Ridgefield Pits Meeting

Welcome

Please mute to start

Send comments via chat

Let us know if you are having any issues

March 7th

Meeting Organizer

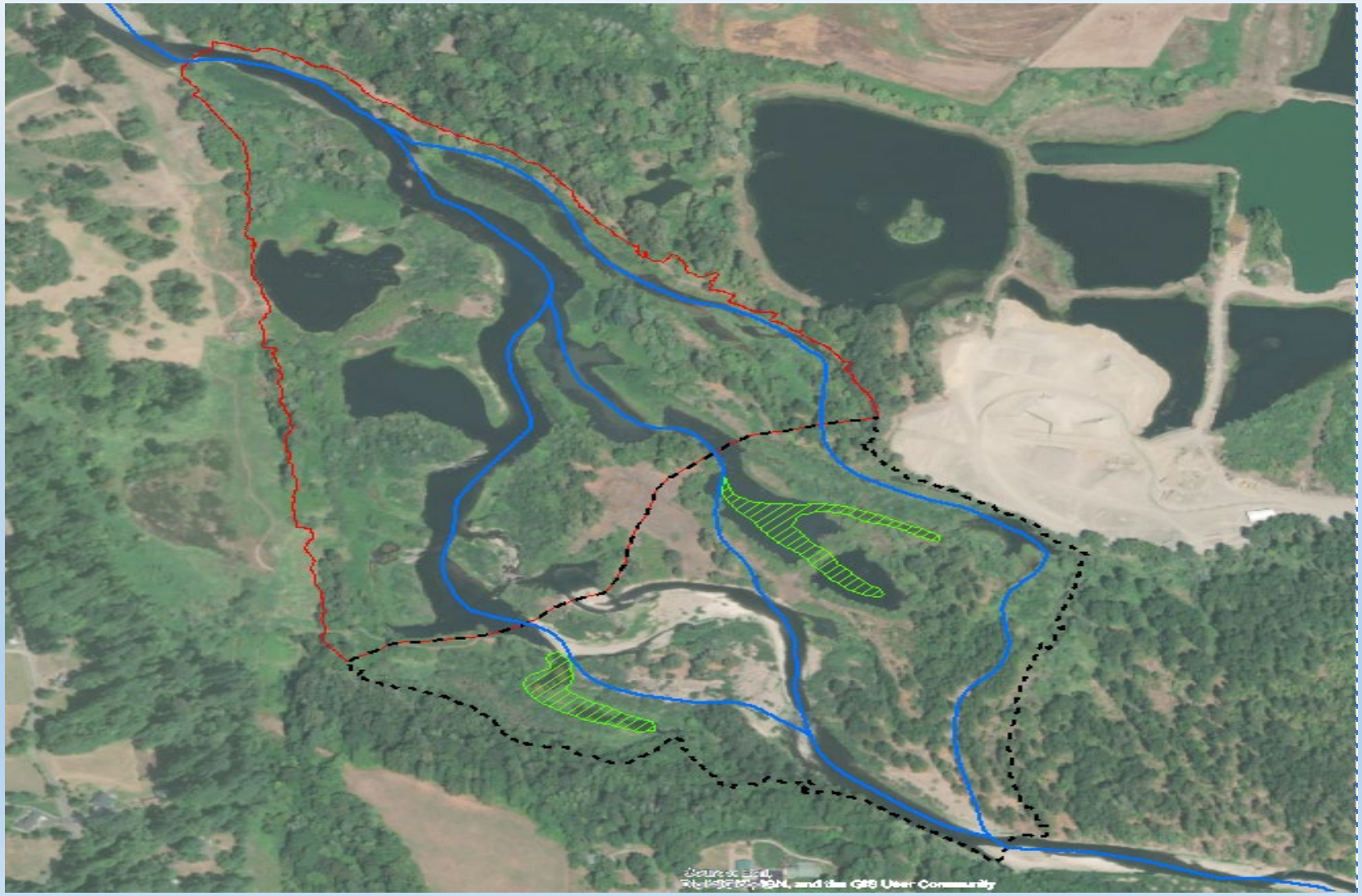
Paul Kolp- Lower Columbia Estuary Partnership

AGENDA

- Recap. of where we are
- Over the last several months- we've been focused on Alternative 3-Revised (Alt. 3 + Alt. 2)
- Example Floodplain Grading- LCFEG (Brice C.)
- Restoration Alternatives- Technical Analysis (presentation & discussion)
- Next steps

Analysis (since last meeting)- Alt 3 Revised

- Creating habitat for fish: sediment, temperature, depths, velocities
- Eliminate warm water sinks & connect to known cooler water
- Floodplain inundation
- Sediment transport through site & downstream (replenish gravels)
- Grading plan
- Risks to infrastructure

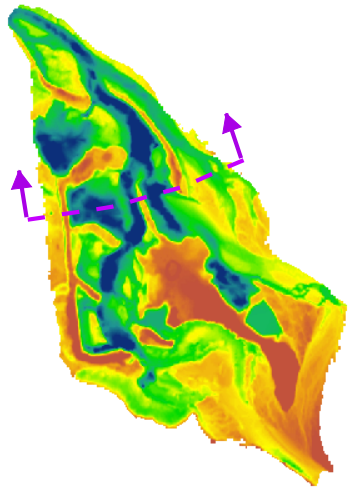


Example Project

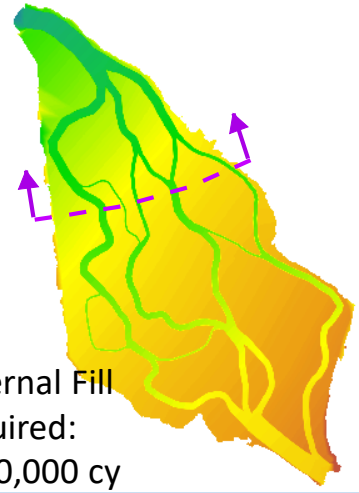
…..South Fork Toutle River Tributary…….

Pits Alternatives- Cut/Fill Balance

Existing Grade

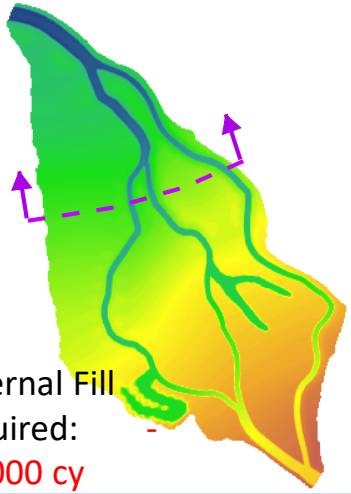


Alt 3. multi-thread, 1st iteration



External Fill required: ~400,000 cy

Alt 3 Revised.- multi-thread, 2nd iteration



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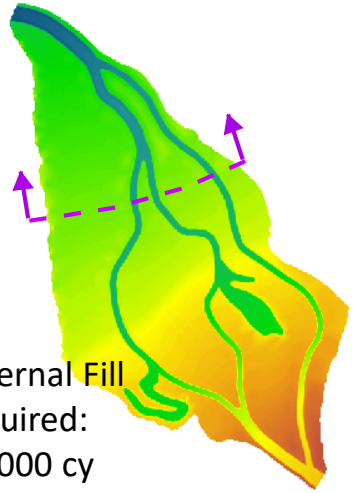
Alt 3 Revised.- multi-thread, 3rd iteration



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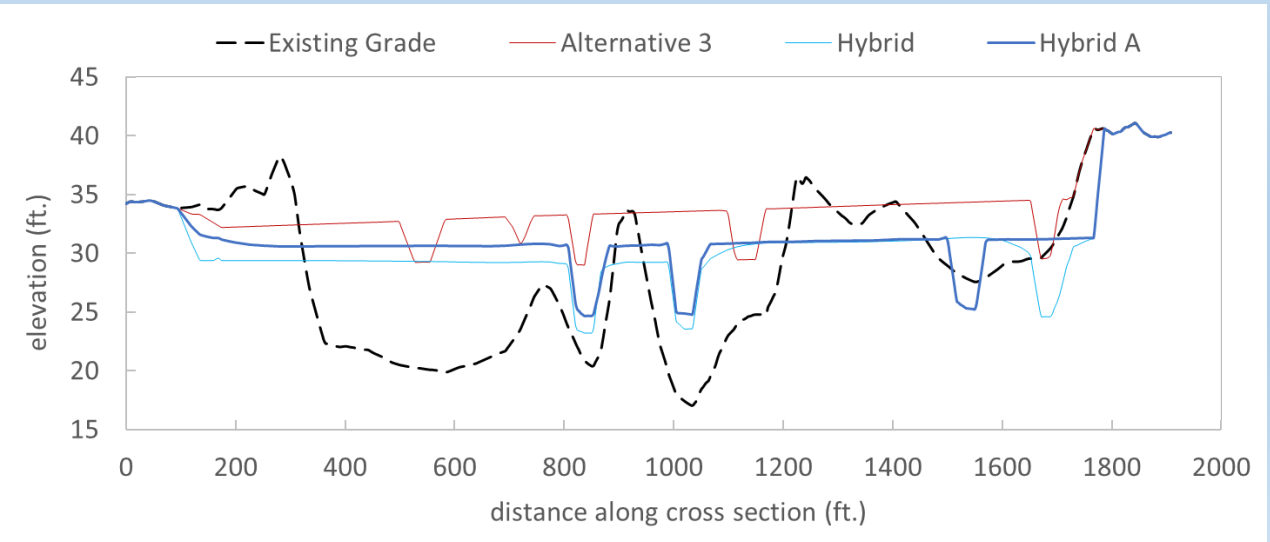
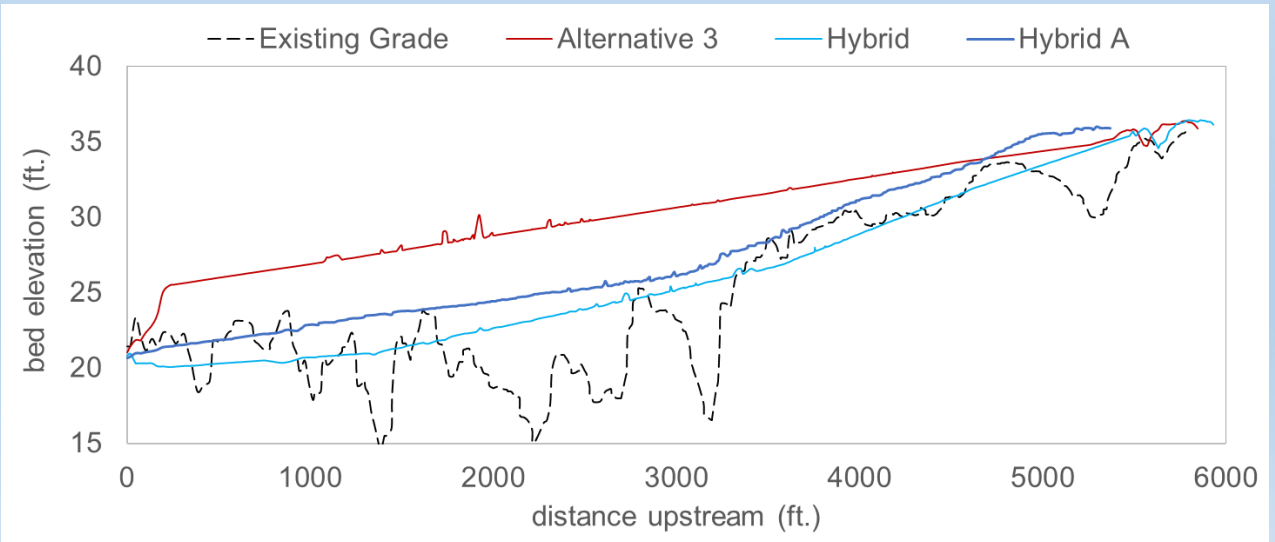
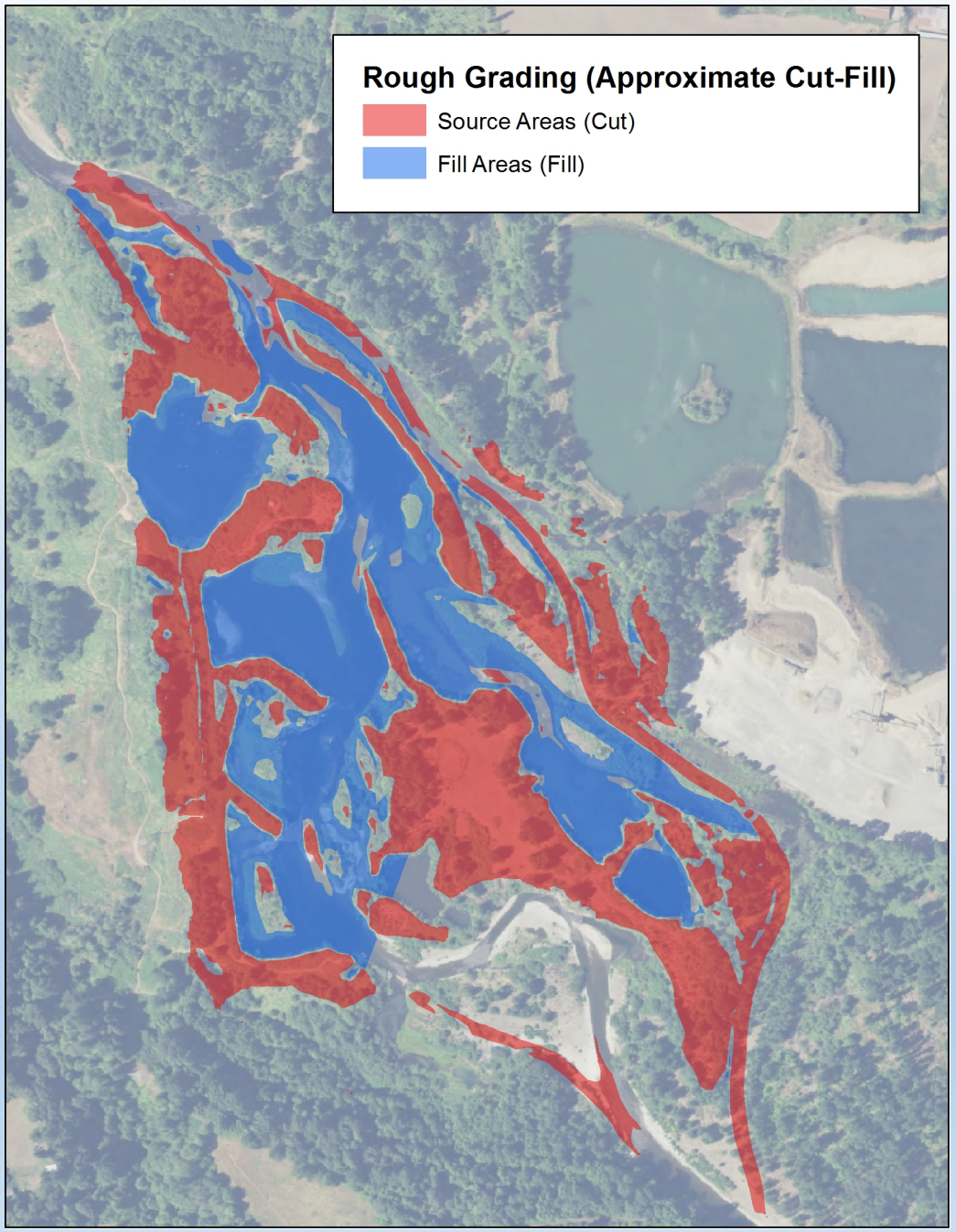
Floodplain x-section profiles

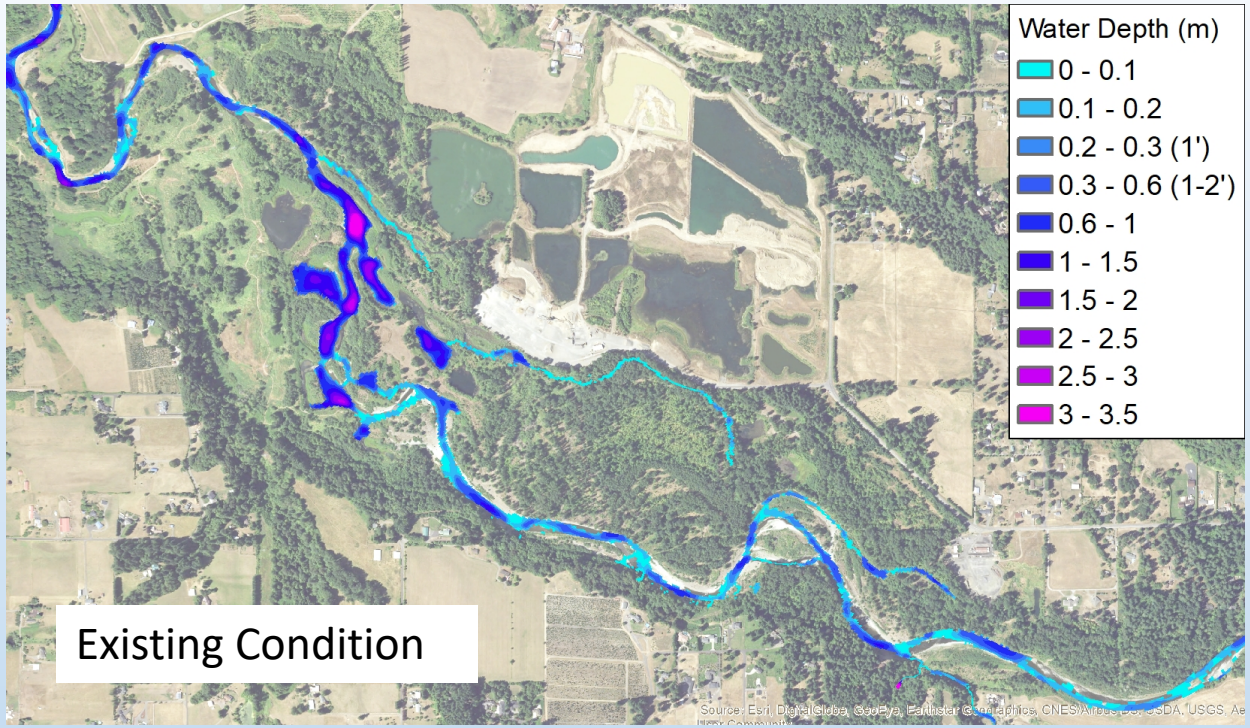


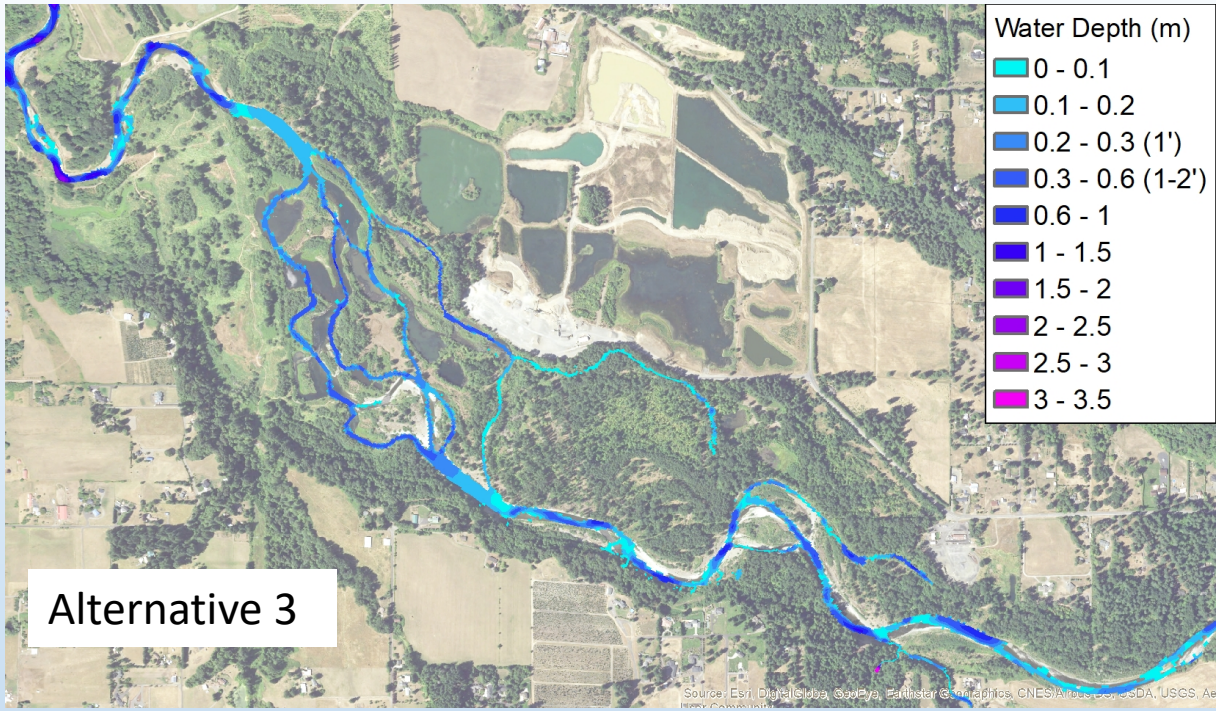
Channel longitudinal profiles

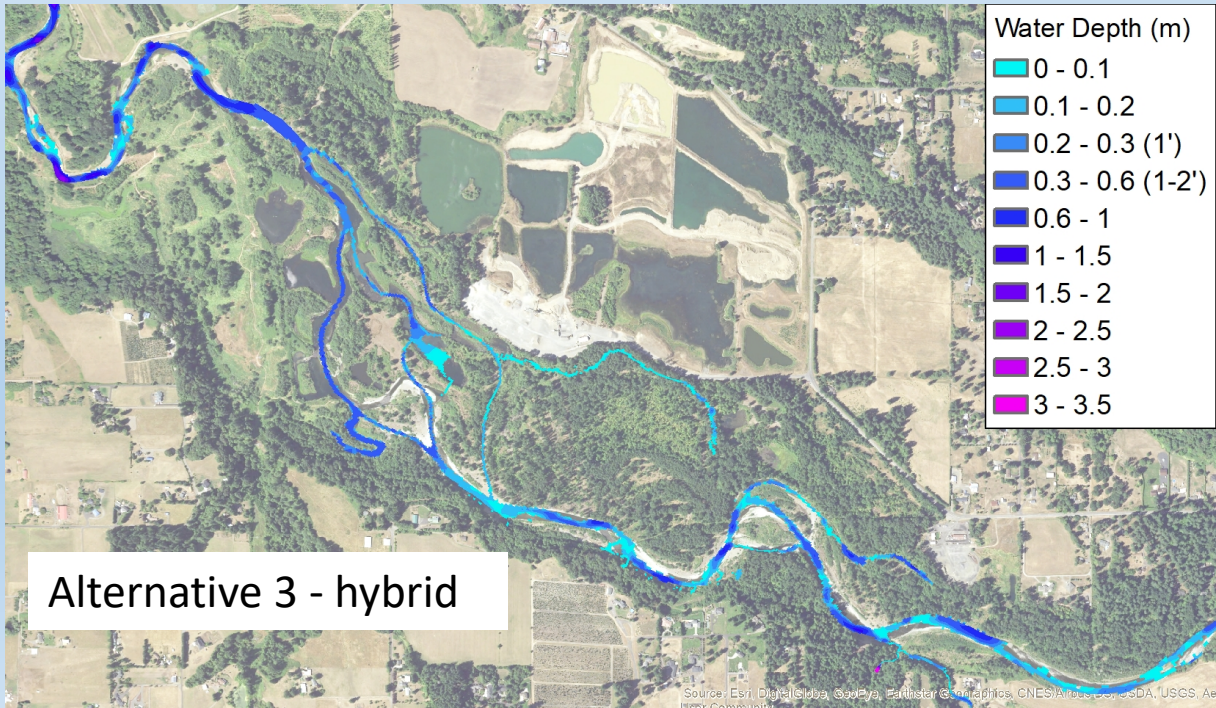


Grading Plan



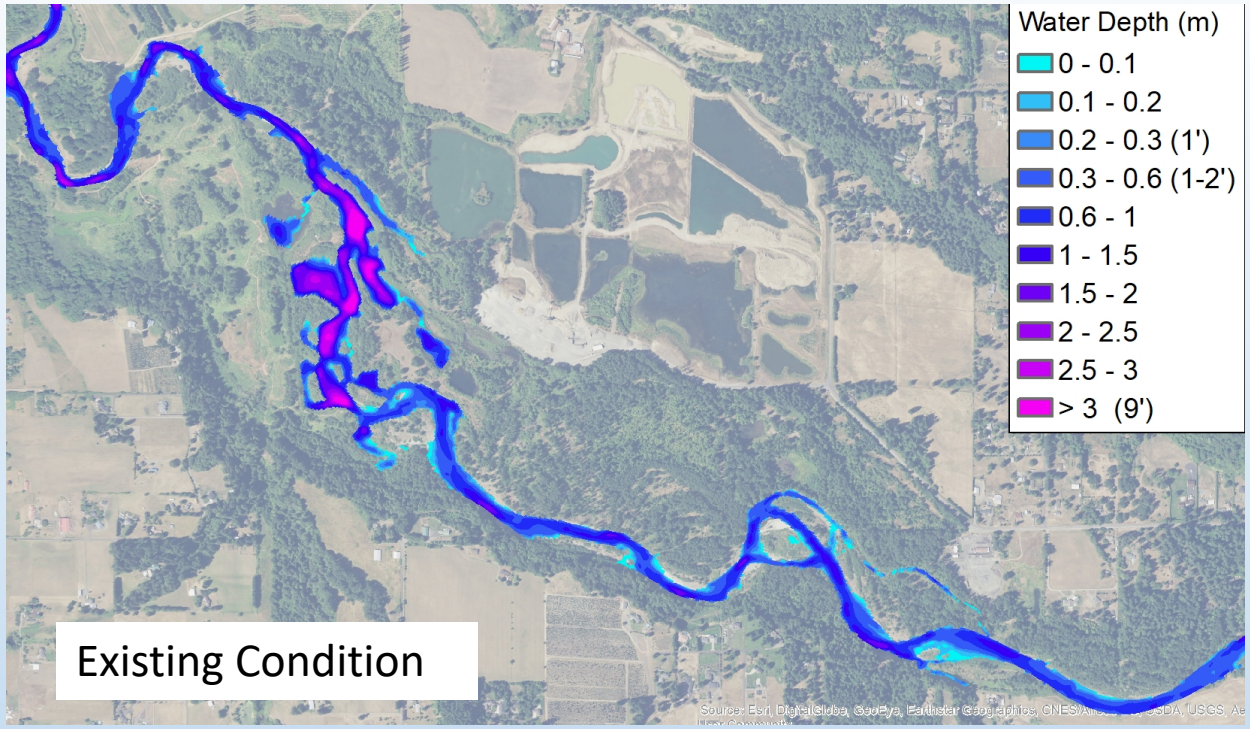


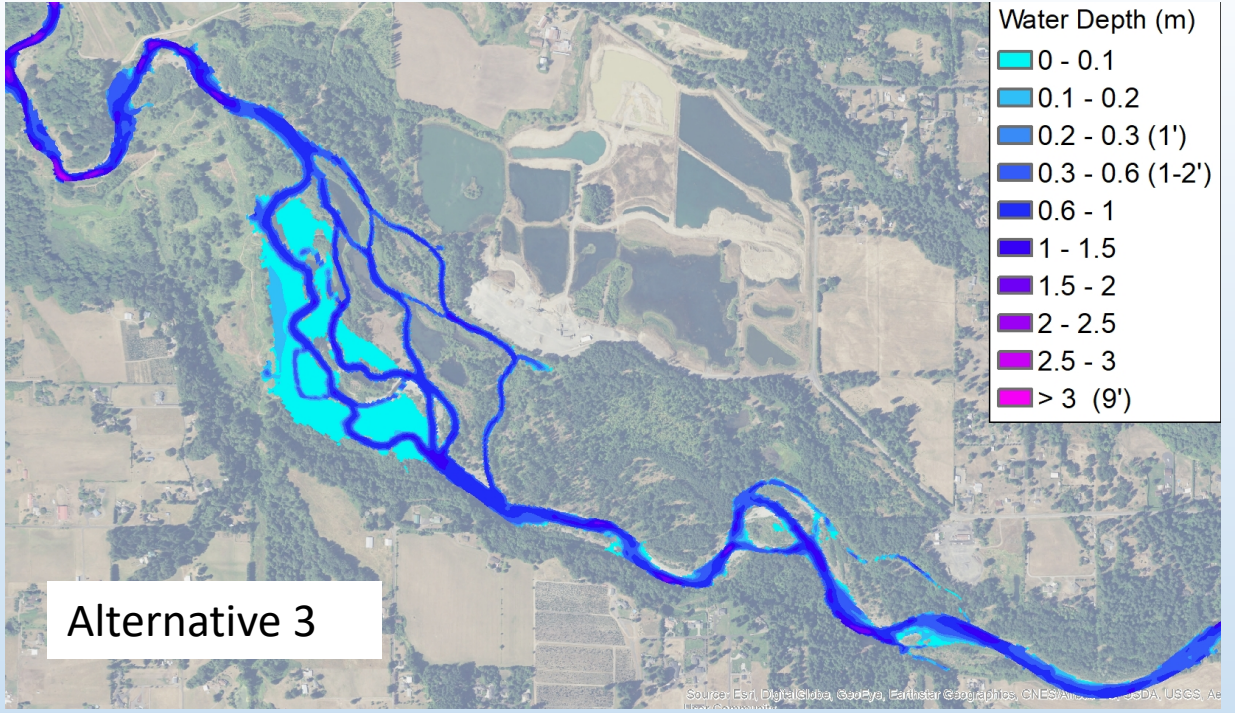


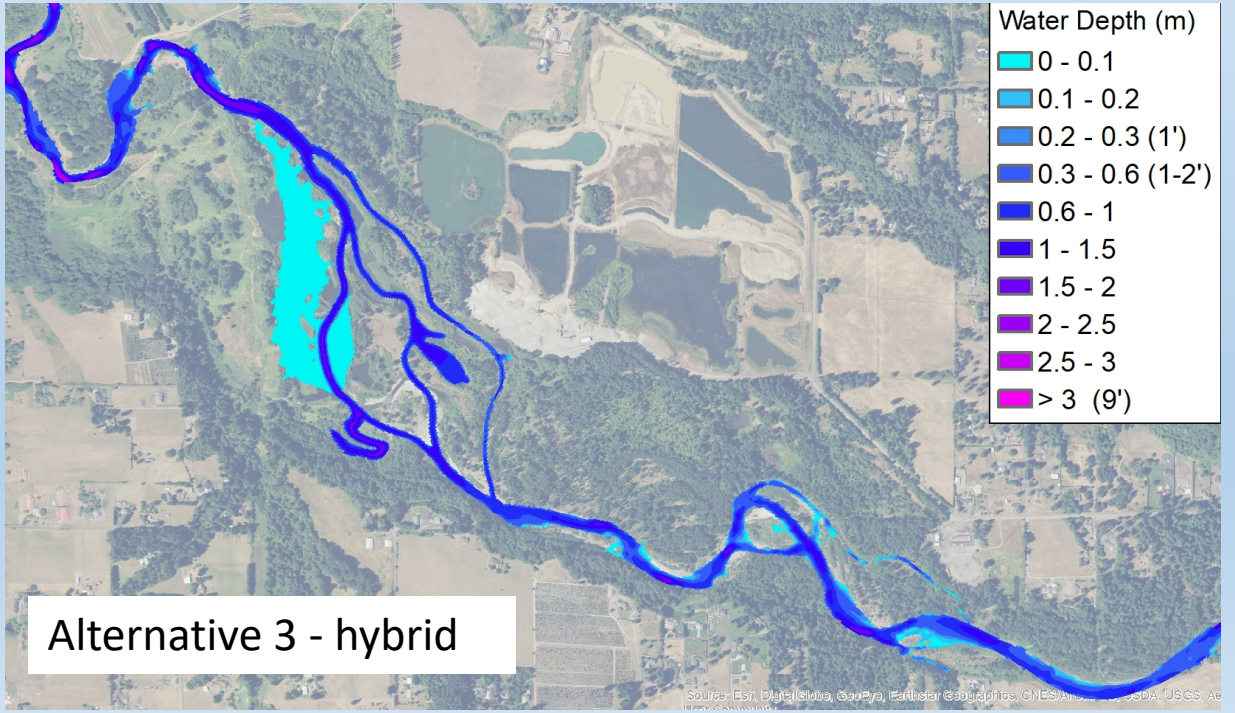


Baseflow Inundation – 35 cfs

- Existing Condition: channel confined within deep pits
- Alt 3 and Hybrid:
  - surface area available for solar heat addition is reduced
  - Hybrid retains accessible alcoves at low flows
- Variation in depth will increase as designs are refined at the channel unit scale (pools, tailouts, riffles).

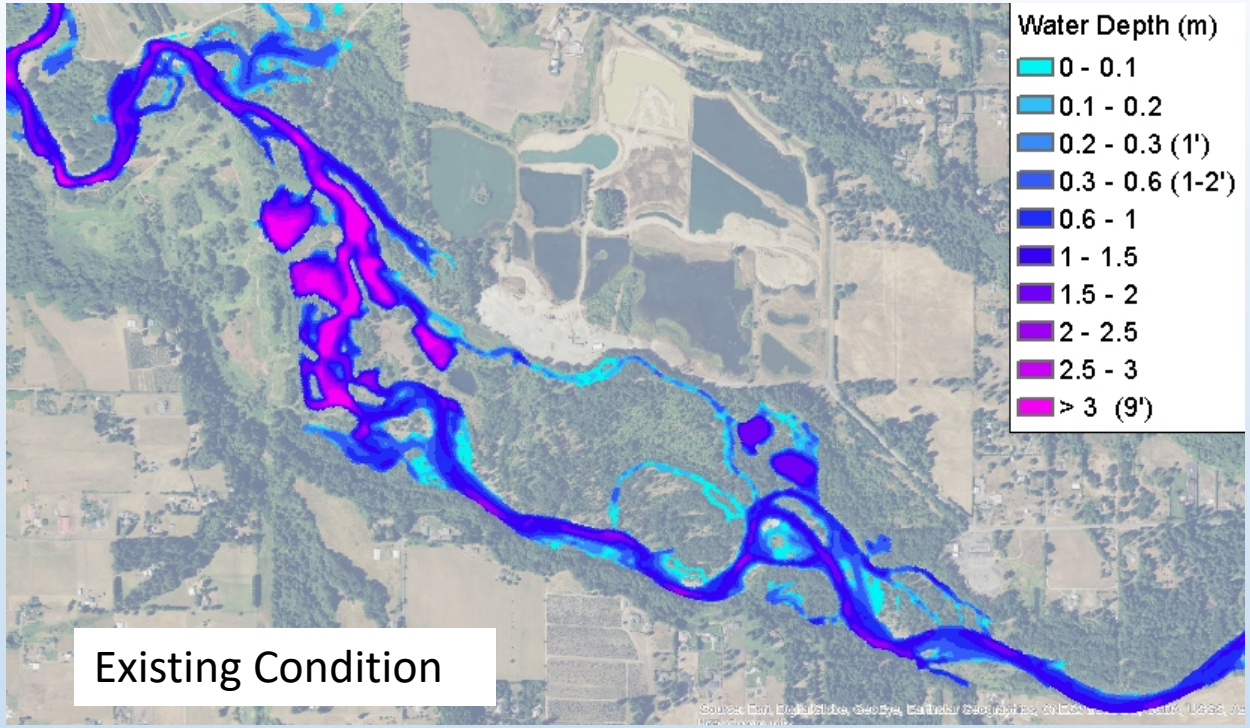


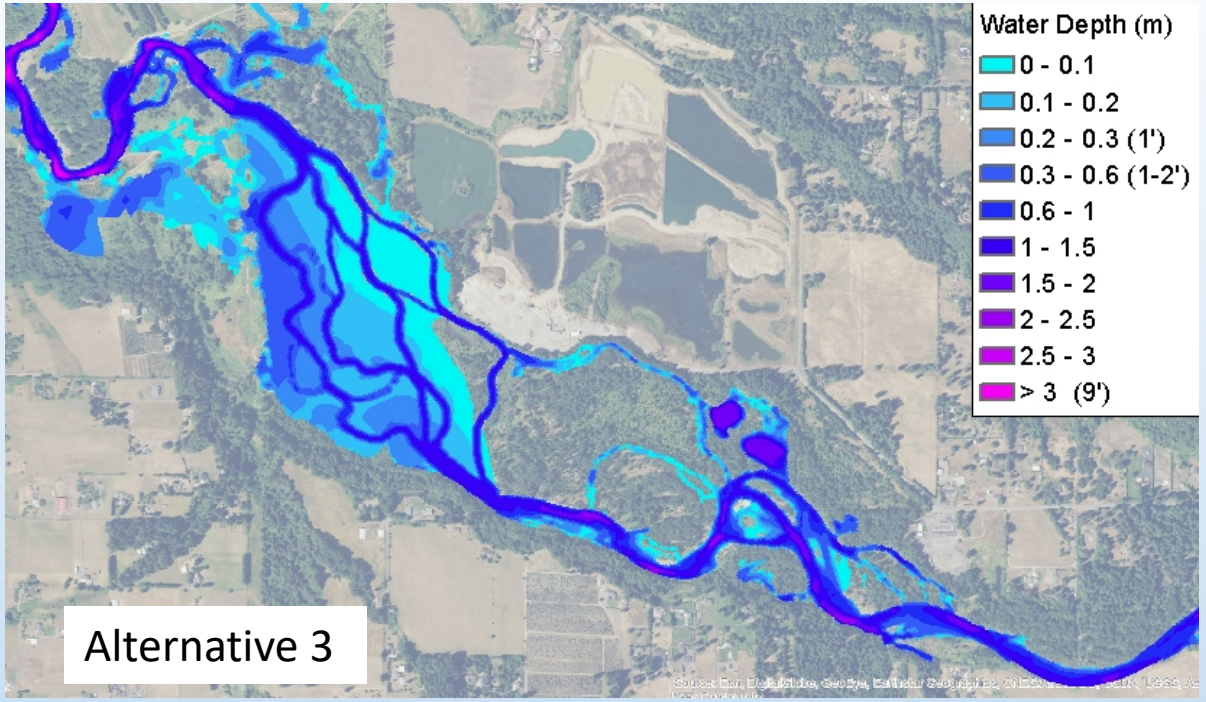


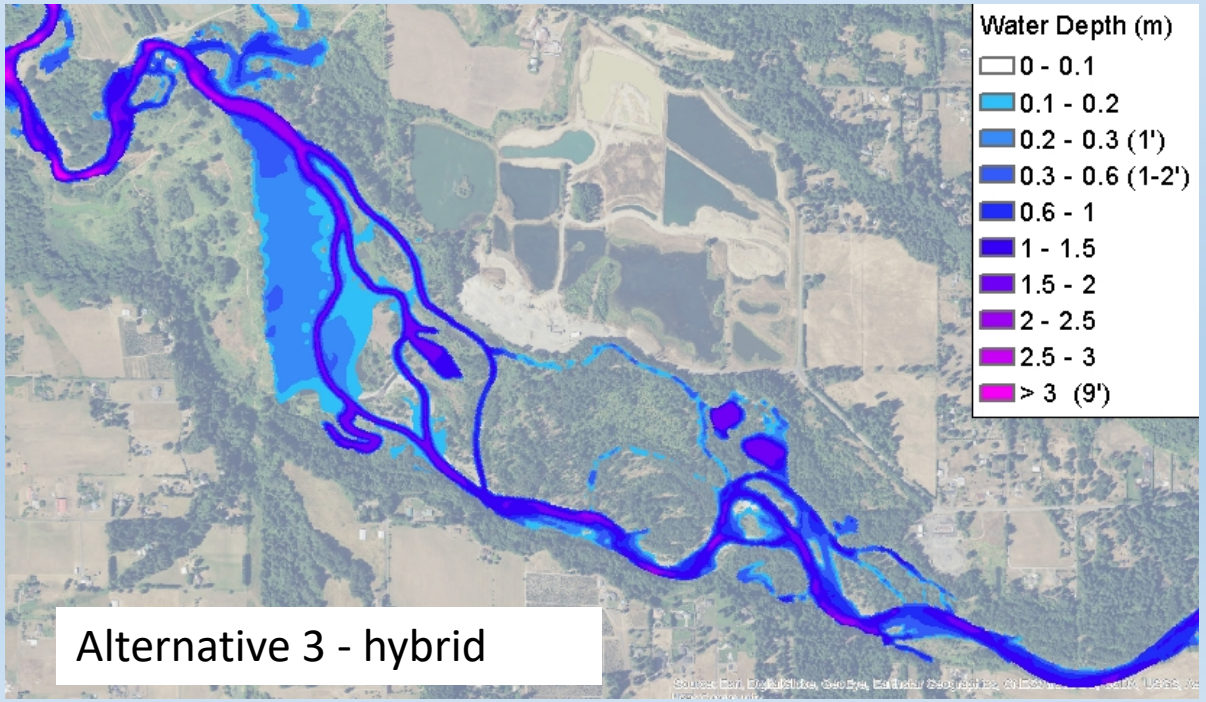


Typical winter flow – 1,000 cfs

- Existing Condition: channel confined within deep pits
- Alt 3 and Hybrid:
  - deep water habitat is reduced significantly
  - flow mostly contained within channels with some shallow wetlands

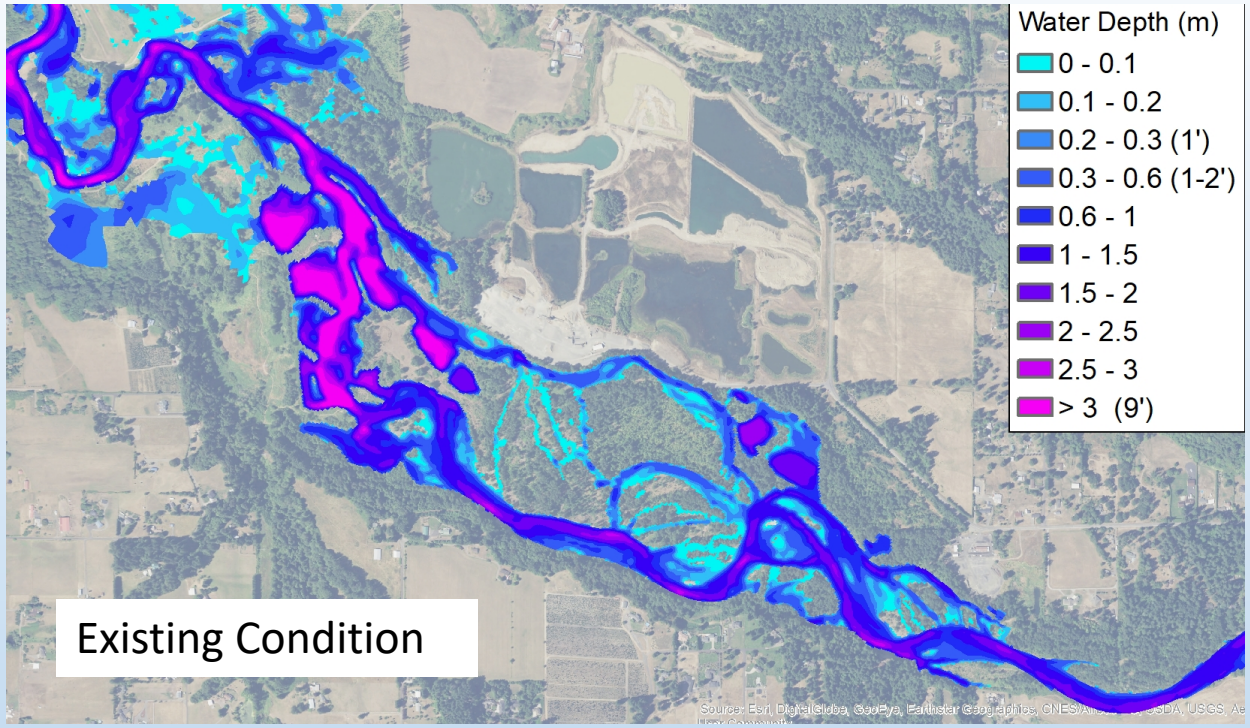


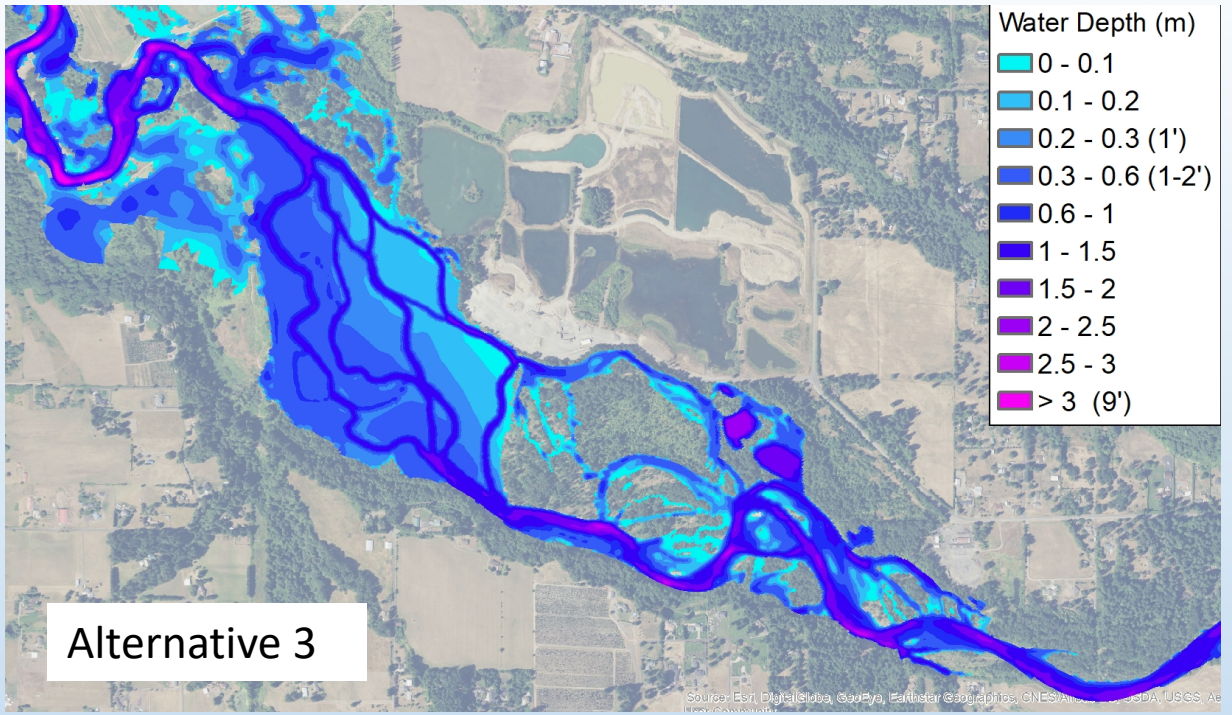


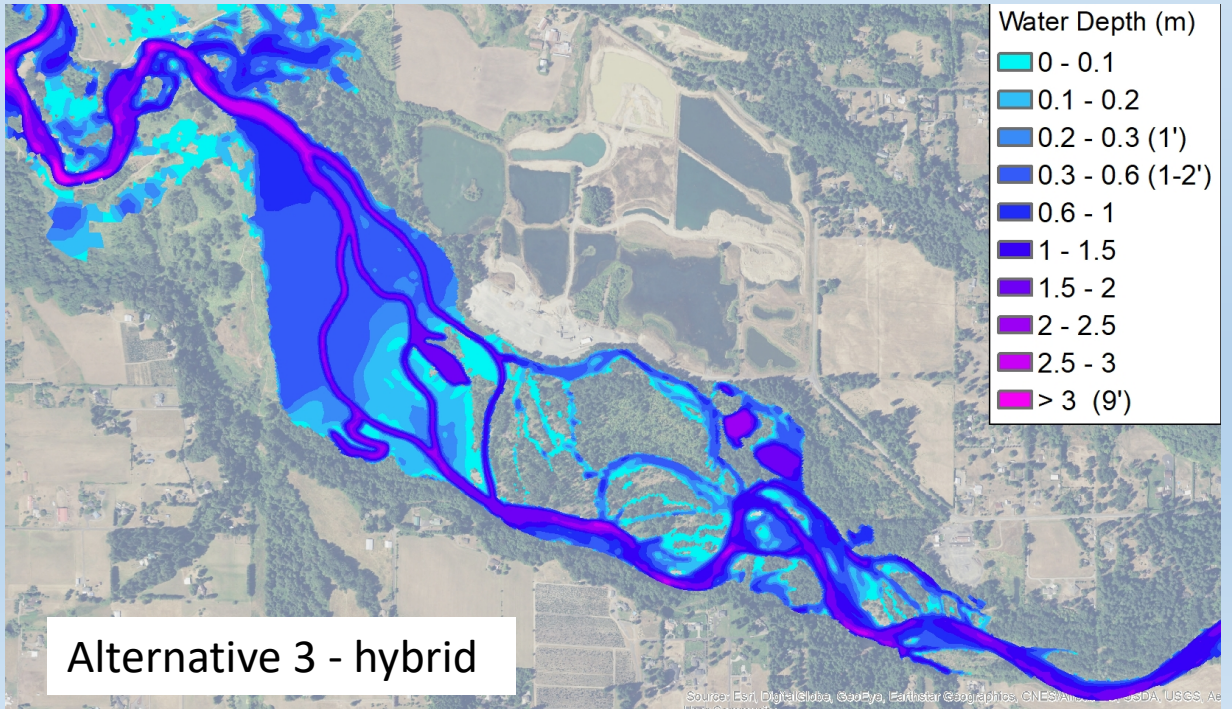


Moderate winter flow – 3,000 cfs

- Existing Conditions: channel confined within deep pits
- Alt 3 and Hybrid: Shallow floodplain inundation throughout much of reach

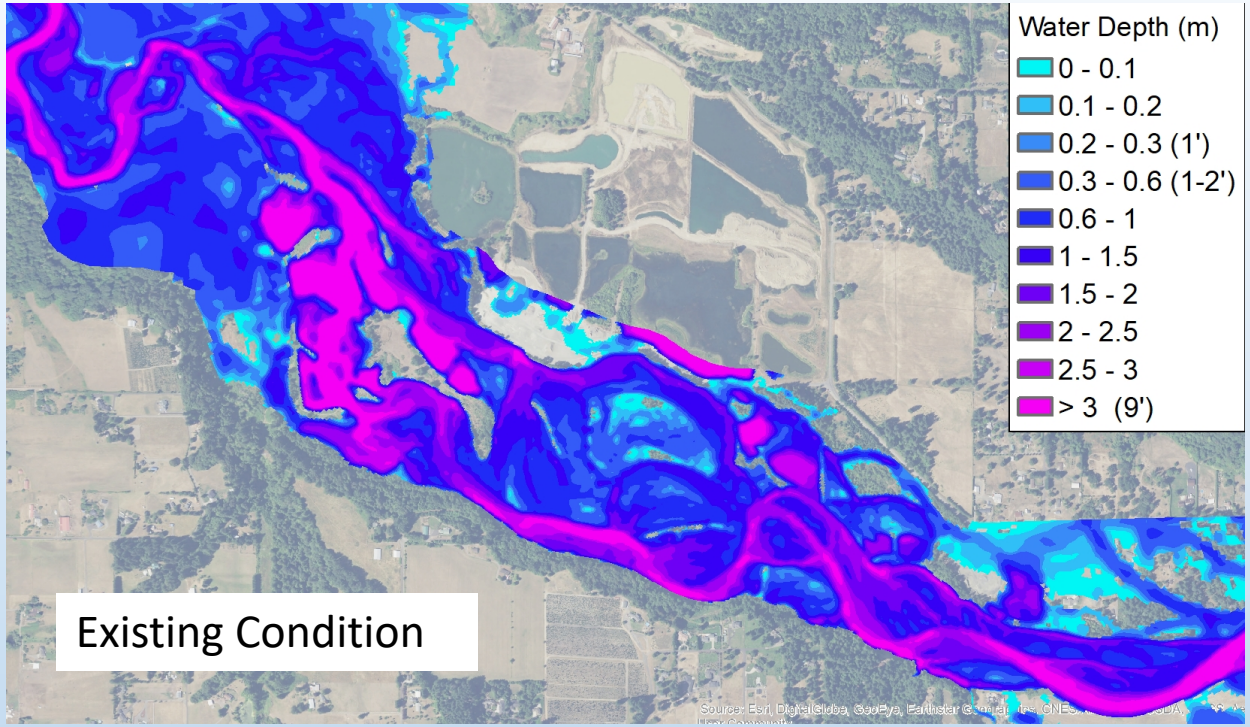


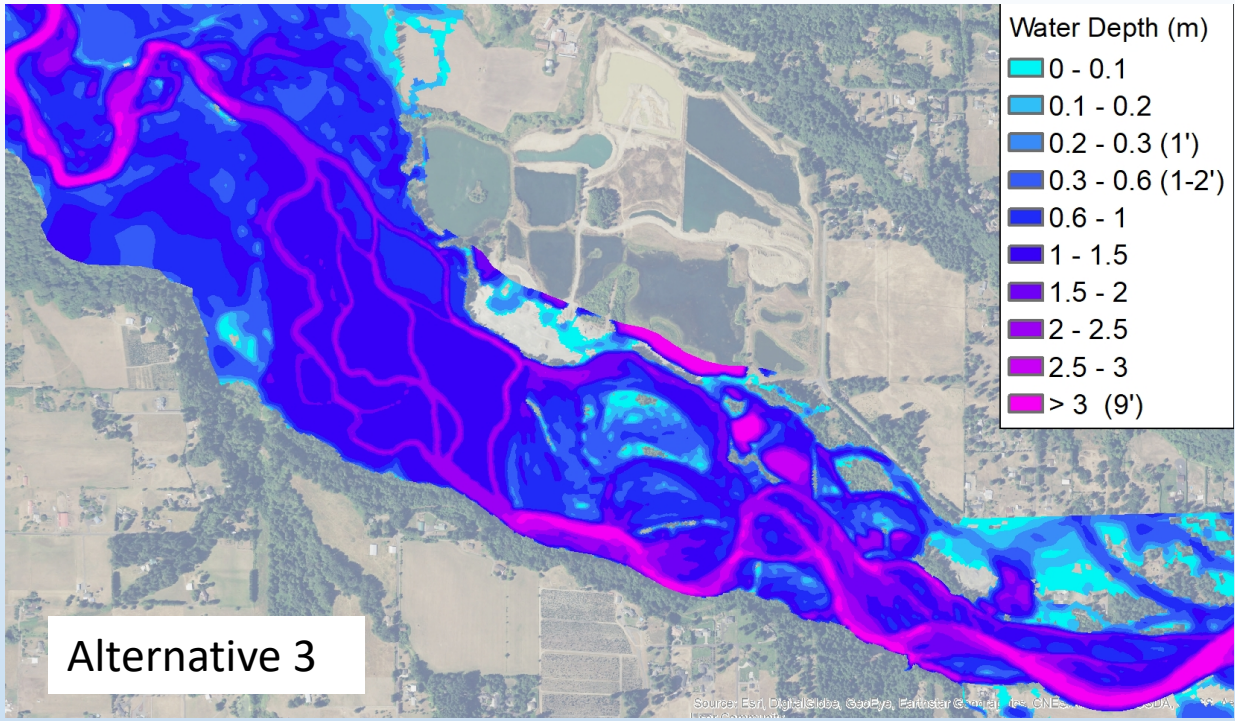


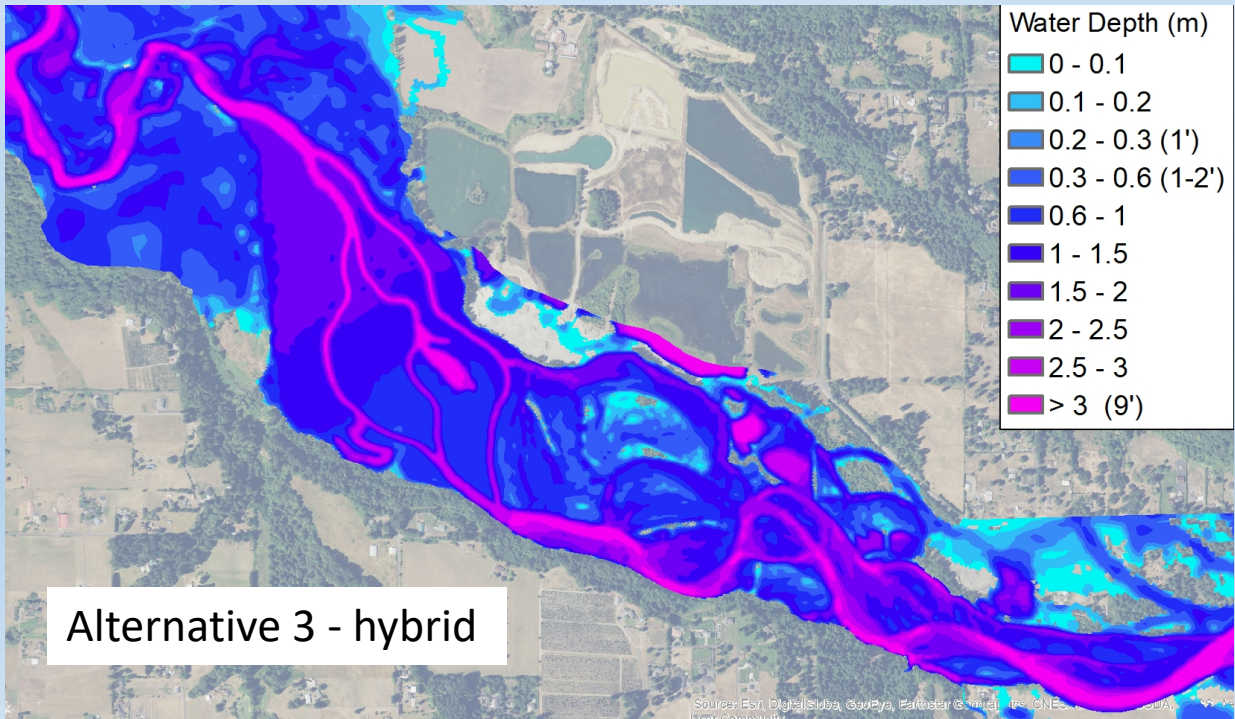


Annual Flood – 5,000 cfs

- Existing Conditions: channel confined within deep pits
- Alt 3 and Hybrid: Floodplain inundation covers most of pits reach

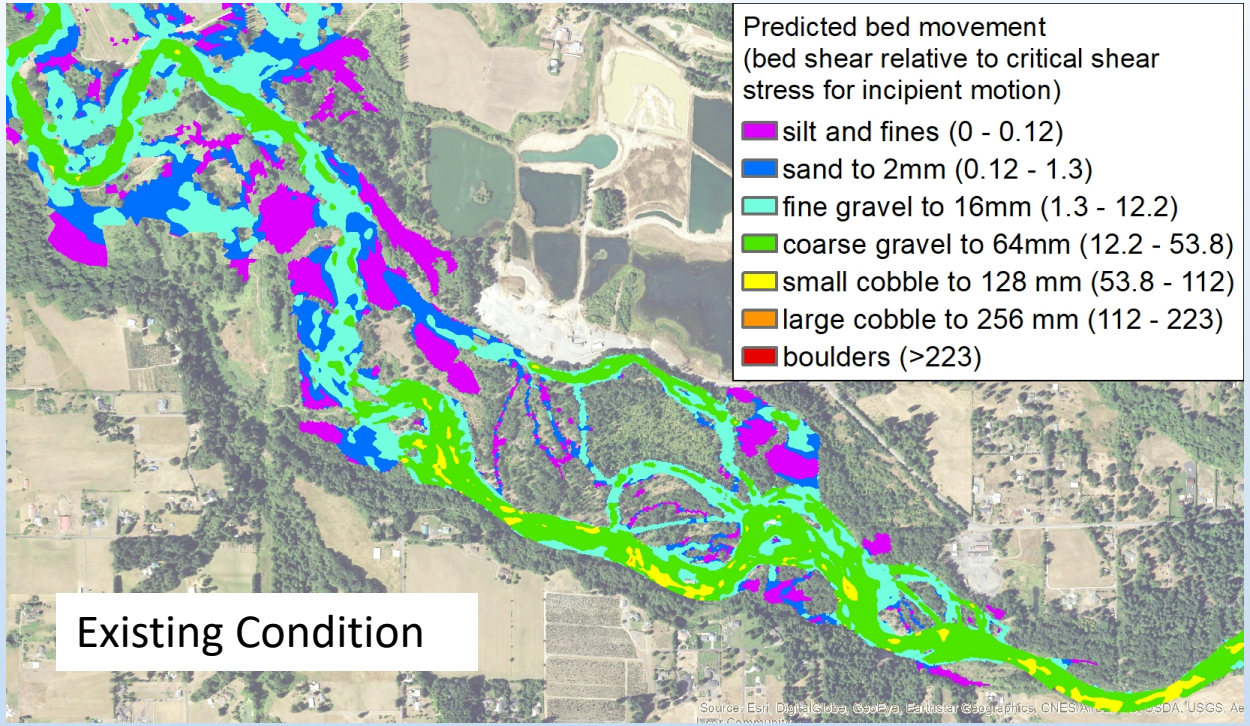


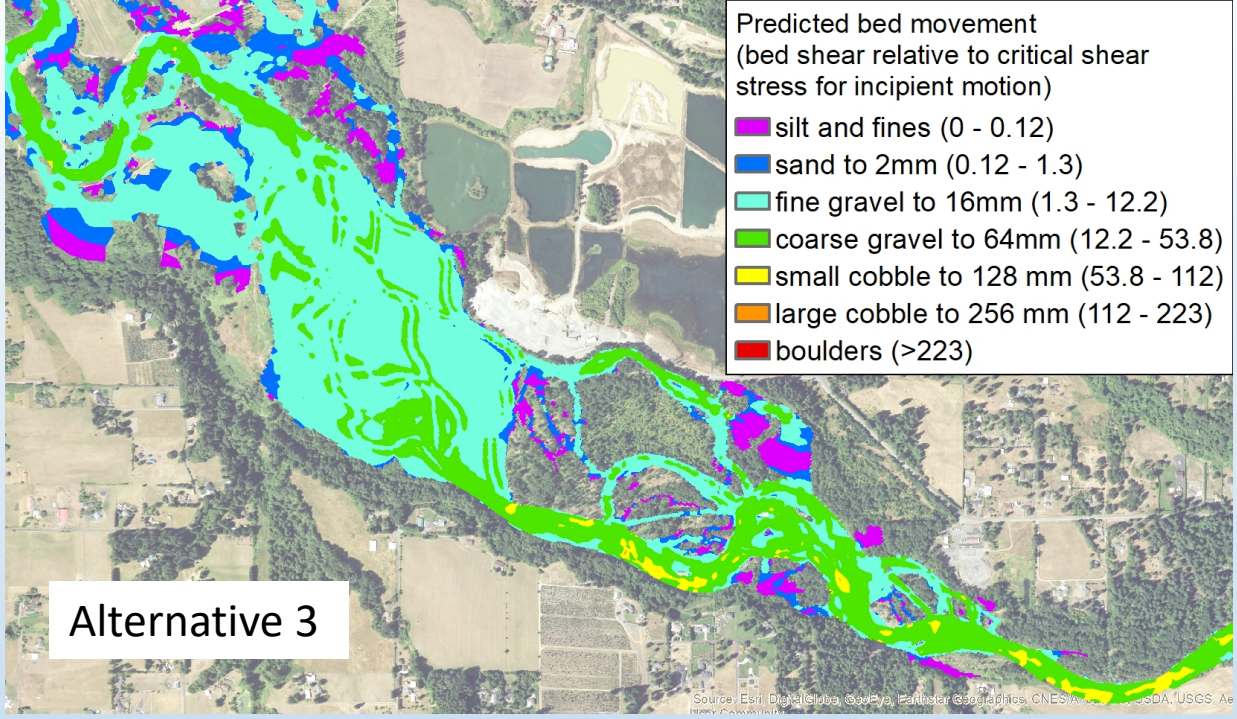


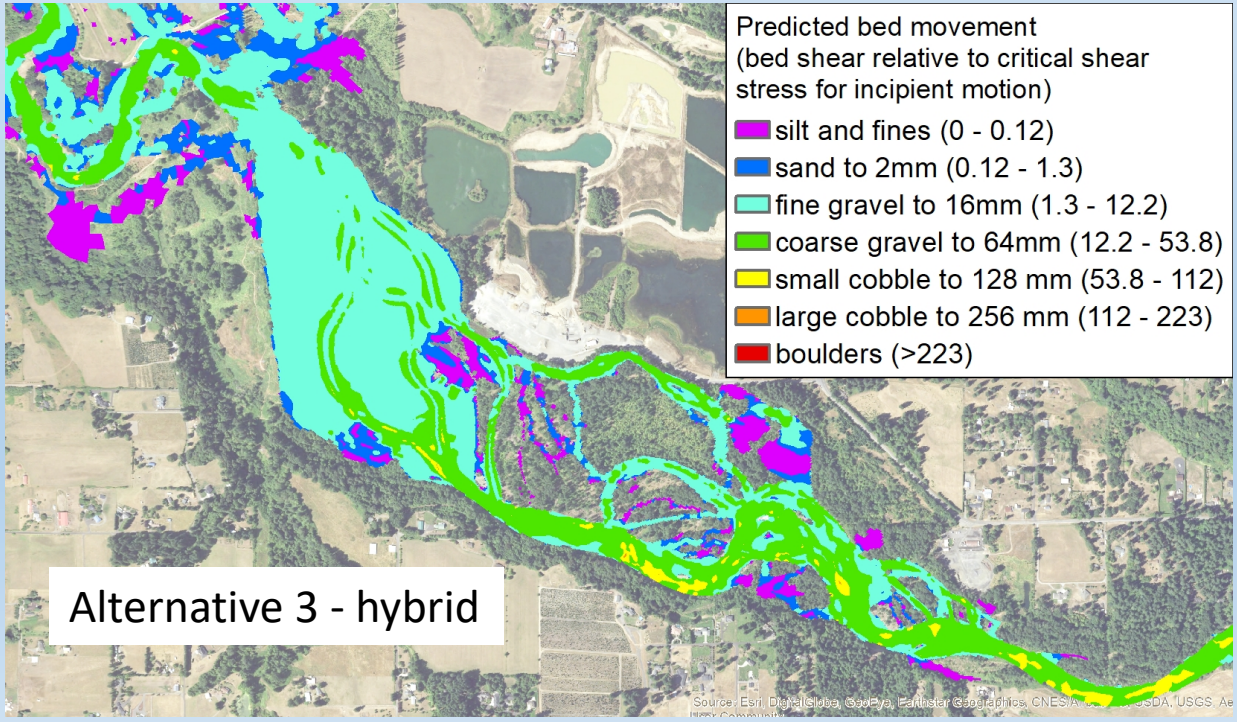


100 year flood – 28,600 cfs

- Existing Conditions: High ground not inundated within pits
- Alt 3 and Hybrid: Increase in floodplain inundation
- Hybrid has increased depth across the floodplain at downstream end of the project
- Variation in depth across the floodplain will increase as grading is refined to add form roughness and support a variety of riparian vegetation communities

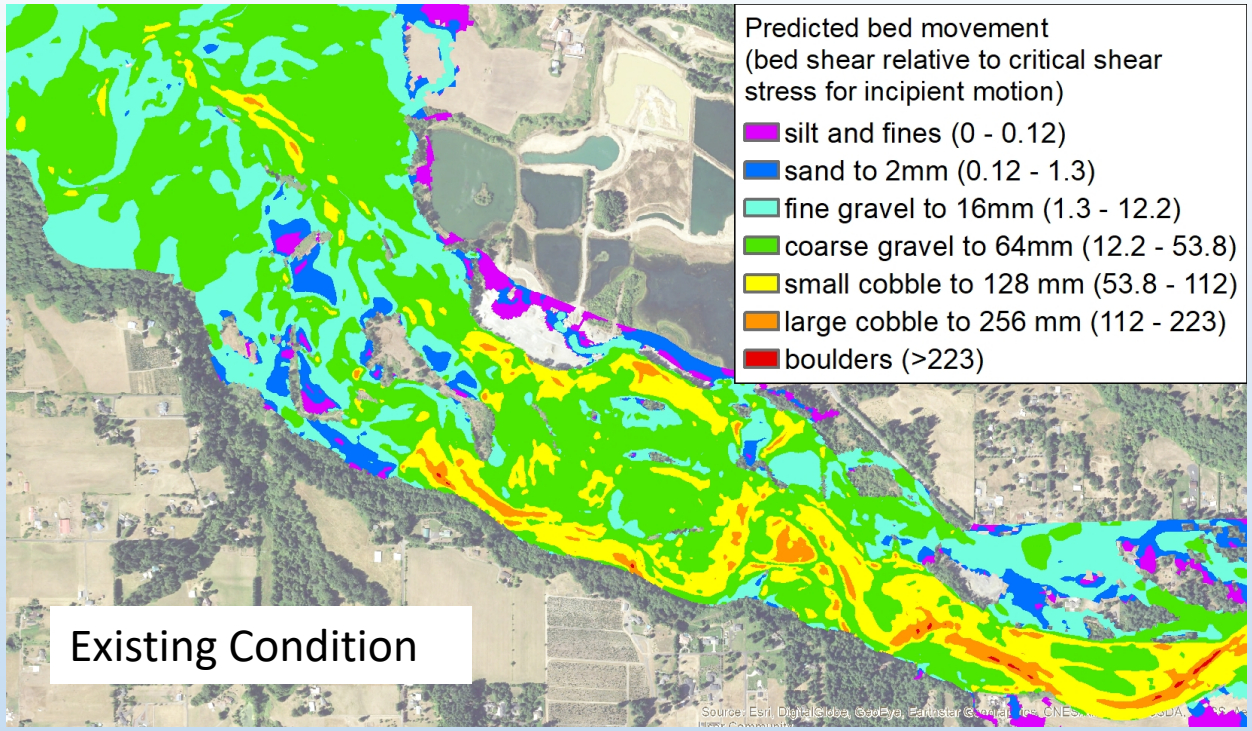


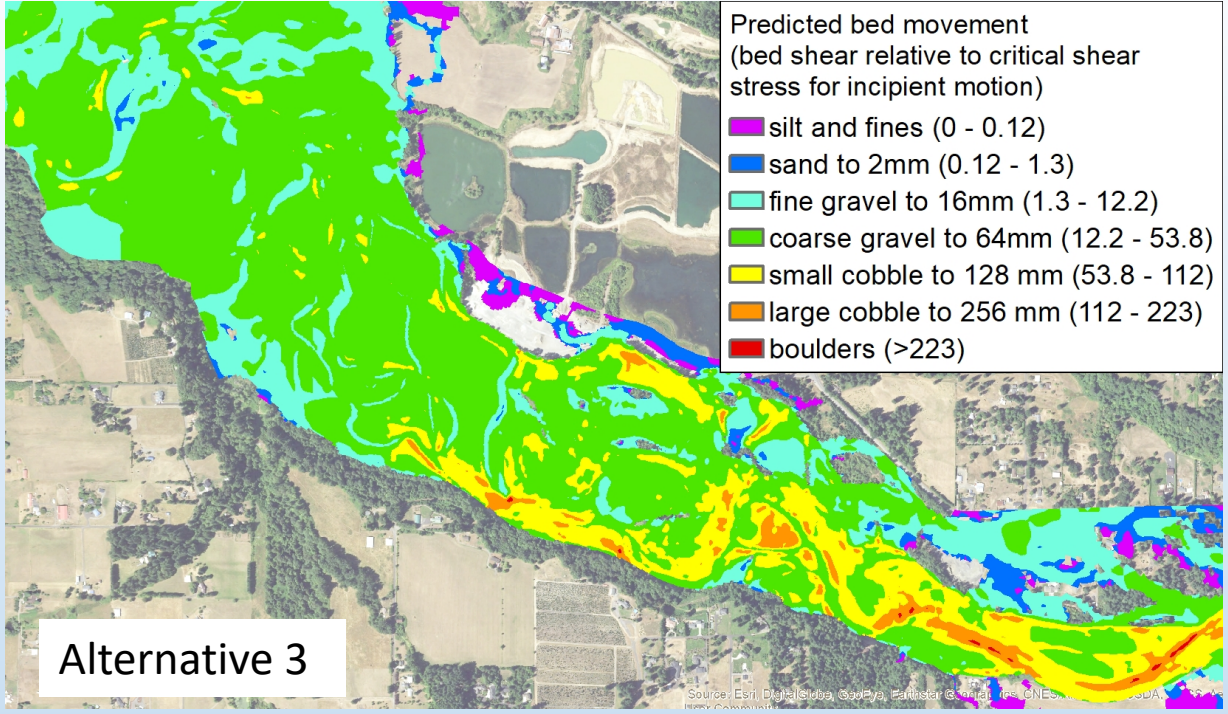


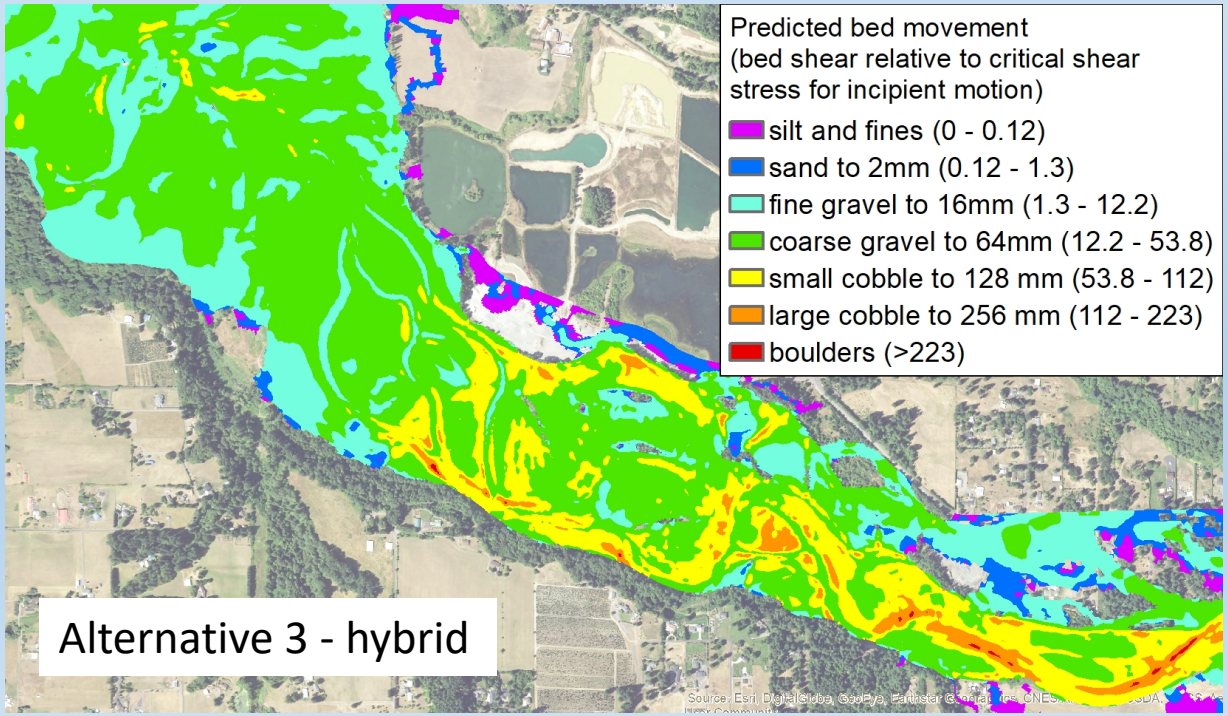


~Q1 - 5000 cfs

- Existing Conditions: Sharp transition from gravels to fines in pits
- Alt 3 and Hybrid:
  - Reduction in fines
  - Restored gravel transport throughout
  - Coarse gravel transport still limited at this flow



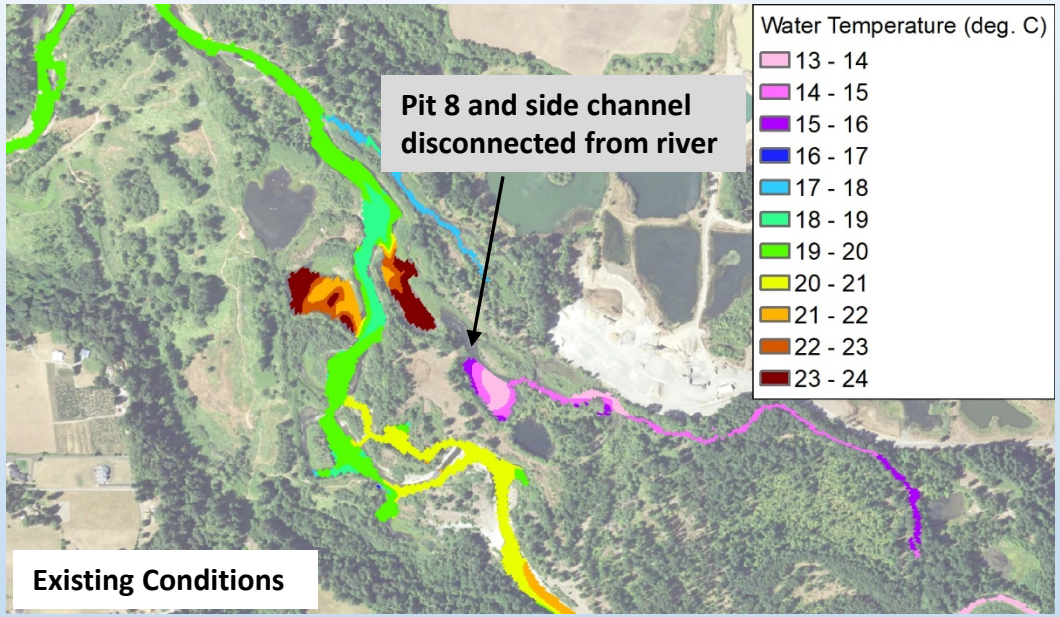


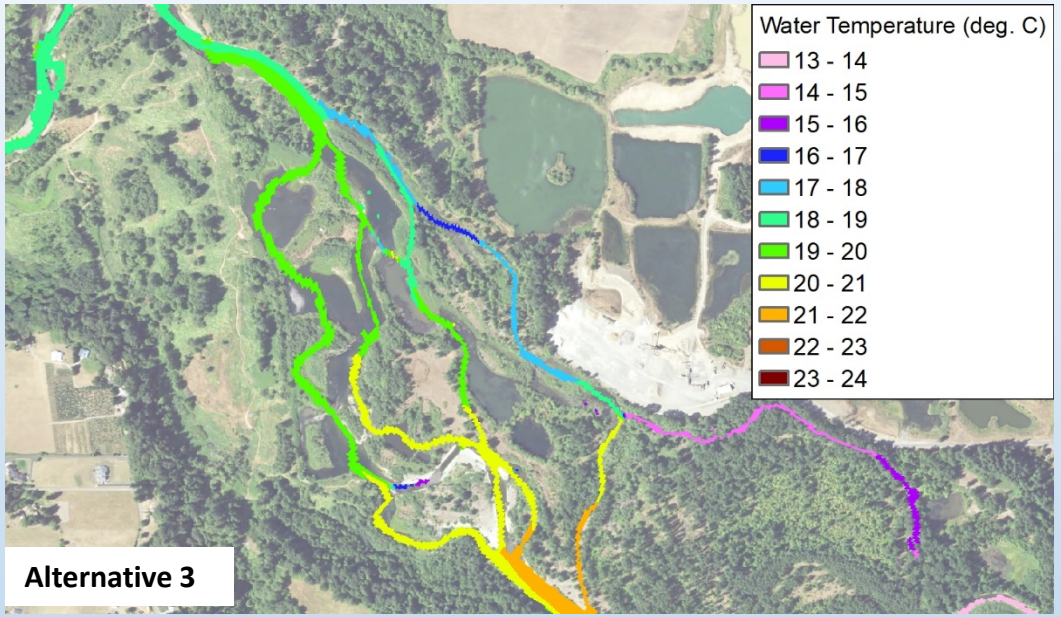


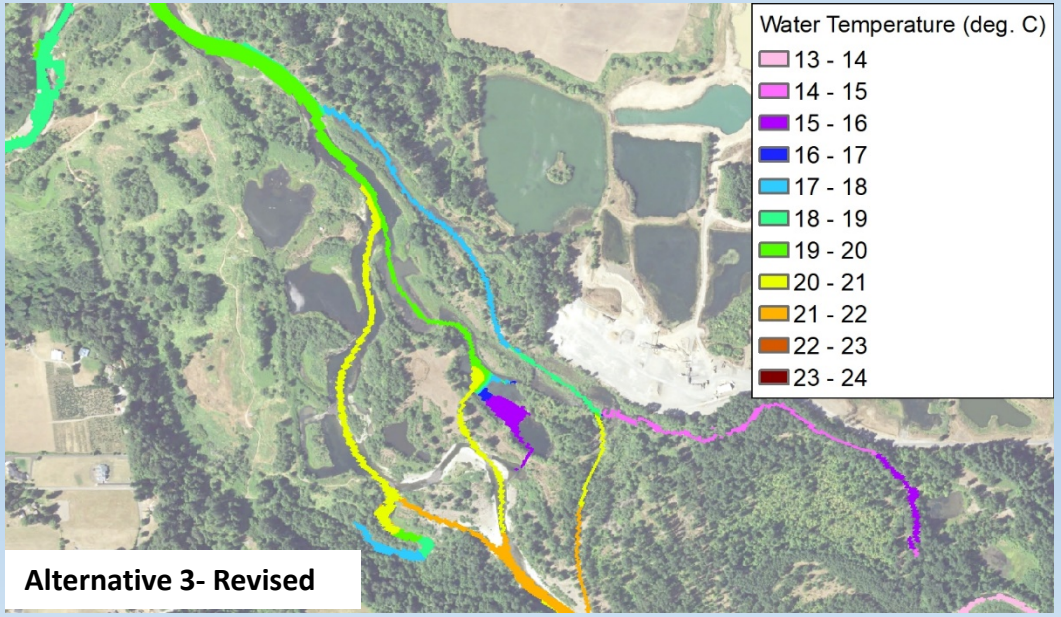
Q100 – 28,600 cfs

- Existing Conditions: Pits segment still limited in transport capacity of coarse material - Discontinuity
- Alt 3 and Hybrid: Restored coarse gravel transport and continuity to downstream reach
- Infrastructure considerations
  - BPA power line towers
  - Daybreak Pits interface
  - Bluffs

Temperature Analysis: Simulated Water Temperature @ 35 cfs







Model temperature input sources: - Quantum Thermal IR survey (2020)
- LCEP temp. monitoring (2018)

Model results observations for restoration alternatives:
- Warm water pits #5 and #7 eliminated
- Potential to provide connectivity to colder side channel waters
- Potential to provide connectivity to colder Pits #8 and 2

Additional thermal benefits predicted for restoration alternatives:
- Reduced channel surface area should reduce heating potential

	Existing Grade	Alternative 3	Hybrid 3-chan Alternative
Wetted surface area (acres)	**20.7**	**19.6**	**14.6**

Expected Geomorphic Trajectory

Existing Conditions:

- Continued confinement within pits for >70 years
- Very slow delta growth
- Extremely depositional – dominated by fines downstream of delta
- Limited floodplain inundation
- Limited access to potential channel migration zone

Proposed Conditions:

- Increased floodplain inundation
- Increased channel migration zone width
- Gravel transport (and deposition) restored throughout
- Still DEPOSITIONAL! – but less than existing. Channels will be expected to continue to evolve due to channel response to bedload aggradation
- Full pits area (channels and floodplain) will aggrade more uniformly over time, as opposed to the pronounced delta that currently exists

Risk Considerations

Existing Conditions:

- High risk to habitat (channel form, temperature, food, invasives, fines)
- Low risk to infrastructure (due to continued confinement)

Proposed Conditions:

- Habitat improvement (immediate habitat created and trajectory set for increased habitat over time)
- Risk of Daybreak Pits avulsion/breaching? – Possible due to increased channel migration zone and uncertainty with future planform changes. Will likely need to be addressed via armoring.
- Risk to BPA Powerline Towers? – Possibly little-to-no risk based on no significant changes to floodplain inundation across powerline alignment. Warrants further investigation as part of Final Design plus consultation with BPA.
- Risk to bluff erosion upstream? – Likely not based on model results and area of expected channel changes.

Next Steps

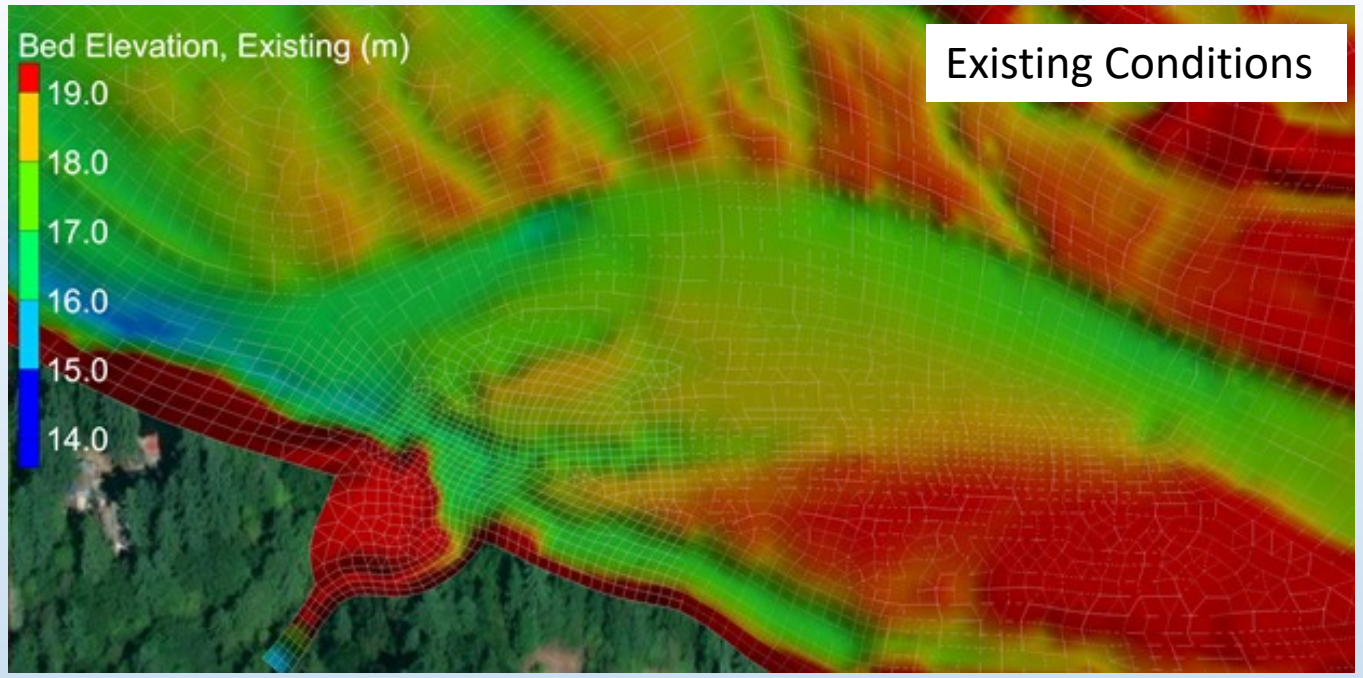
- ✓**Present the results** of model runs
- ✓**Model revised alternatives** (as needed)- Al3 Revised (this meeting)
- ✓ **Present results** to the group- today
  - ➢**Preferred alternatives**
  - ➢**Develop preliminary designs at three locations**, engineering plans cost estimates, quantities.

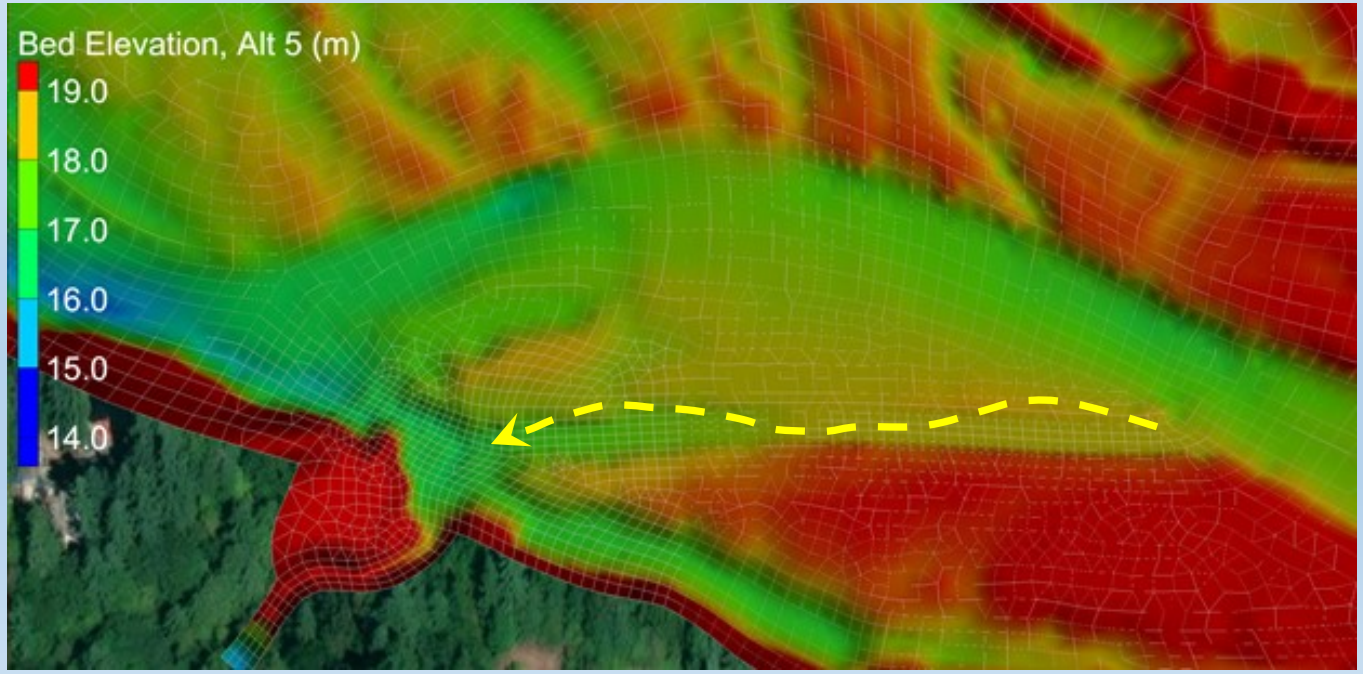
We did not get to the next 3 slides in the Meeting

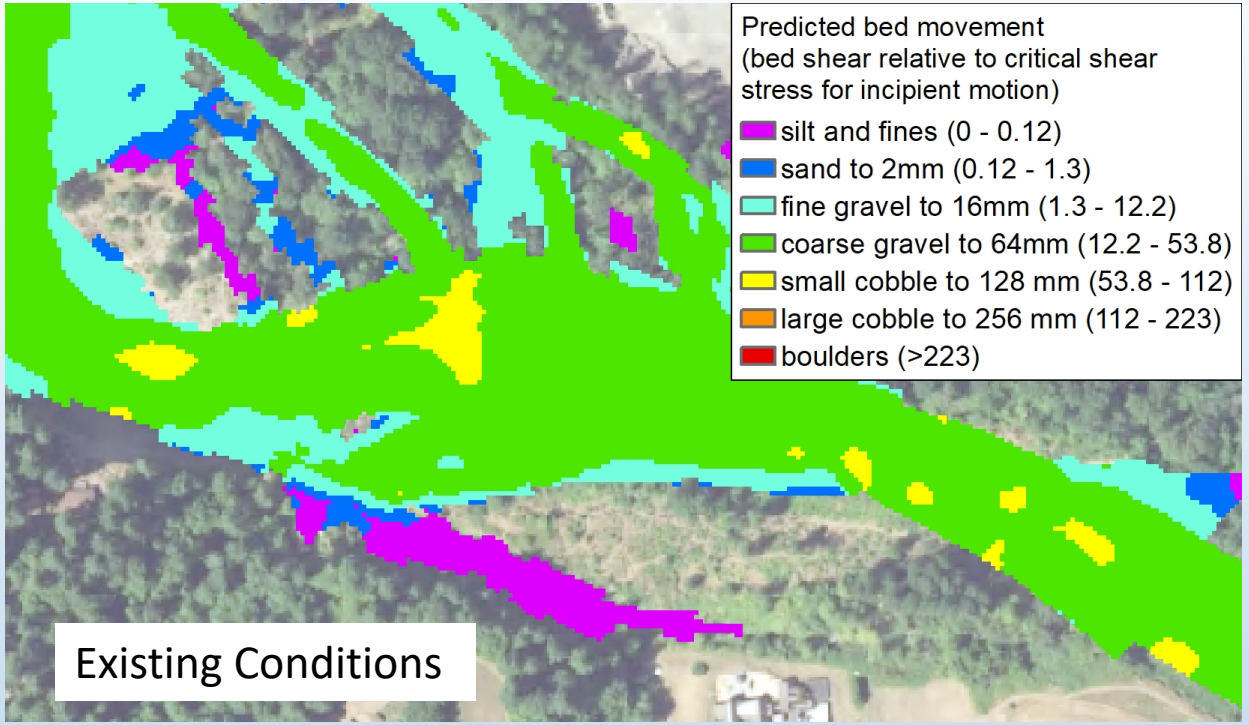
Mill-Manley Confluence

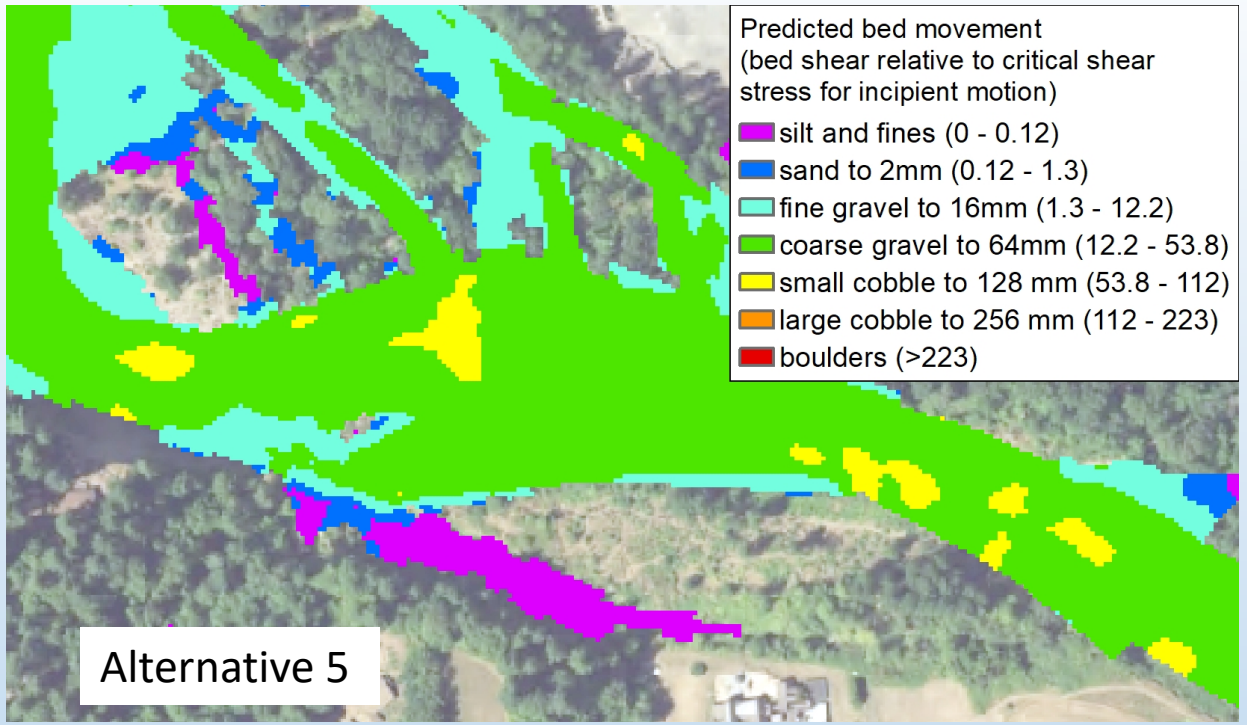
Alternative 5

- Objective – increase scour of Mill confluence gravels in cold water alcove
- Grading at the upstream edge of the gravel bar to encourage high flows routed through confluence zone





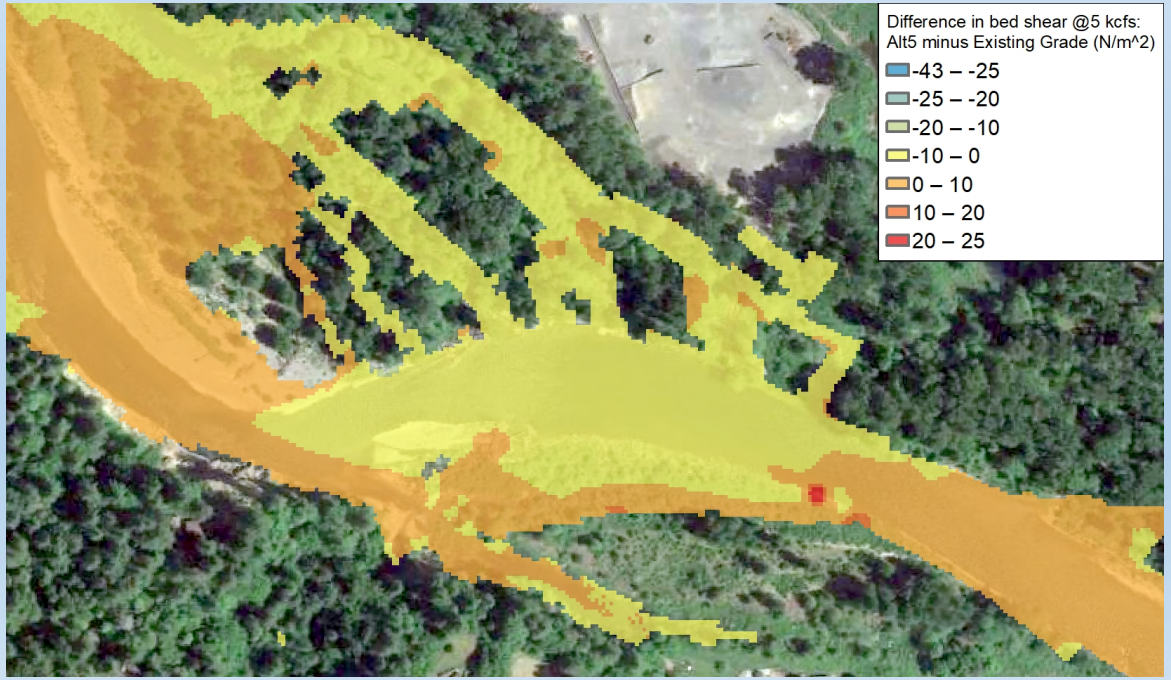




Mill-Manley Confluence: ~Q1 - 5000 cfs

Alt 5 – Sediment Transport

- Slight increase in shear stress in Alt 5
- No dramatic changes to the sediment transport capacity at the confluence



Mill-Manley Confluence

<u>Geomorphic Trajectory and Risk</u>

- Channel migrating to the north over the last 30 years
- Continued migration will lengthen back-bar channel fed by Mill and Manley
- Creating a scour channel has uncertain outcome especially given continued channel migration
- Existing house on top of bluff currently being undermined
- Effects on bluff erosion uncertain as channel migrates

END

Restoration Alt.'s- Voting From Last Year Meeting

- Alt. 1- No action/passive recovery
- Alt. 2- Relocate main channel back to pre-1996 avulsion
- Alt. 2a- Relocate river into a portion of its pre-avulsion flow path
- Alt. 3- Full Floodplain & Pits Re-Grade
- Alt. 3a- Select Floodplain & Pits Regrade