



Implementing a Large Wood Estuarine Experimental Design at South Tongue Point Restoration

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Conceptual Model of Potential Estuary Ecosystem and Habitat Functions of Large Wood

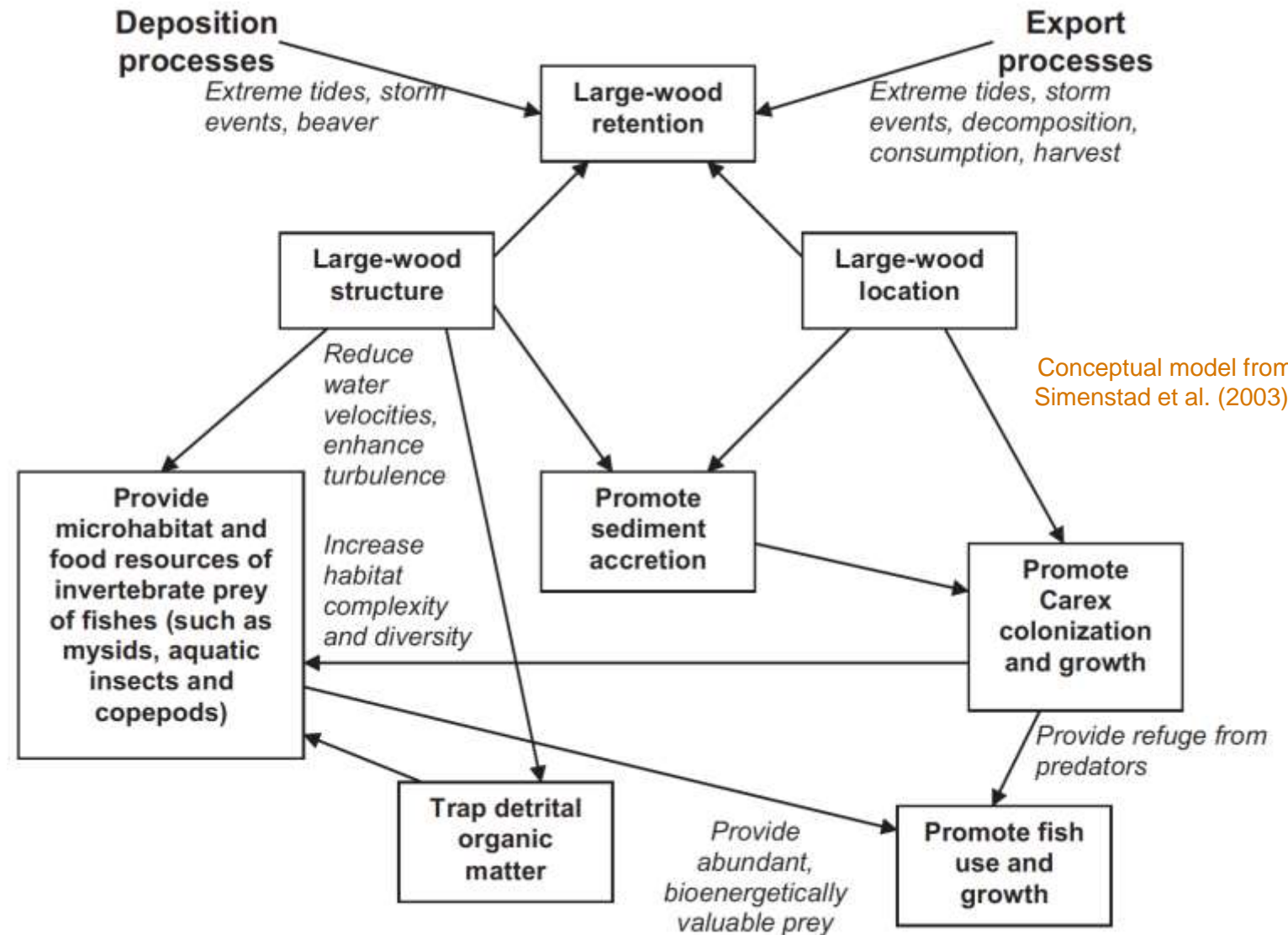
Estuarine literature is sparse; most literature is from fluvial reaches.

Expert Regional Technical Group, ERTG 2016-01, Recommended:

1. Future CEERP Projects “Treat wood as an experiment.”
2. Be “contingent on a testable experimental design.”

Restoration Design Challenges Team (PNNL and Columbia Land Trust) then

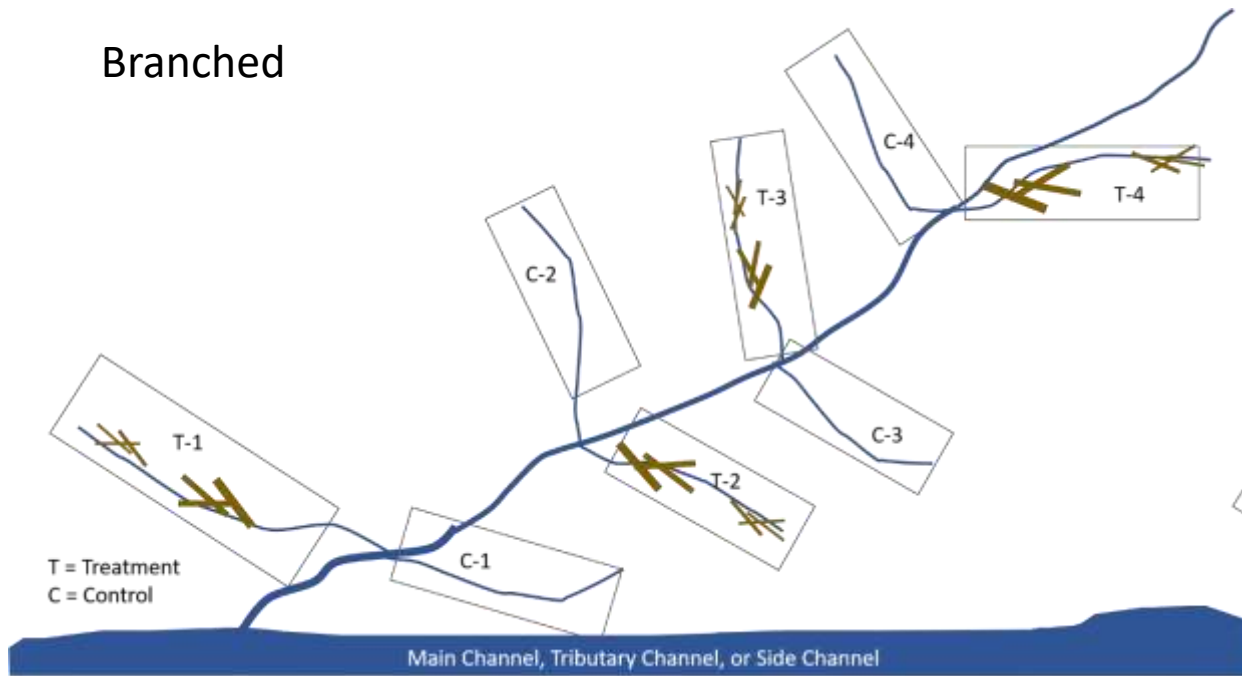
1. developed CEERP study design,
2. Field-tested wood sampling methods for invertebrates, and
3. partnered with CREST and Kilgren Water Resources to implement it on the ground.



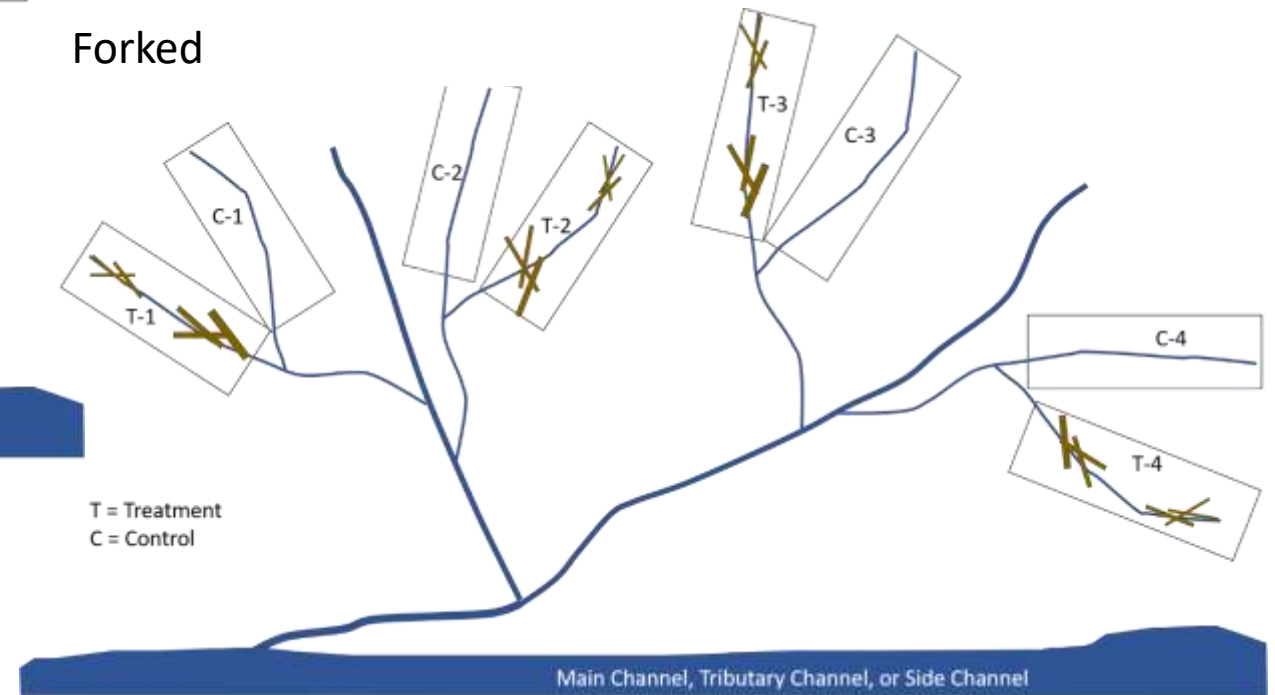
Alternative Large Wood Experimental Designs: Branched or Forked Configurations

2022 Objectives. Find a proposed CEERP reconnection project with preliminary channel network designs suitable to implement the *forked or branched* large wood study design, described in the 2021 report, PNNL-30920. Make engineering modifications with willing partners to develop a robust experiment consistent with overarching project goals.

Branched



Forked

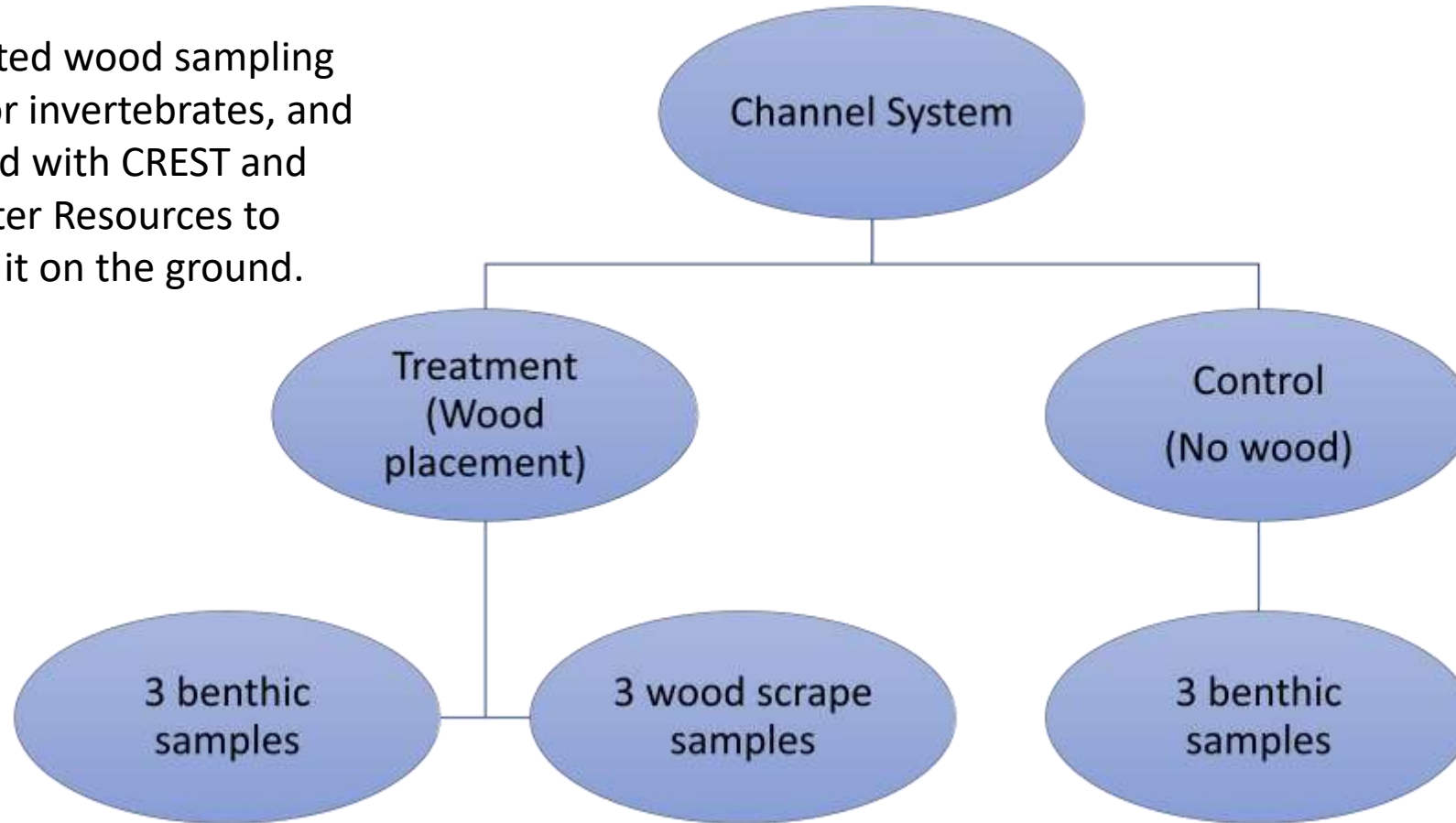


See Diefenderfer, Borde, Sinks, Cullinan, and Mackereth.
“Experimental Design for Evaluating Salmon-Habitat Functions of
Large Wood Placed in Tidal Channels at Restoration Sites in the
Lower Columbia River and Estuary.” PNNL-30920.

Conceptual Invertebrate Sampling Design

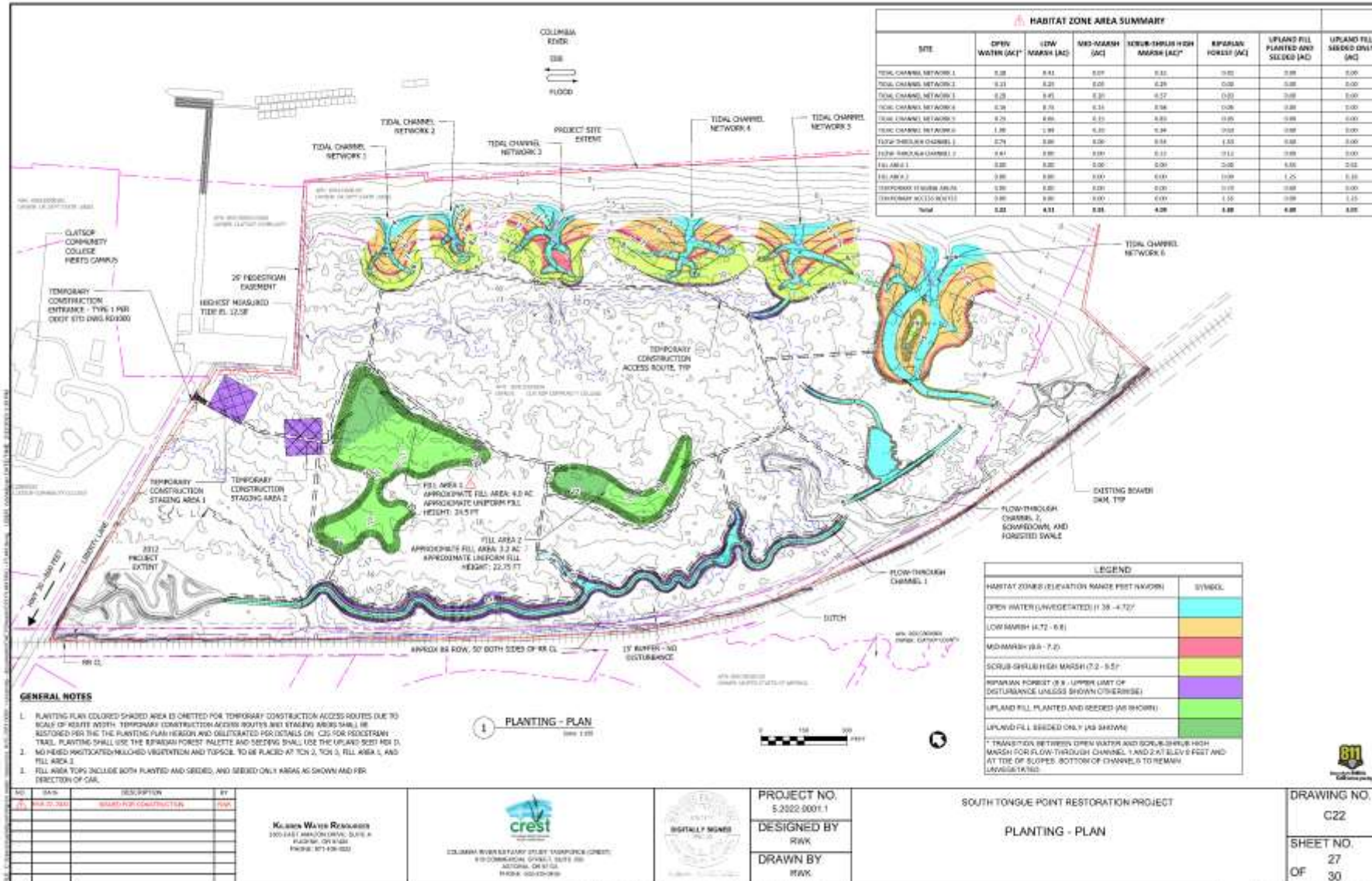
Restoration Design Challenges
Team then

2. Field-tested wood sampling methods for invertebrates, and
3. partnered with CREST and Kilgren Water Resources to implement it on the ground.



Treatment & control sampling, *at left*, will be implemented at 3 replicate channel networks

South Tongue Point Restoration Large Wood Experiment

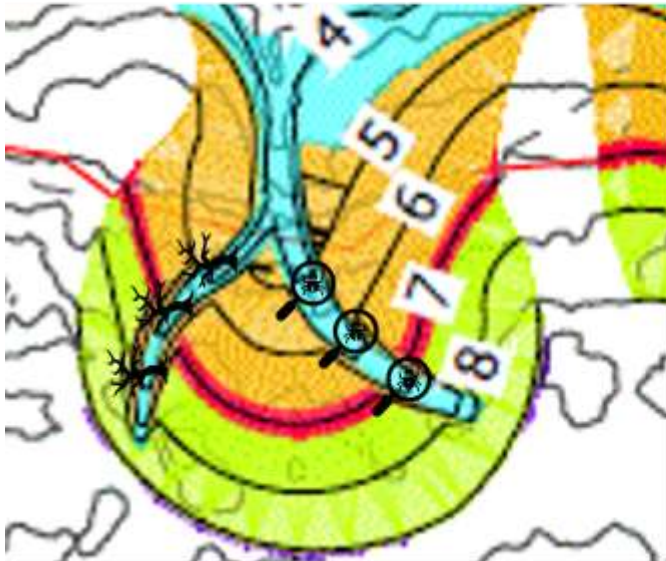


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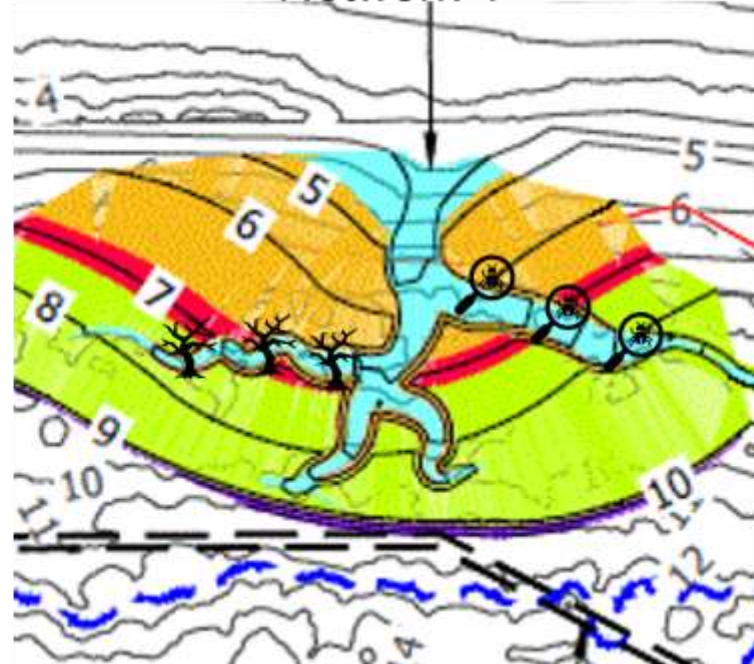
DATE ISSUED: 9/17/2023 11:00 AM

South Tongue Point Restoration Large Wood Experiment Detail: Three Channel Networks Designed for the Study

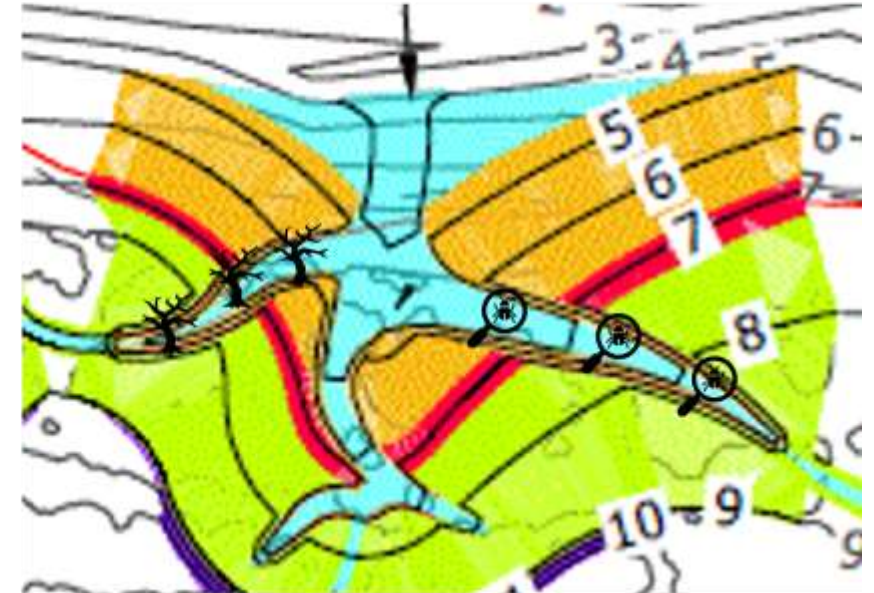
Network 1



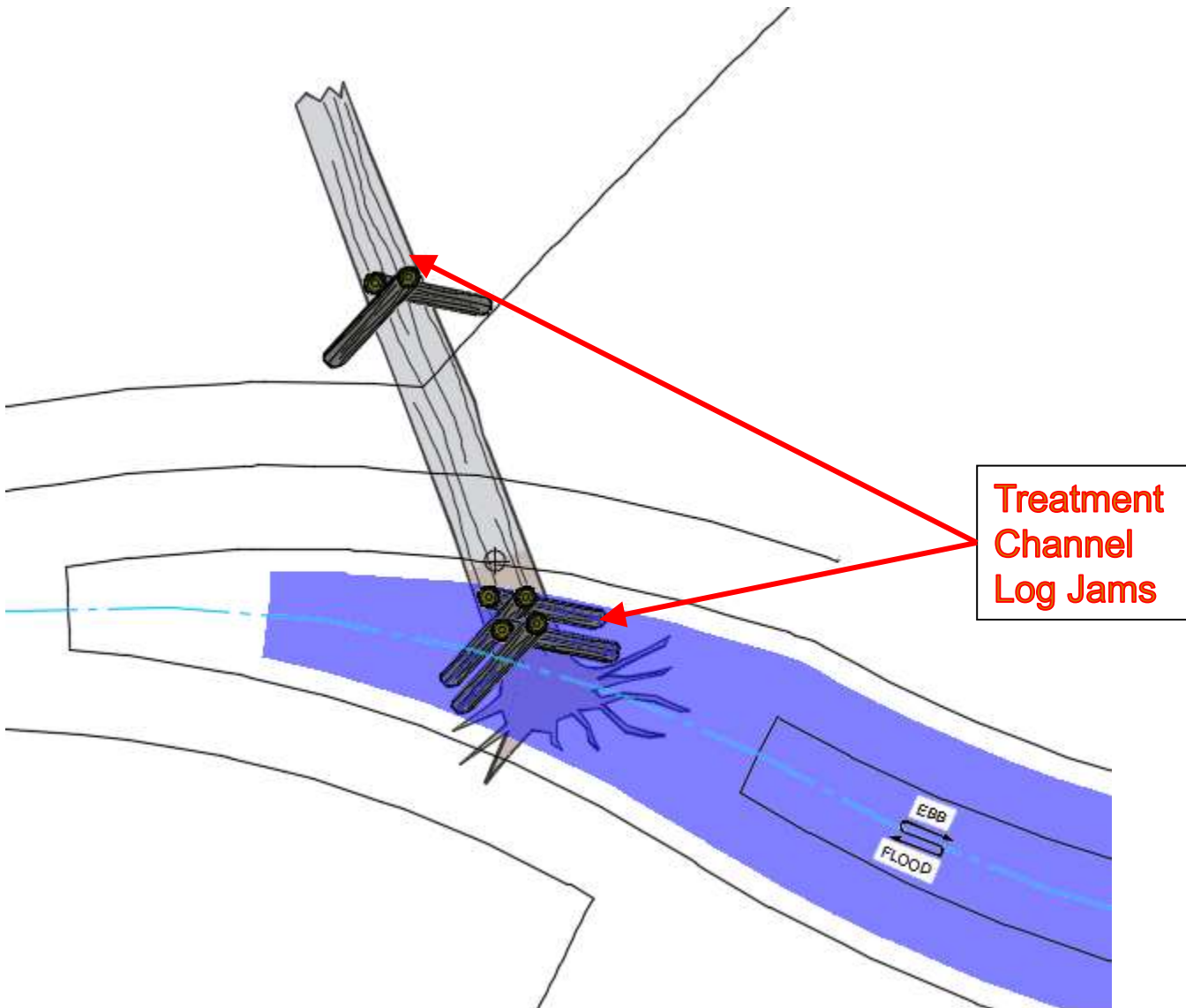
Network 4



Network 5



Engineering Detail & Next Steps



Next Steps

- Project sponsor, engineer, and research scientists to ensure the final design and construction in 2023 continue to reflect study goals
- Continue refinement of potential sampling methods and locations, roles and responsibilities, and raw and calculated metrics
- Benthic and wood scrape sampling begin spring 2024. Test hypotheses: no difference between wood/no wood for both prey and fish; log stability
- Long-range: Work toward Astoria-local education partnerships aiming for monitoring > 5 years

Study Context: CEERP Critical Uncertainties Research



1. Large Wood Experiment, Juvenile Salmon/Lamprey Food Web & Habitat

2. System Modeling-Temperature

Kate Buenau, later in this session

3. Sediment Accretion Data Synthesis

Zachary Weller, this afternoon

4. Columbia River Sediment Loads

Maggie McKeon, this afternoon

5. Surface Elevation Tables

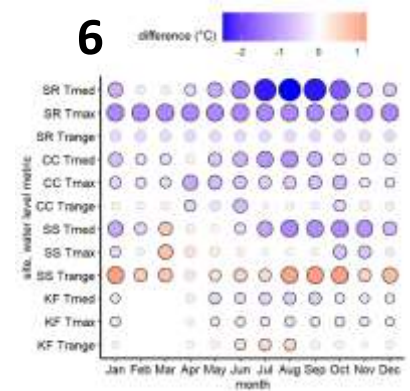
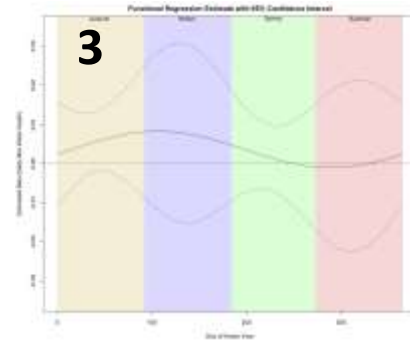
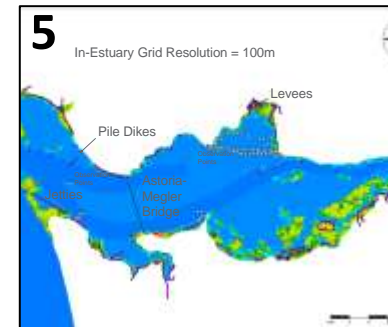
Shon Zimmerman, this afternoon

Earthquake Modeling-Hydrodynamic

Matt Brand, Thursday

6. Shallow-Water Habitat Area

Will Templeton, Thursday



Goal of CEERP Critical Uncertainties Research

Investigate critical uncertainties in the state-of-the-science pivotal for optimizing ecosystem restoration project-selection priorities, engineering design, construction, and short- and long-term management.

Questions and Discussion

End-of-session Q&A 3:05-3:15 PM



Acknowledgements

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