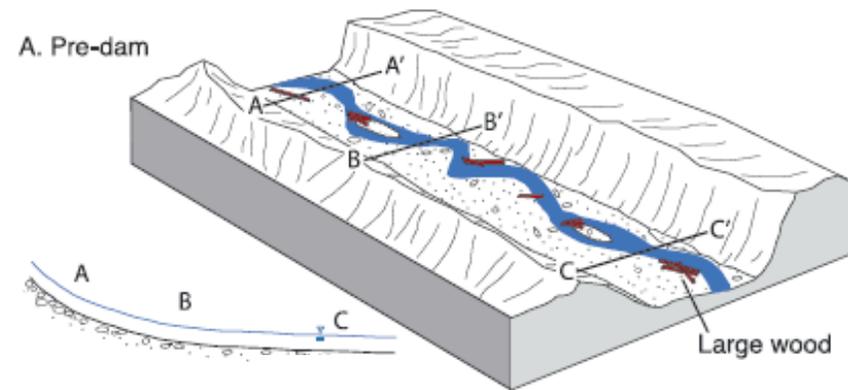
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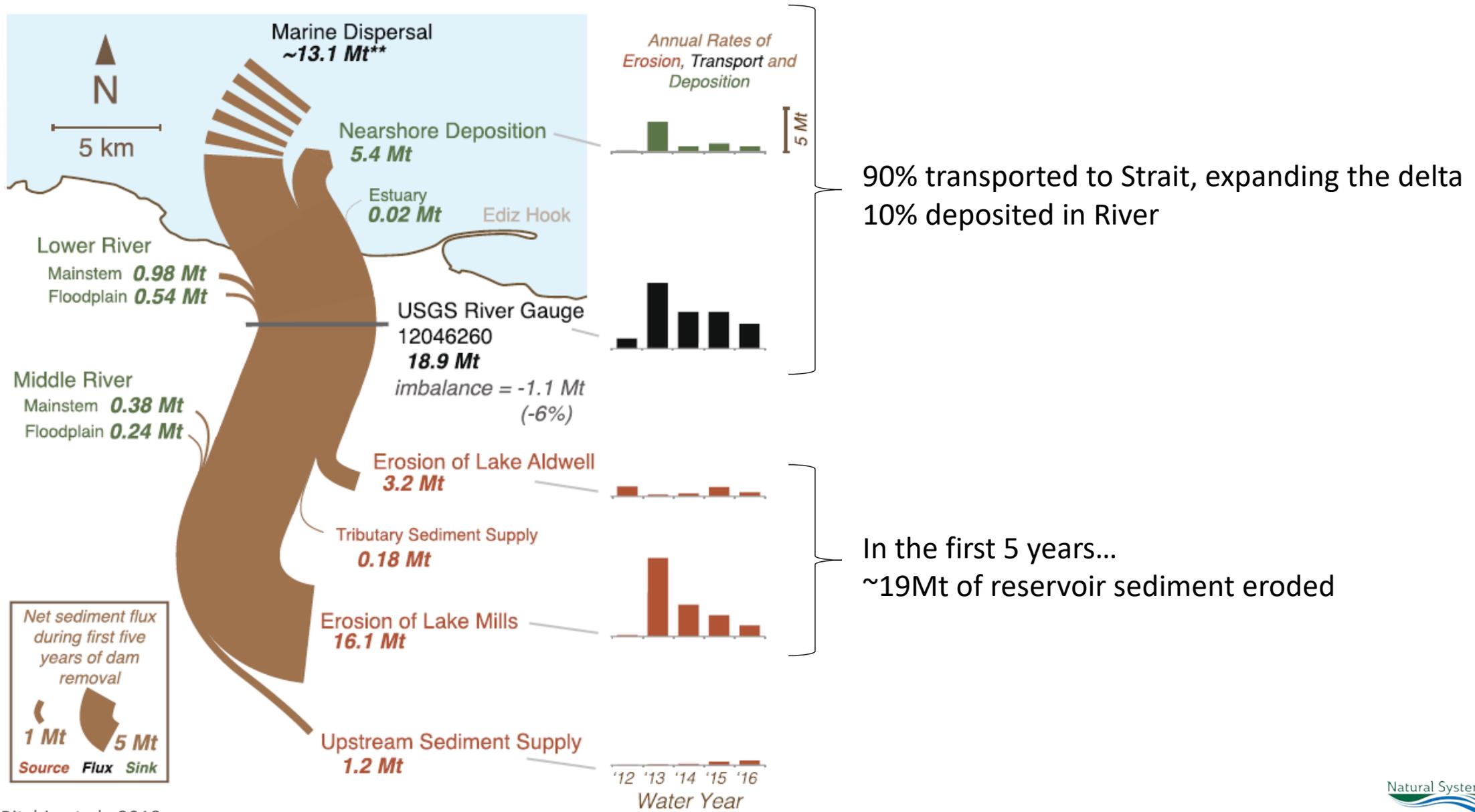
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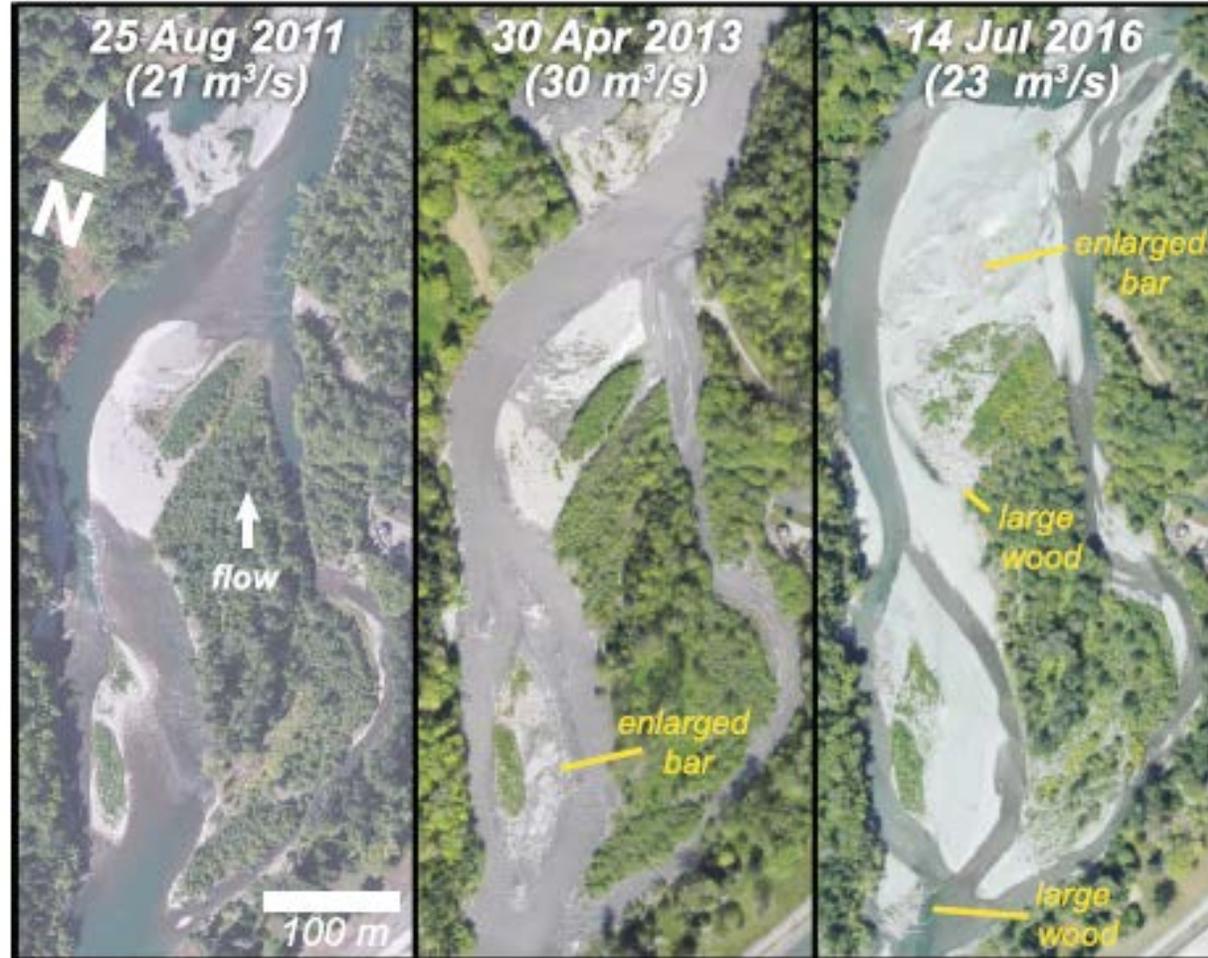
<https://www.opb.org/article/2022/08/02/elwha-river-transformed-10-years-after-dam-removal/>



Elwha River – Dam removal



(a) Lower Elwha River at Rkm 4.0

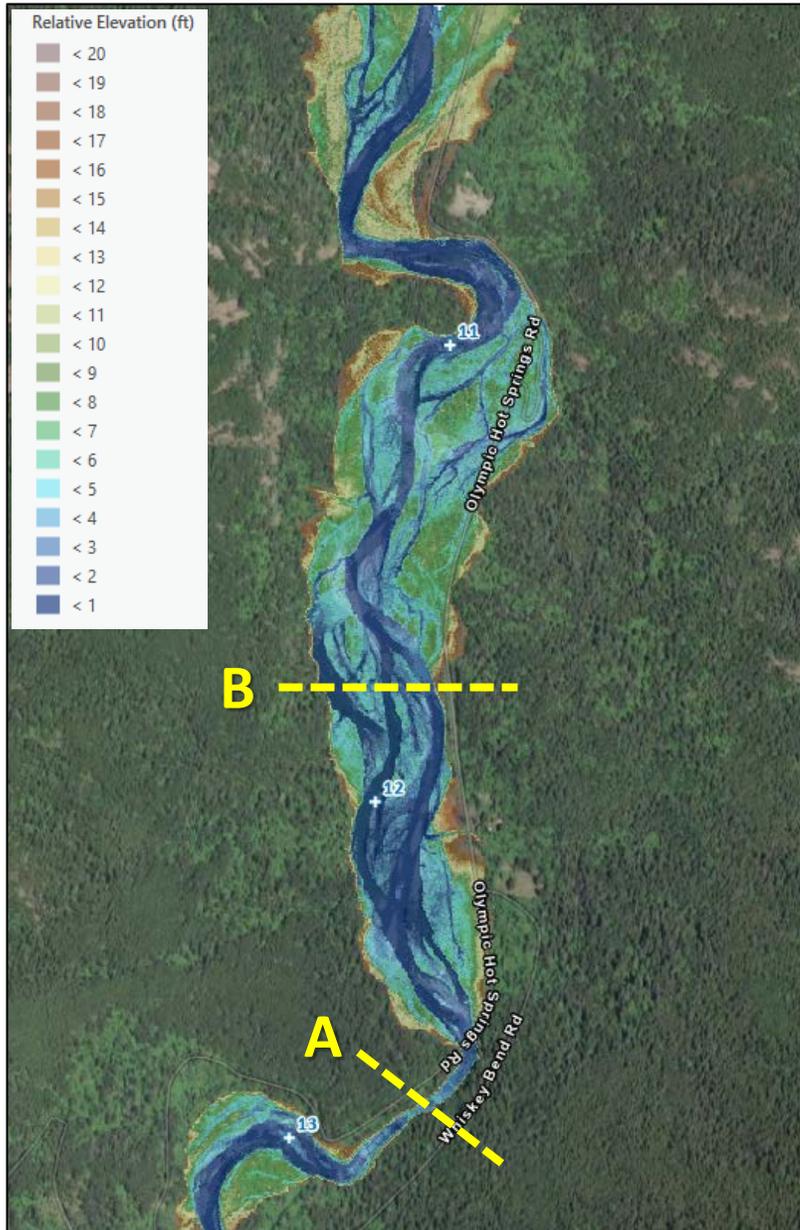


(b) Middle Elwha River at Rkm 17.5

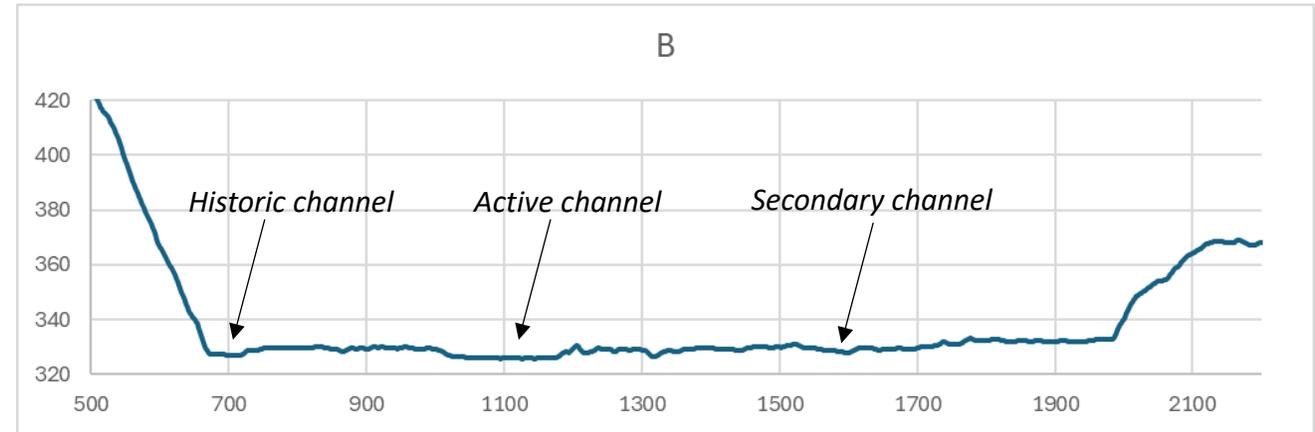


Ritchie et al., 2018

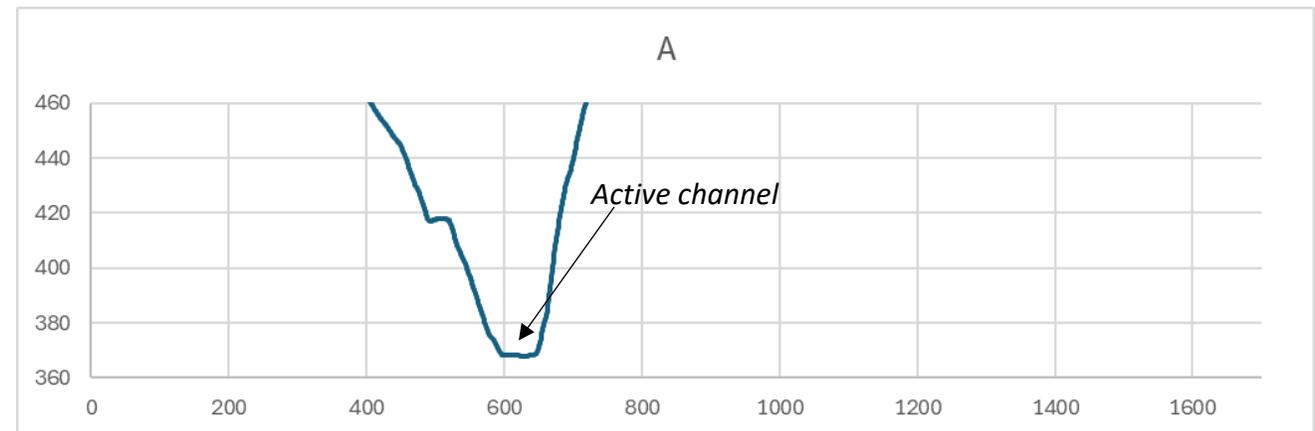
The Elwha River is continuing to adjust from dam removal.

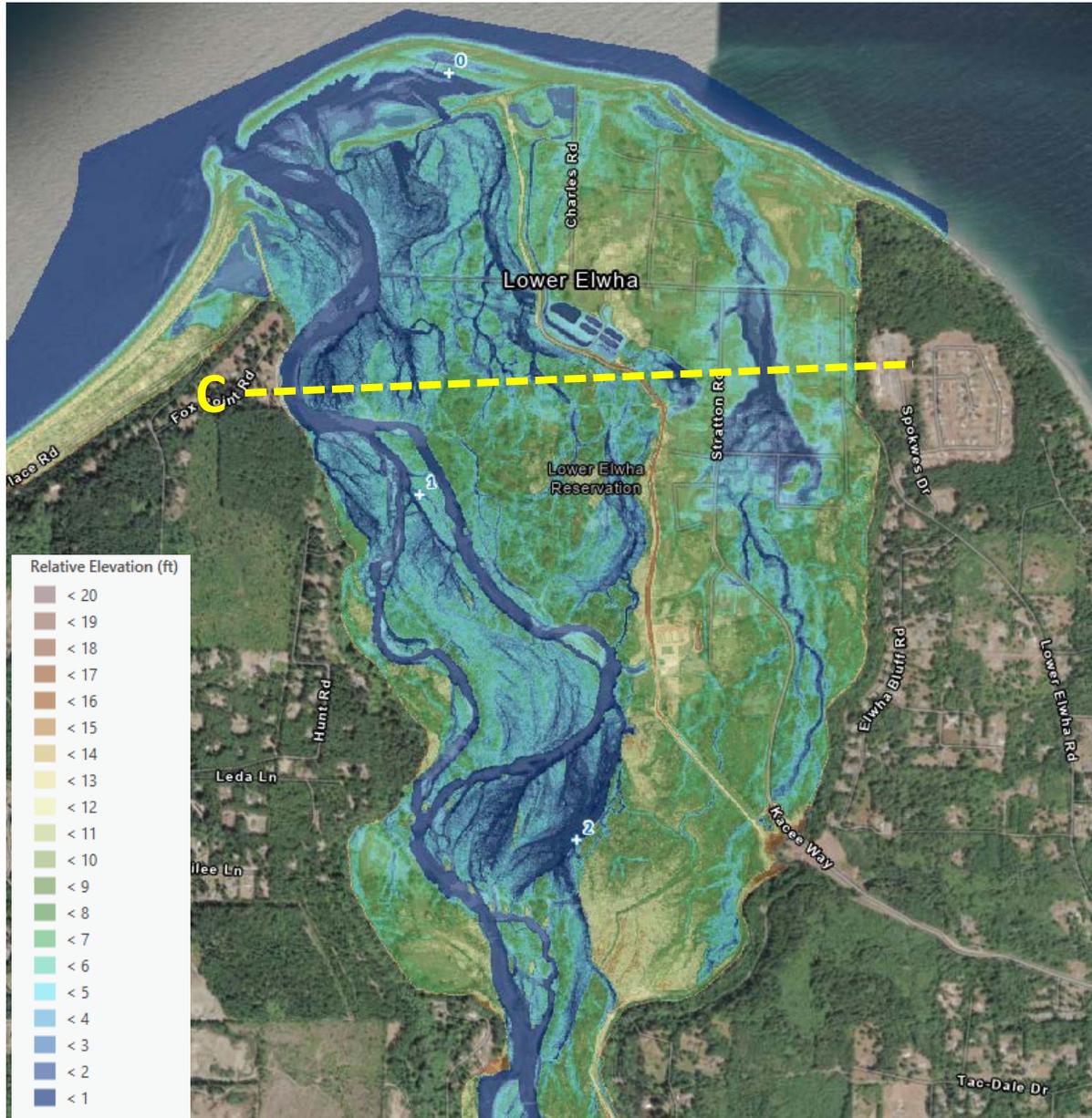


Wide floodplain with multiple channels

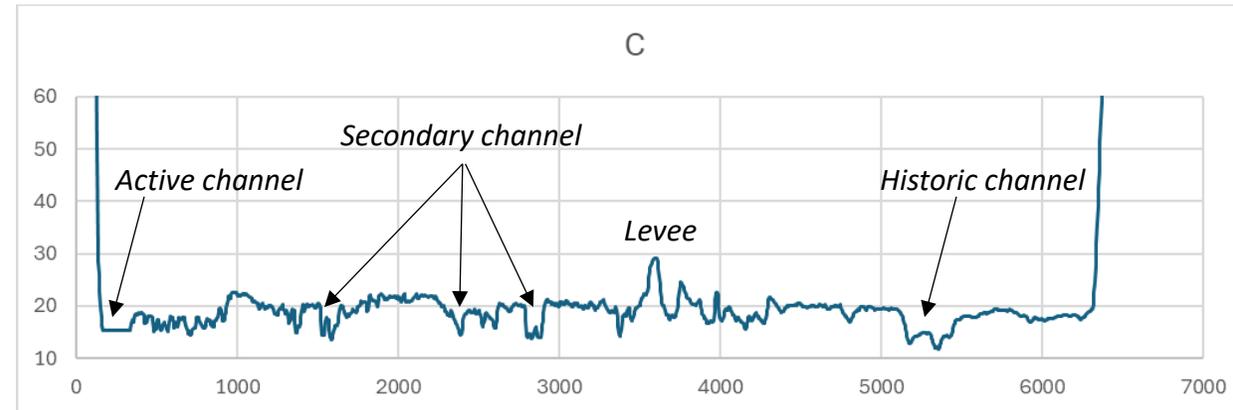


Narrow canyon with a single channel





Wide river delta with active and historic channels



Lower Elwha River, 2016



Flooding – inundation from high river flows.

The FEMA 100-year floodplain is a standard definition of risk area

- *1% chance in a given year*

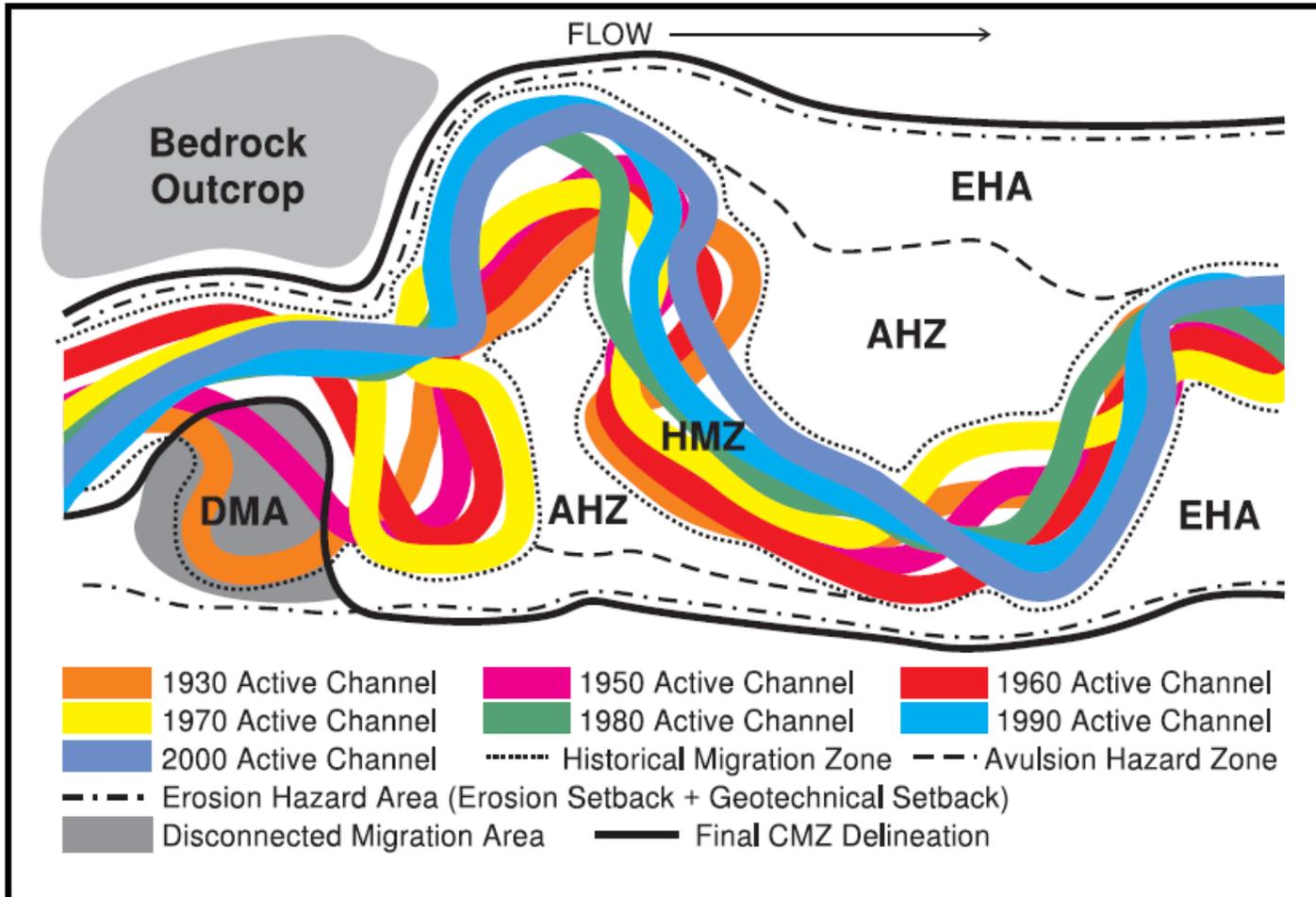
Lower Elwha River, 2020



Erosion – removal and transport of soil or rock by river processes.

- Bank erosion
- Channel avulsion
- Mass wasting

Delineating Elements of a Channel Migration Zone

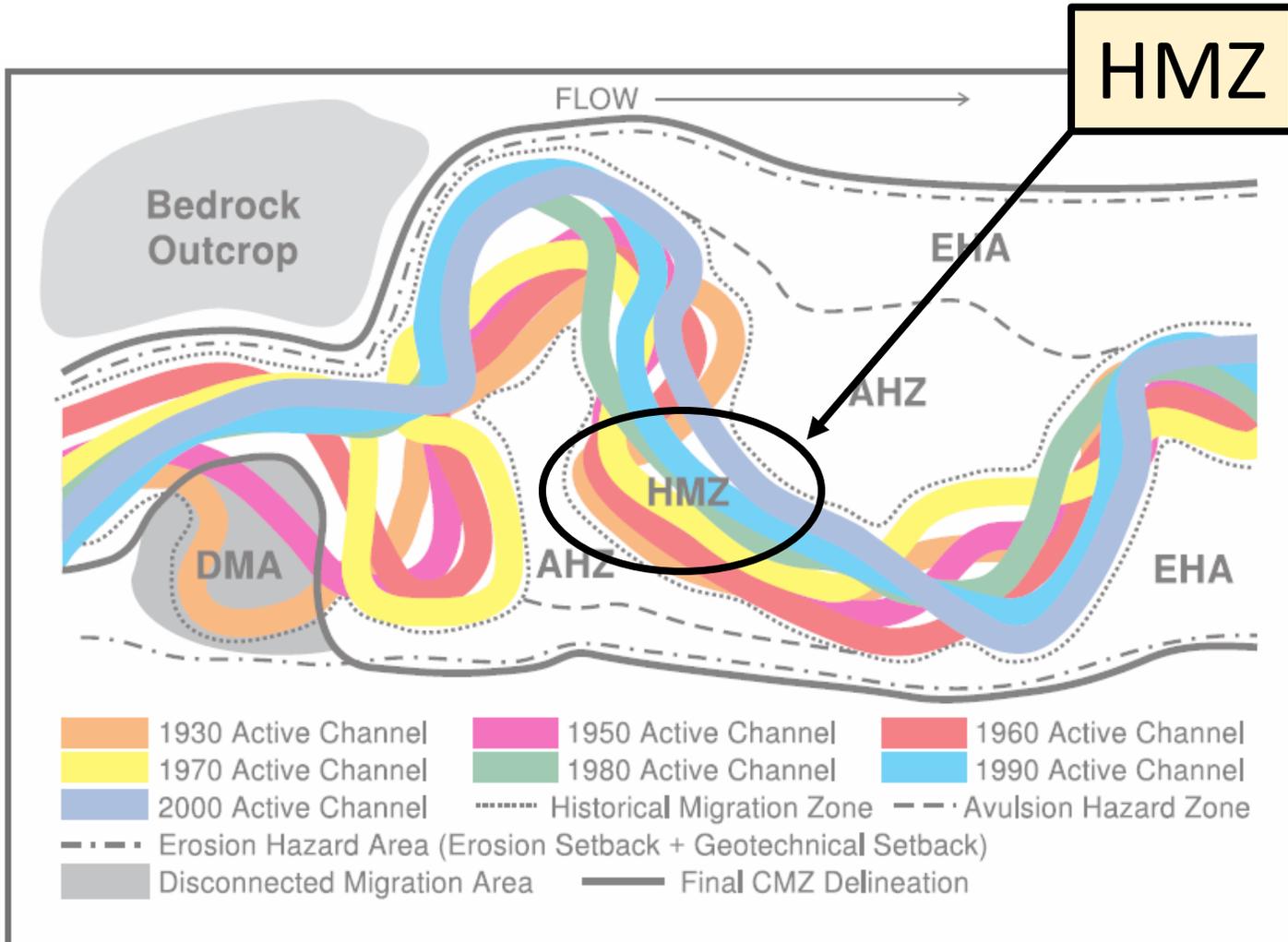


The CMZ boundary delineates the area in which channel processes will occur over a specified period of time: 100 years

- Historical Migration Zone (HMZ)
- Avulsion Hazard Zone (AHZ)
- Erosion Hazard Area (EHA)
- Disconnected Migration Area (DMA)

$$\text{CMZ} = \text{HMZ} + \text{AHZ} + \text{EHA} - \text{DMA}$$

A Framework for Delineating Channel Migration Zones (Rapp and Abbe, 2003)

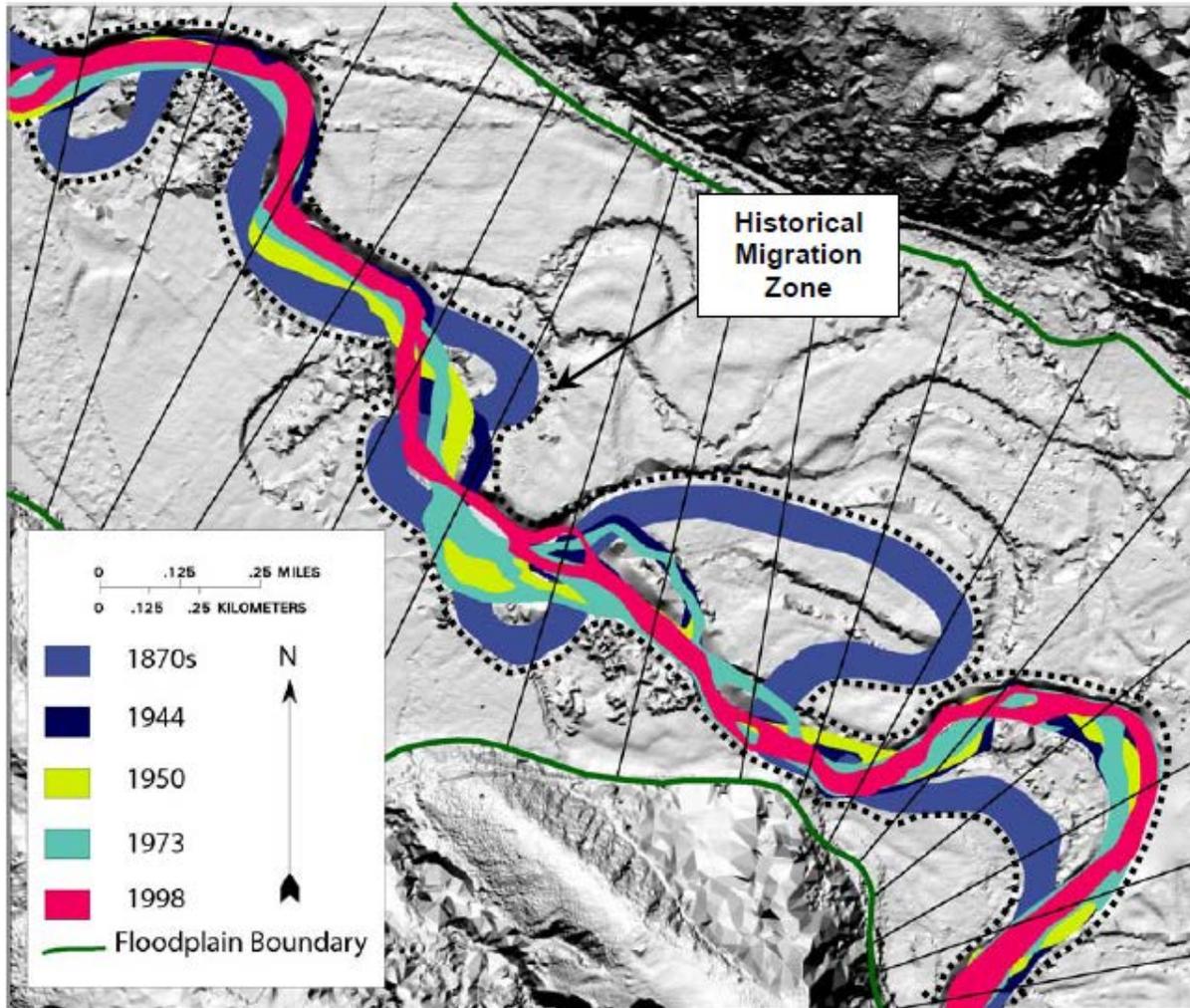


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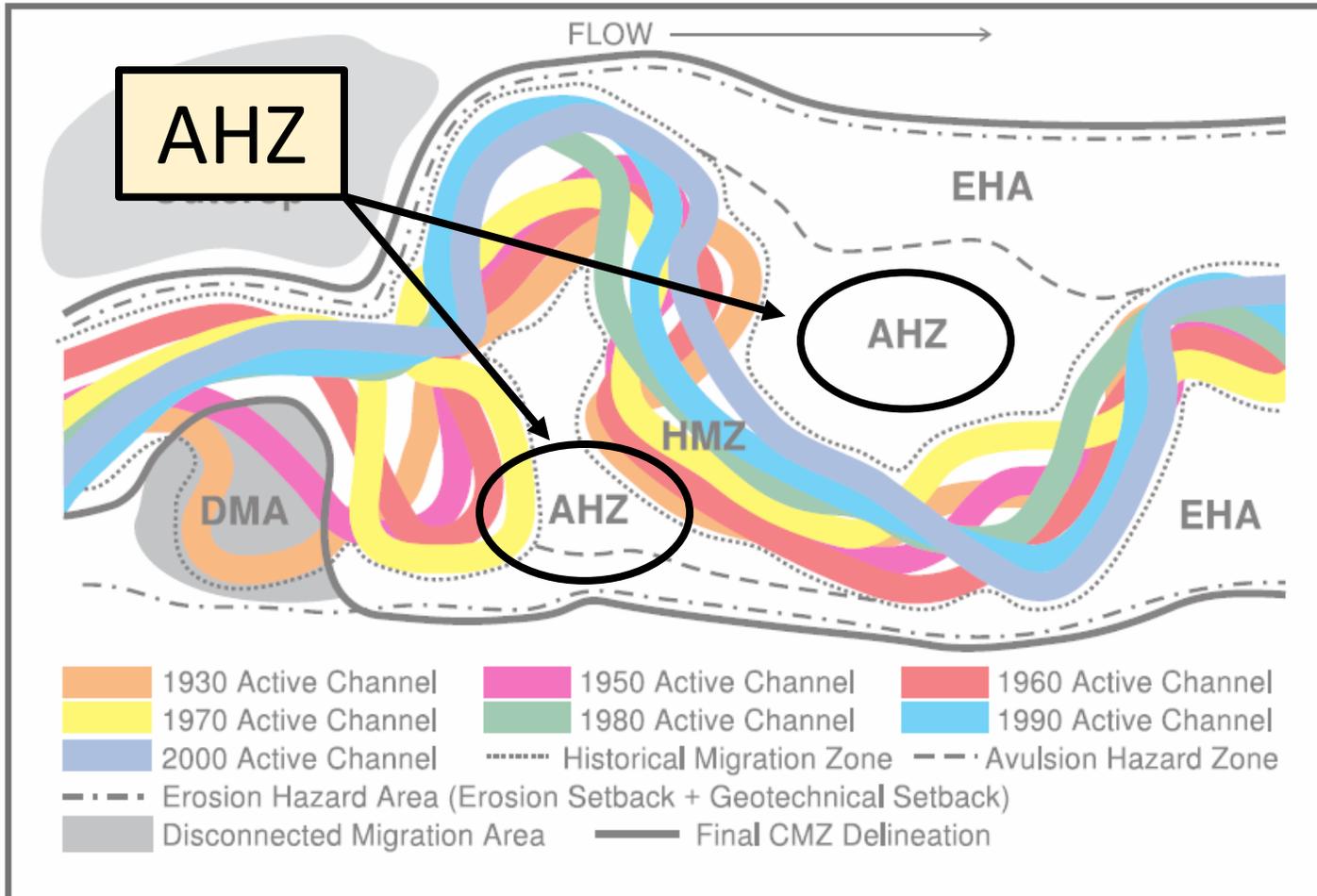
A Framework for Delineating Channel Migration Zones (Rapp and Abbe, 2003)



A Framework for Delineating Channel Migration Zones (Rapp and Abbe, 2003)

The HMZ boundary is the area the channel has occupied over the course of the historical record.

- Aerial photographs
- USGS topographic maps
- GLO survey plats

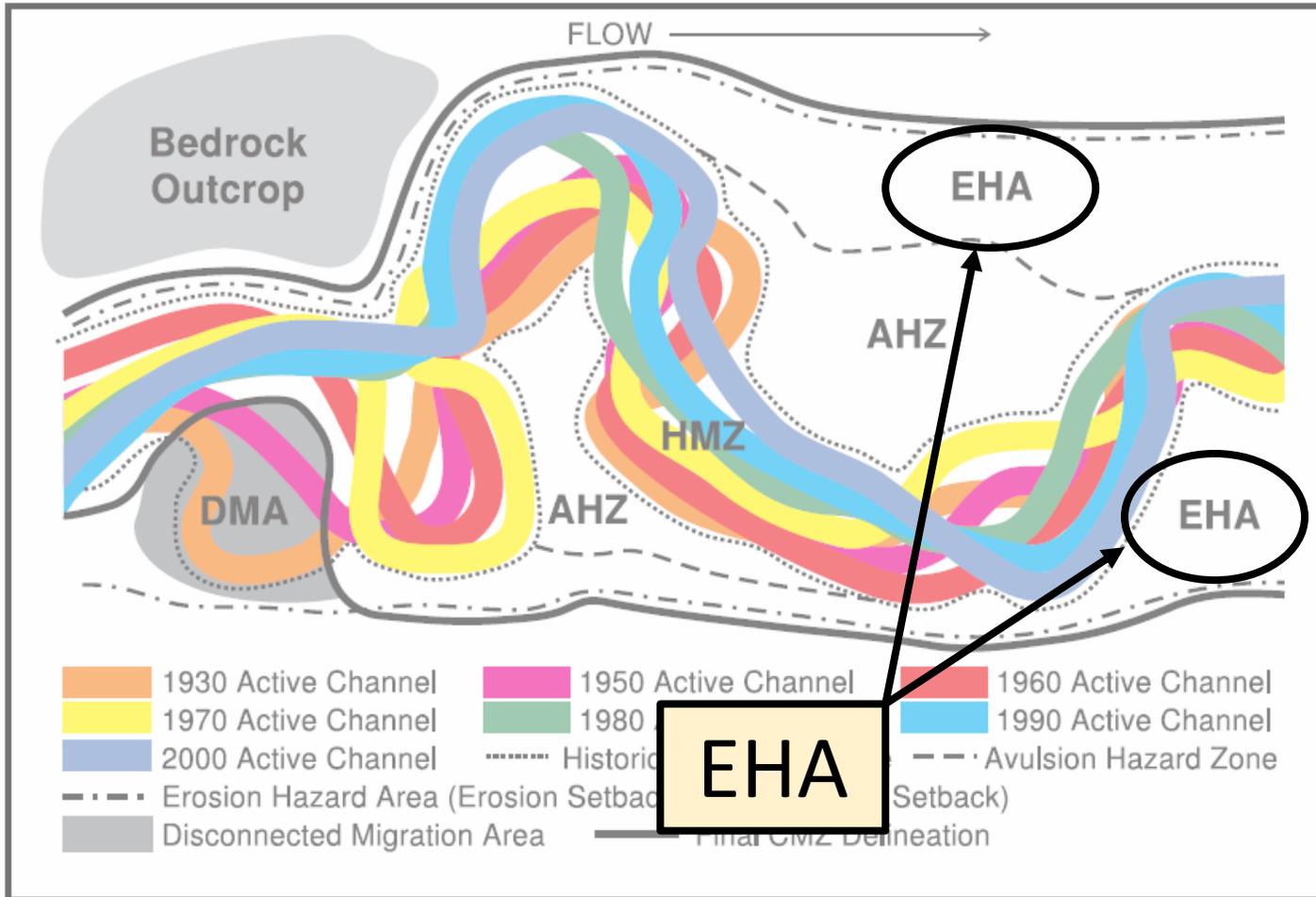


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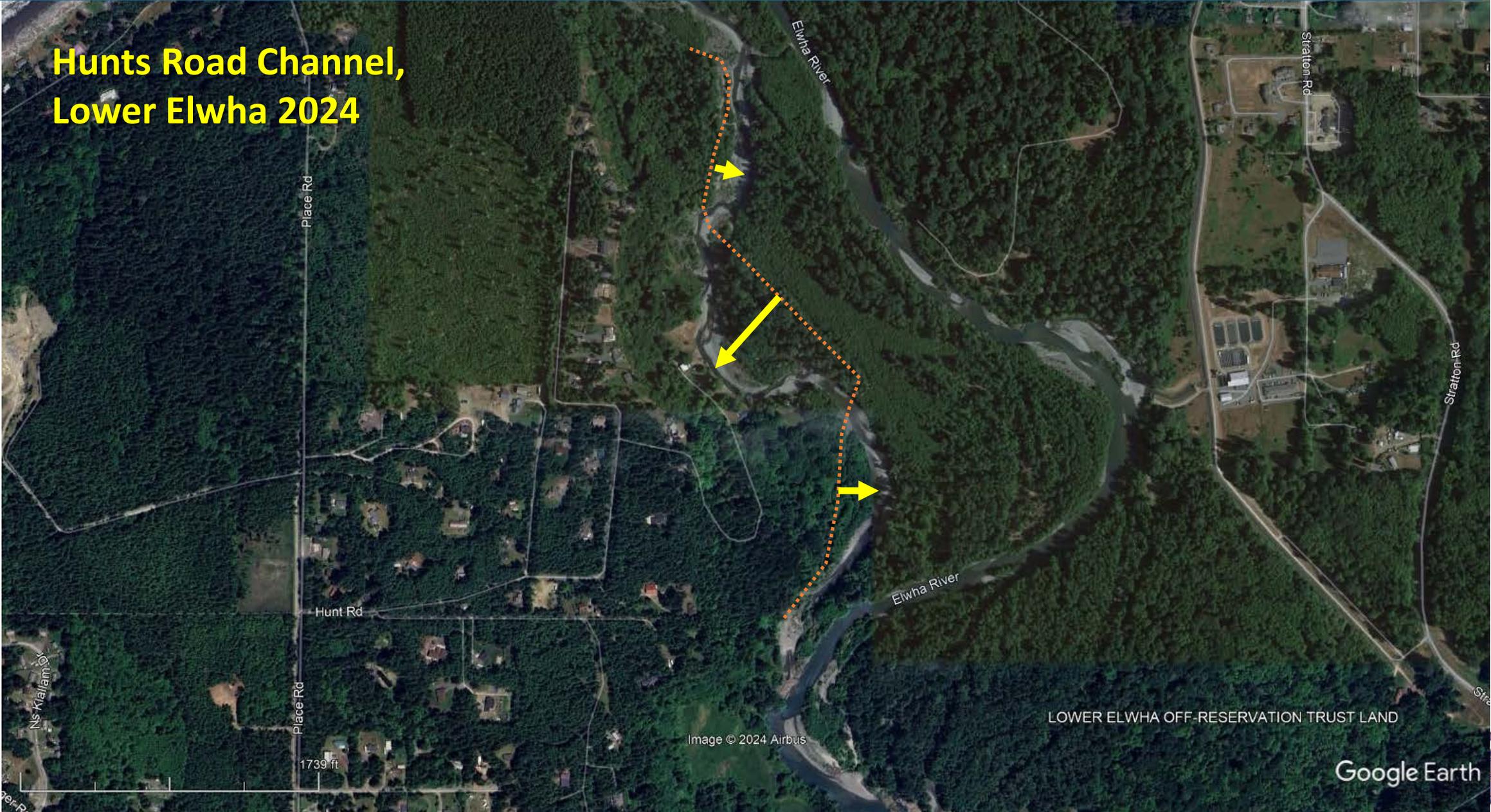
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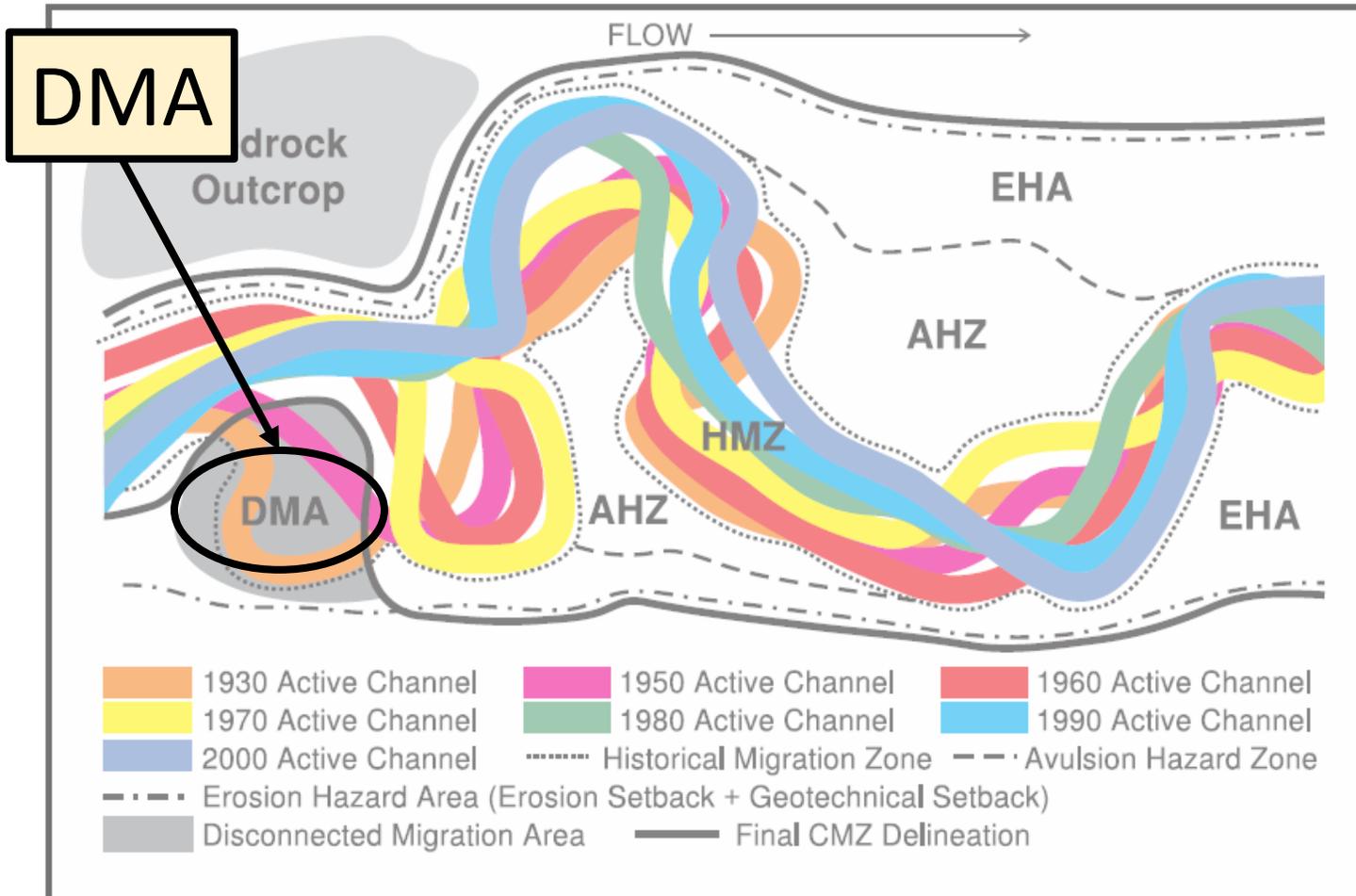
Avulsion Hazard Zone (AHZ)

Hunts Road Channel, Lower Elwha 2024





**Channel Avulsion
along Hot Springs
Road, Upper Elwha
1/12/2016**



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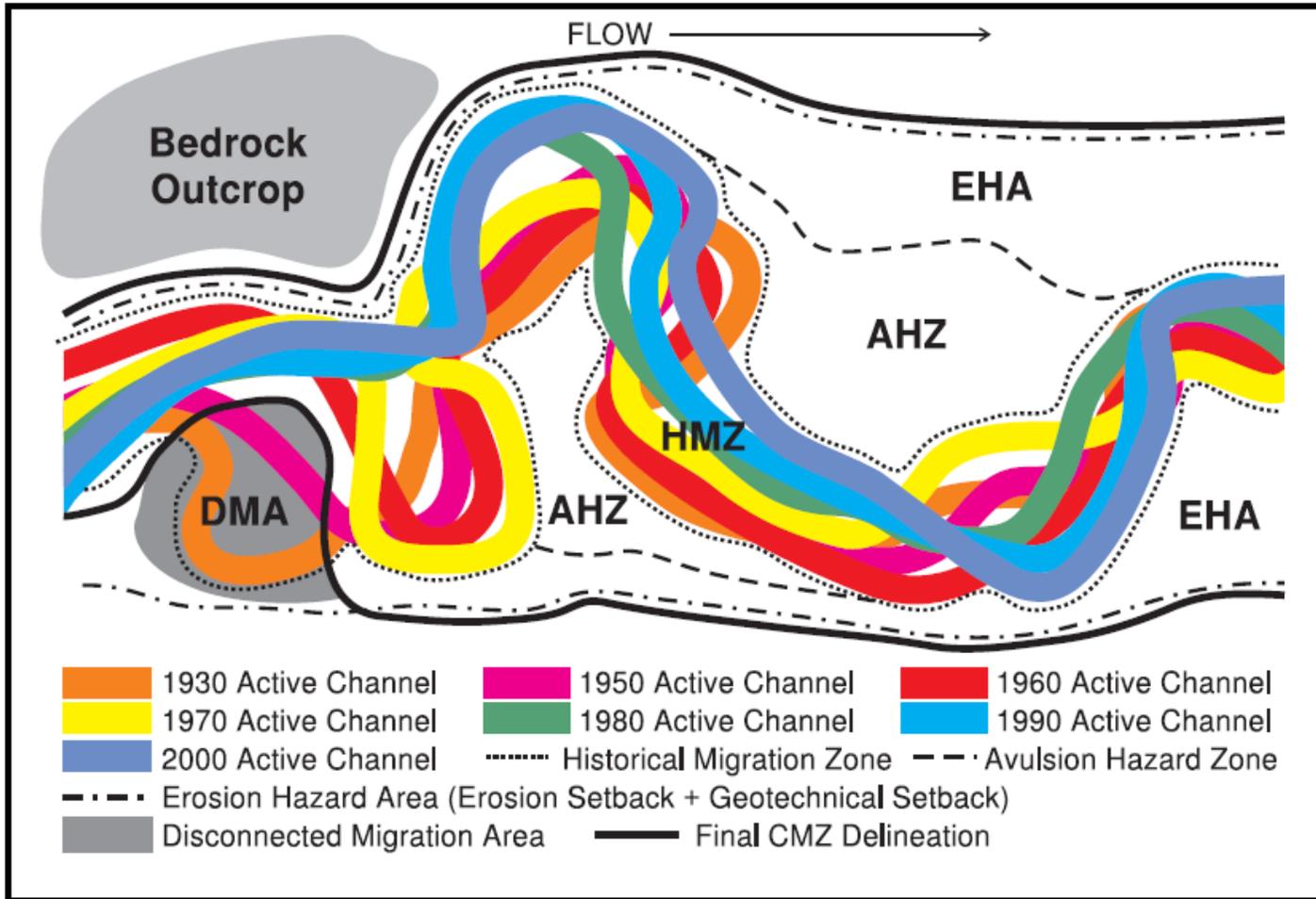
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Disconnected Migration Area





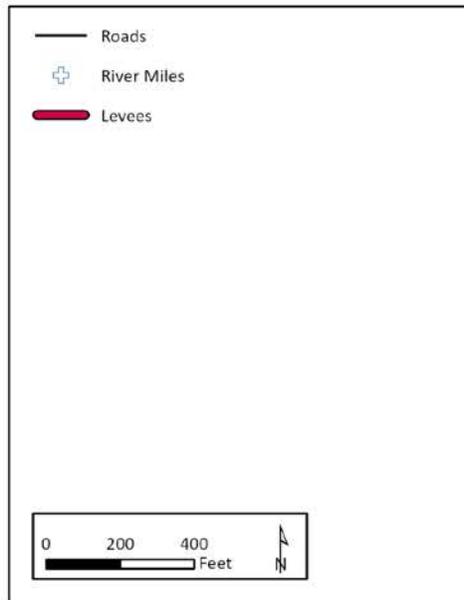
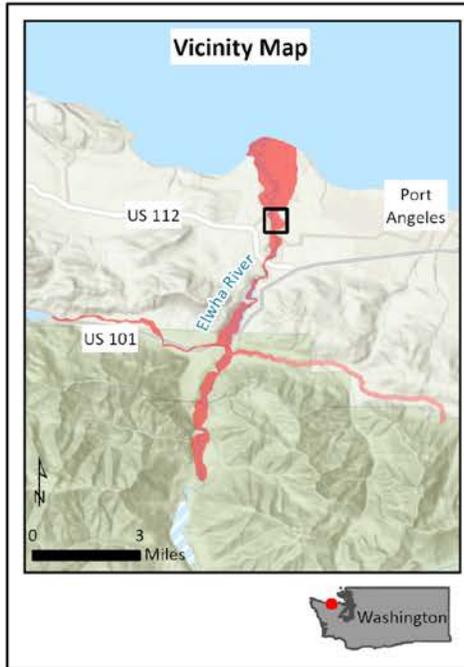
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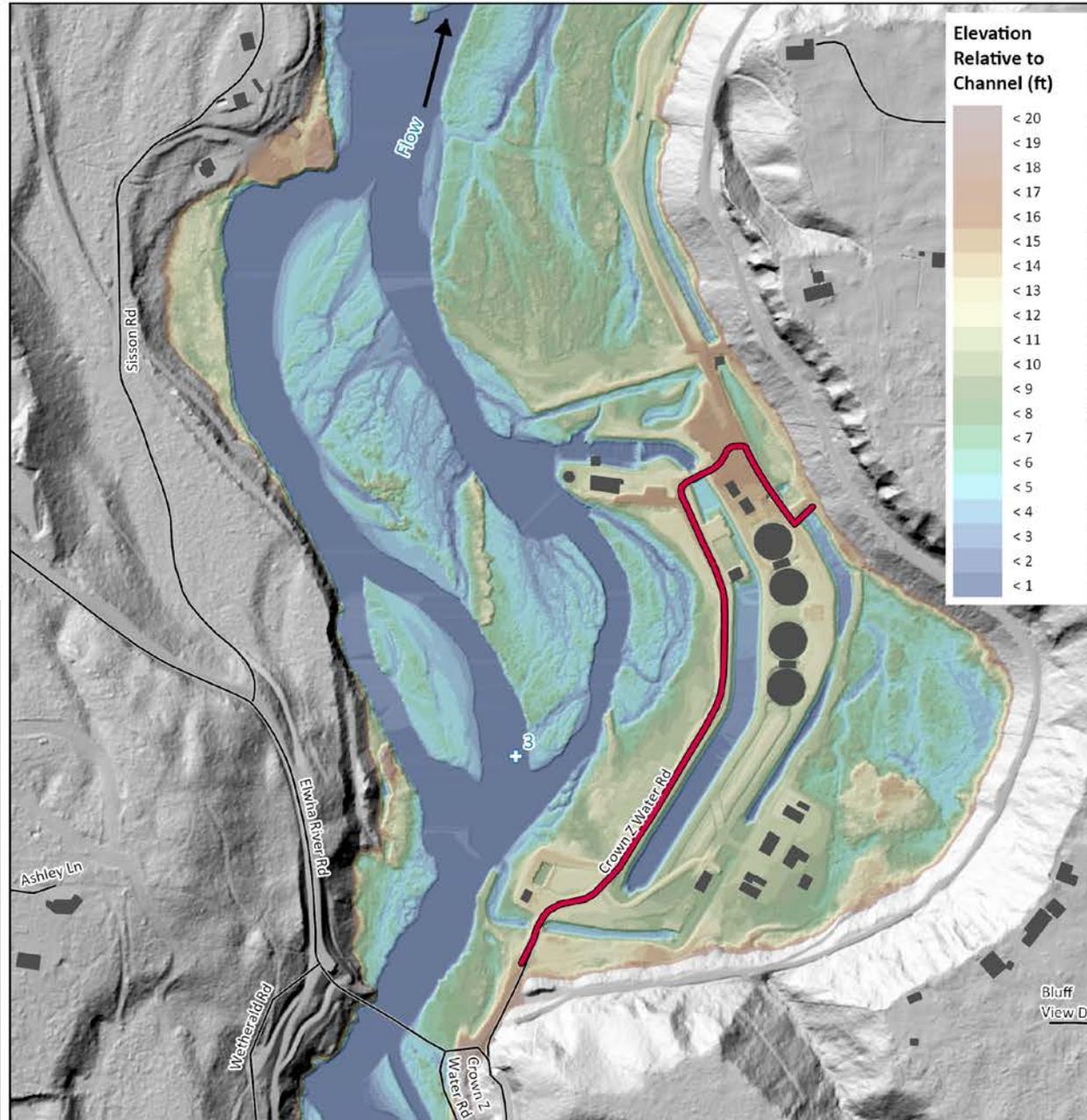
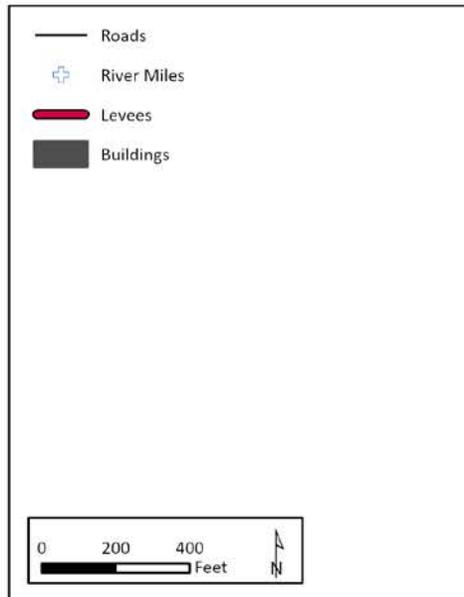
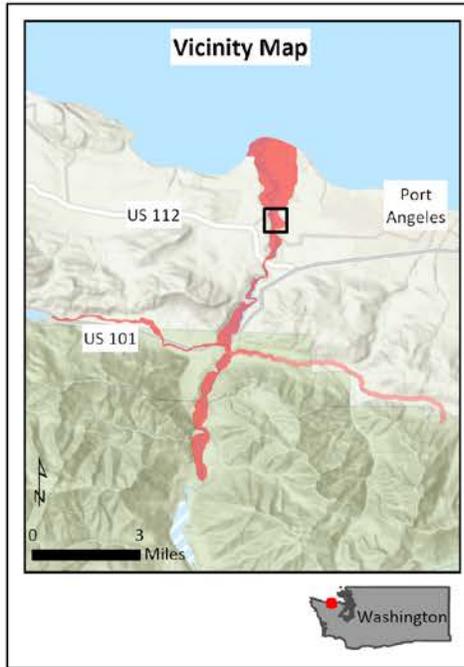
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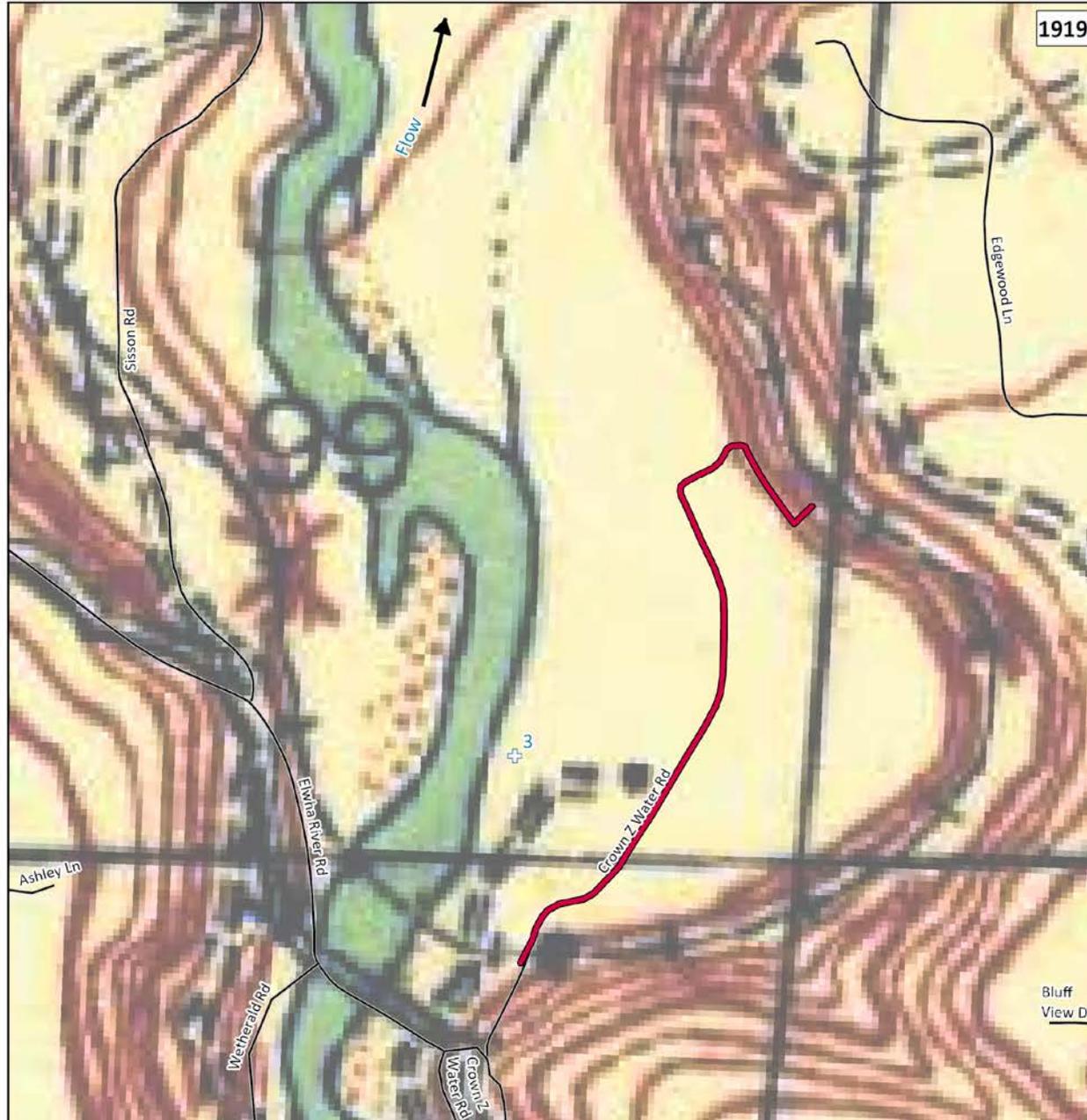
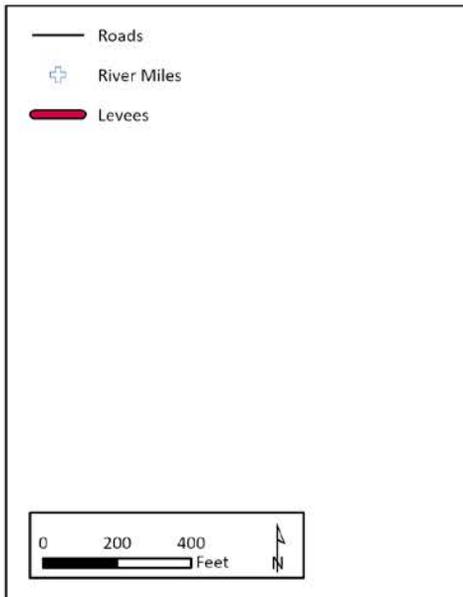
CMZ Mapping Example



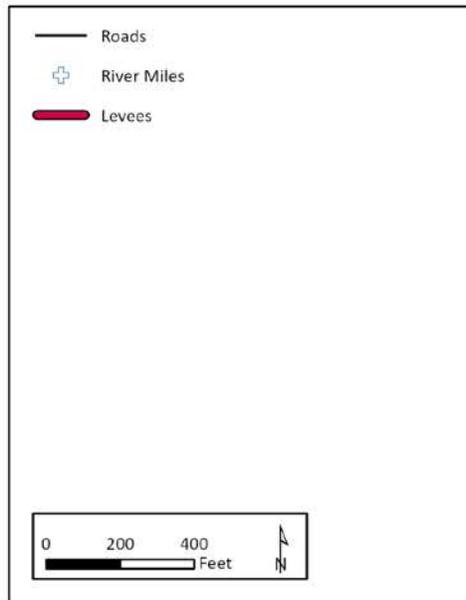
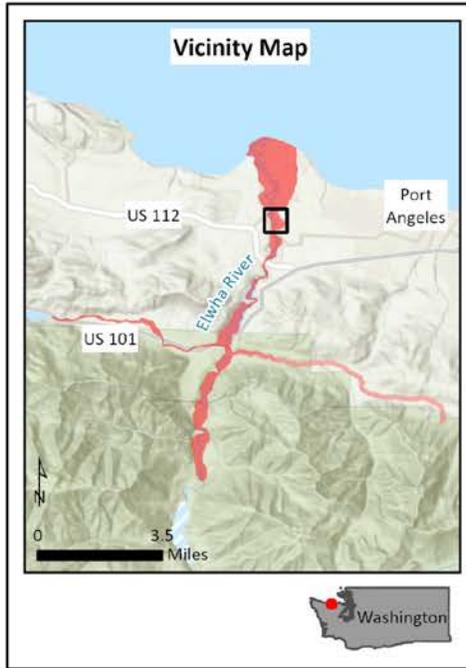


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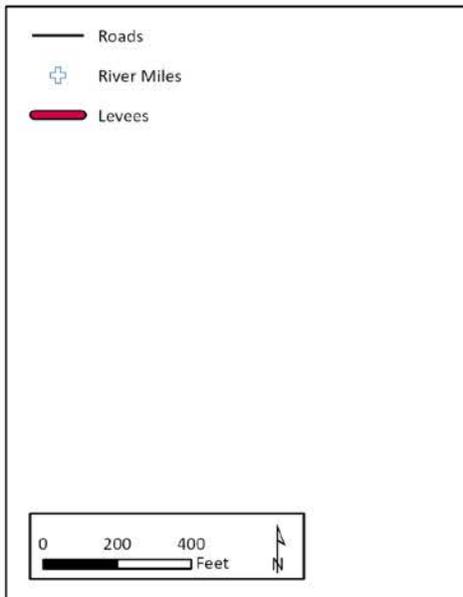
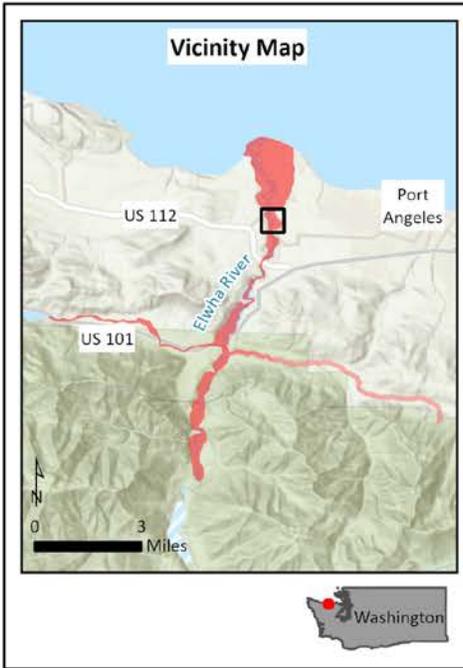
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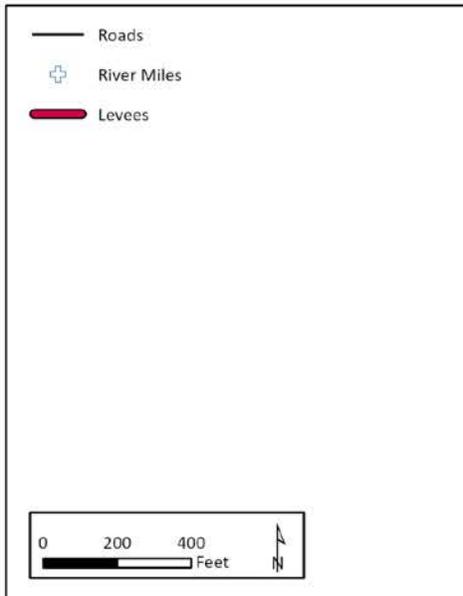
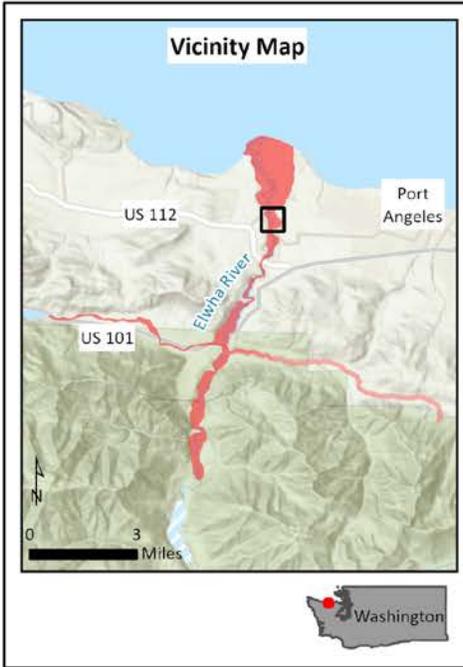
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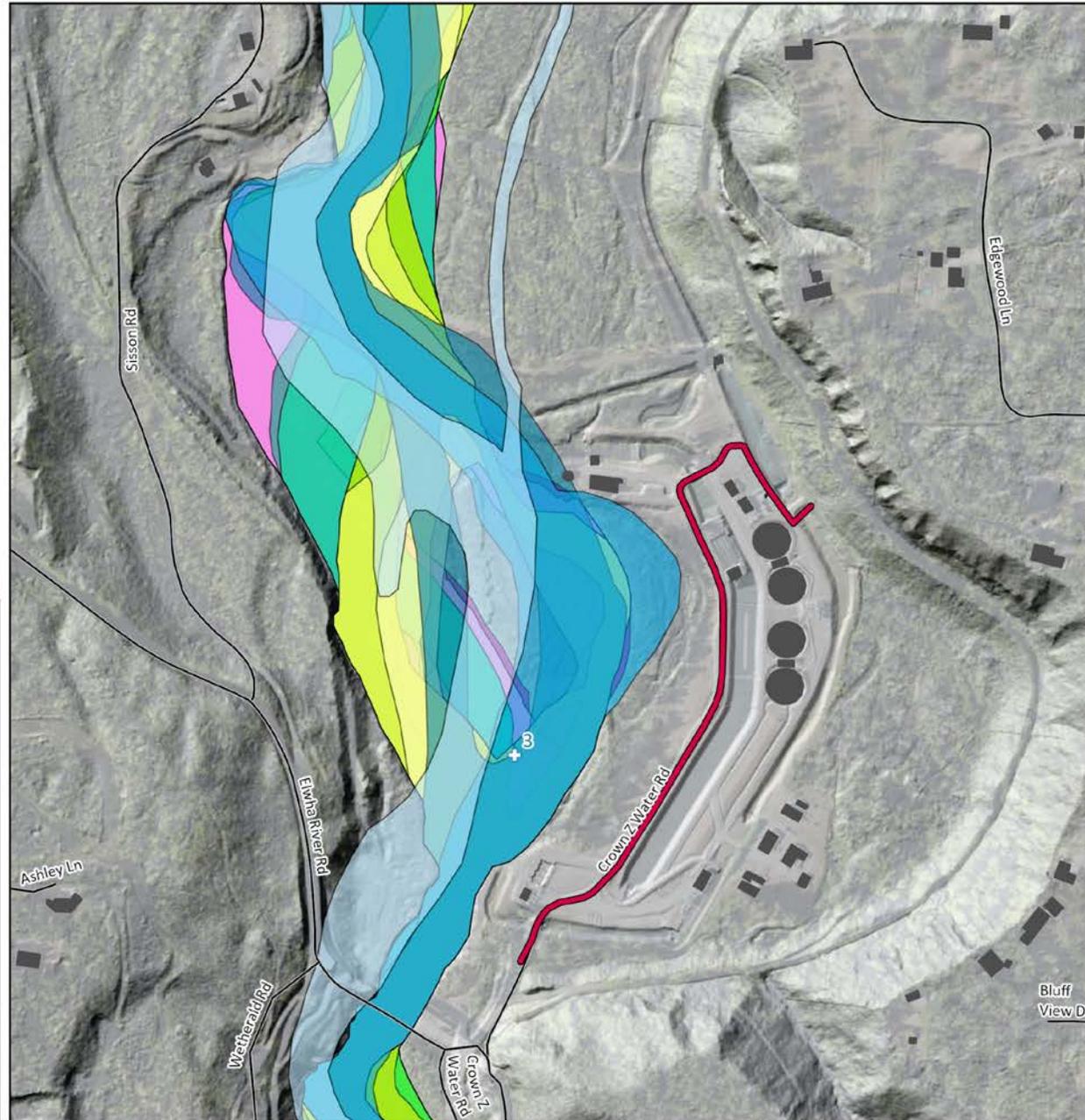
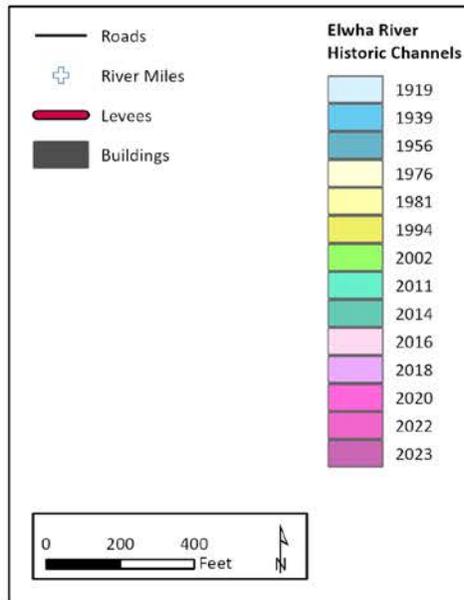
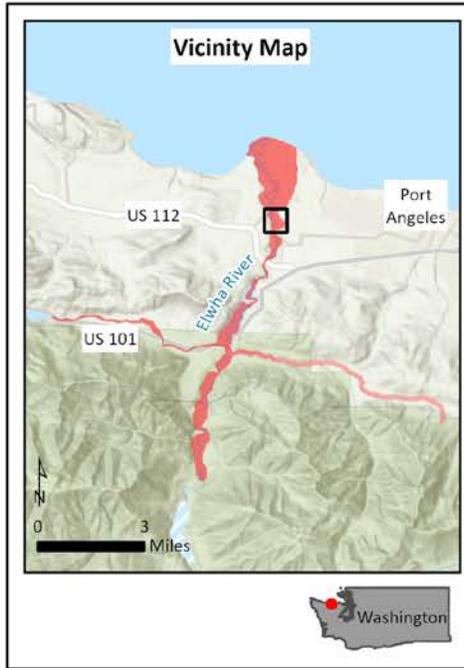


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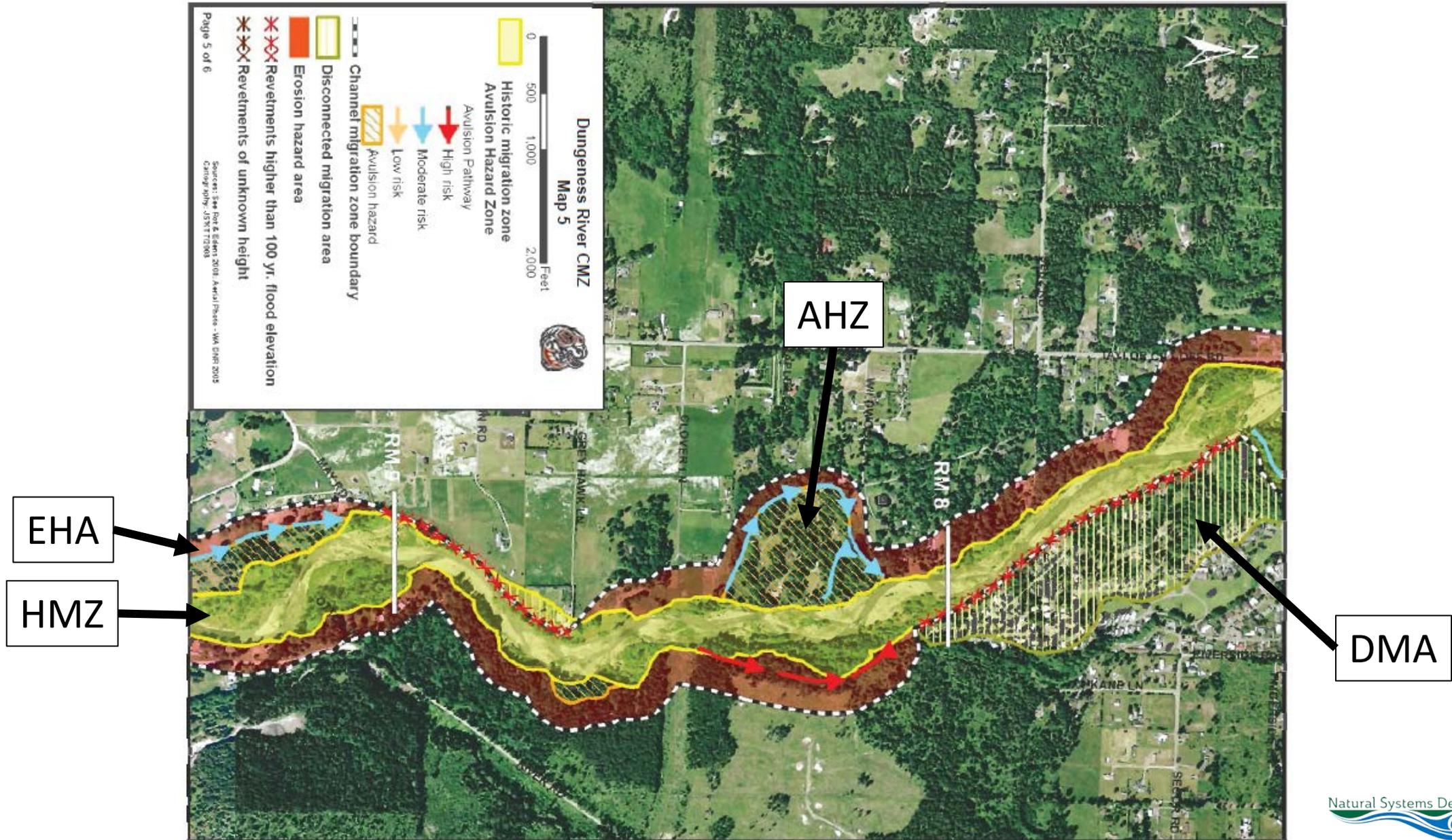
2023





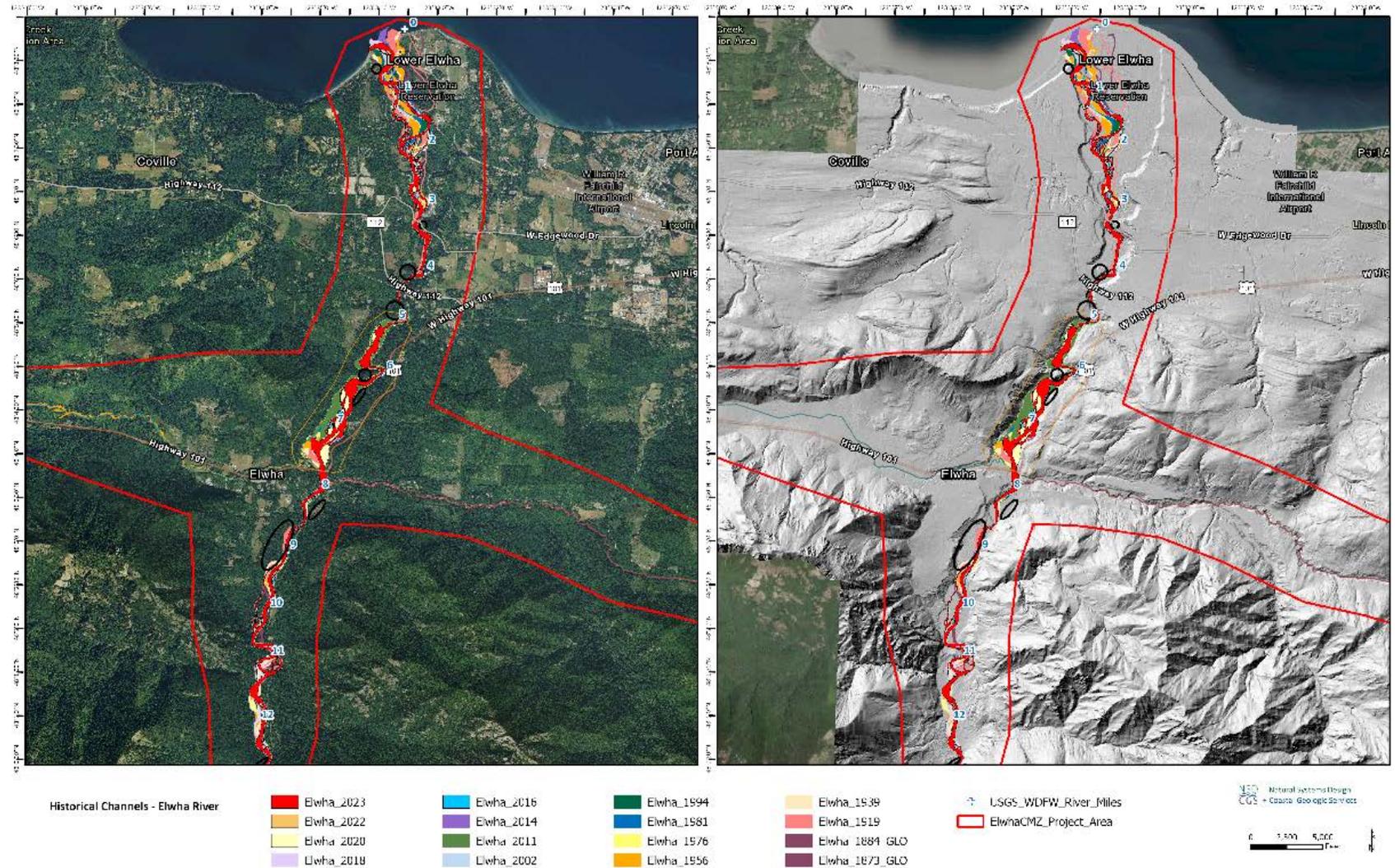
Additional CMZ Examples

Example CMZ Mapping – Dungeness River



Questions?

1. **Conduct draft CMZ mapping for Elwha R., Little R., Indian Cr.**
(ongoing)
2. **Collect input from Community, Co-Managers, Stakeholders**
(ongoing)
3. **Revise draft CMZ maps**
(early 2025)
4. **Presentation of final CMZ maps**
(late Spring 2025)



1. Interactive mapping session - Today
2. Online Questionnaire
3. Website link: <https://www.clallamcountywa.gov/1827/Elwha-River-Channel-Migration-Zone-Delin>

QR Code to take
Questionnaire



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