



The Gap to Gap Project Past and Future

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Yakima County Surface Water Management

Yakima Basin Science and Management
Conference 2012

Flood Control Zone District

Long Term View – Planning for Future

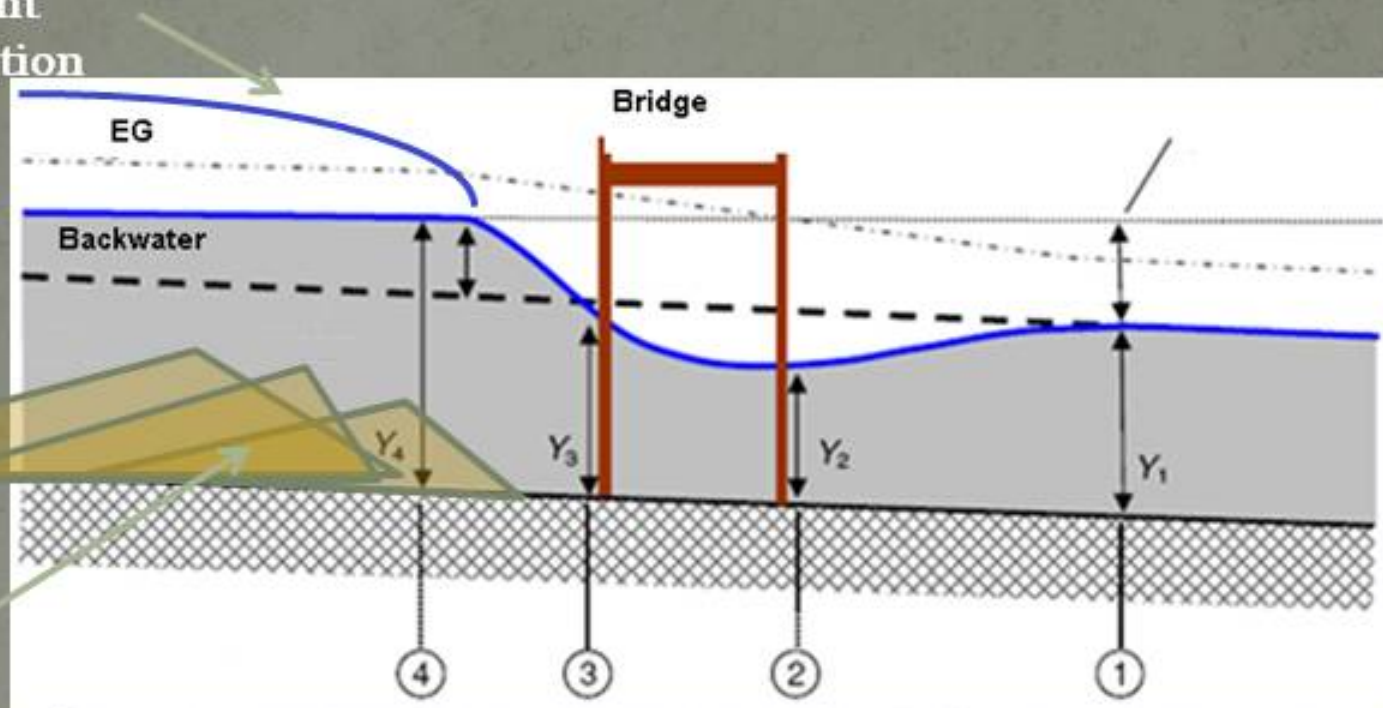
- **Known Problem Areas (historic archives)**
- **High Resolution Topography**
- **Flood and Sediment Modeling & Studies**
- **Observed Changes During Flood Events**

Surprising observations – search for understanding

Repeated Pattern related to Flood Hazard – increases in time & space

Increase in WS and Flattened Energy Grade due to Sediment Accumulation

- **Constrictions** at Approaches to Infrastructure – Bridges, Levees, Levee Alignment, Irrigation & Water Supply Diversions

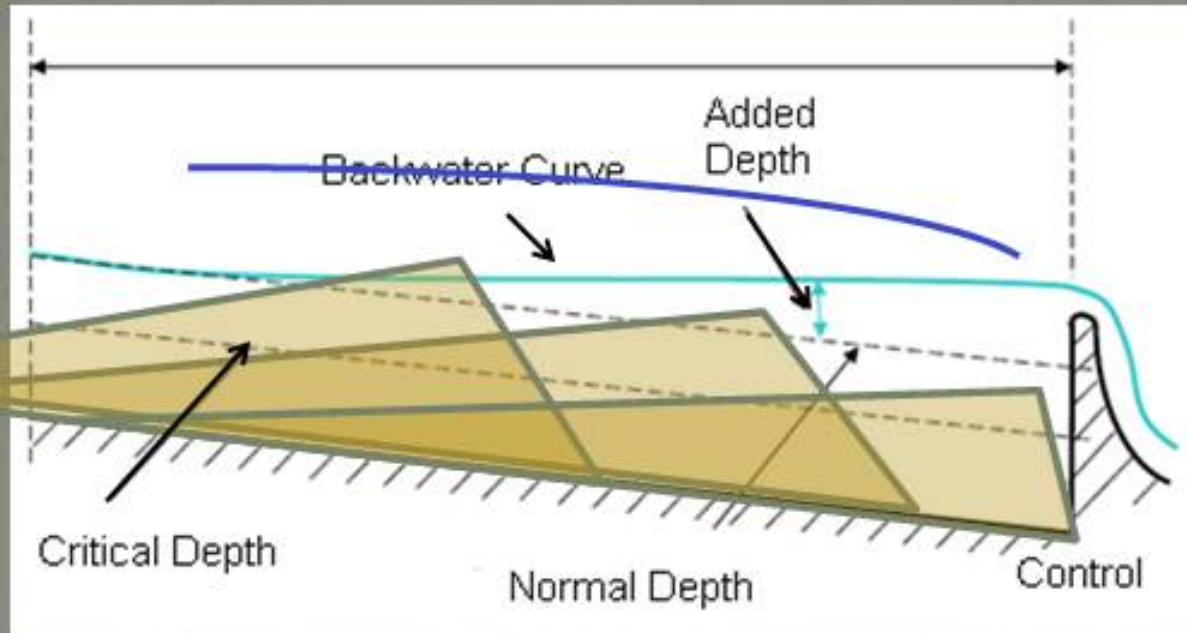


Backwater and Sediment Accumulation

Vertical bed response to horizontal restraint

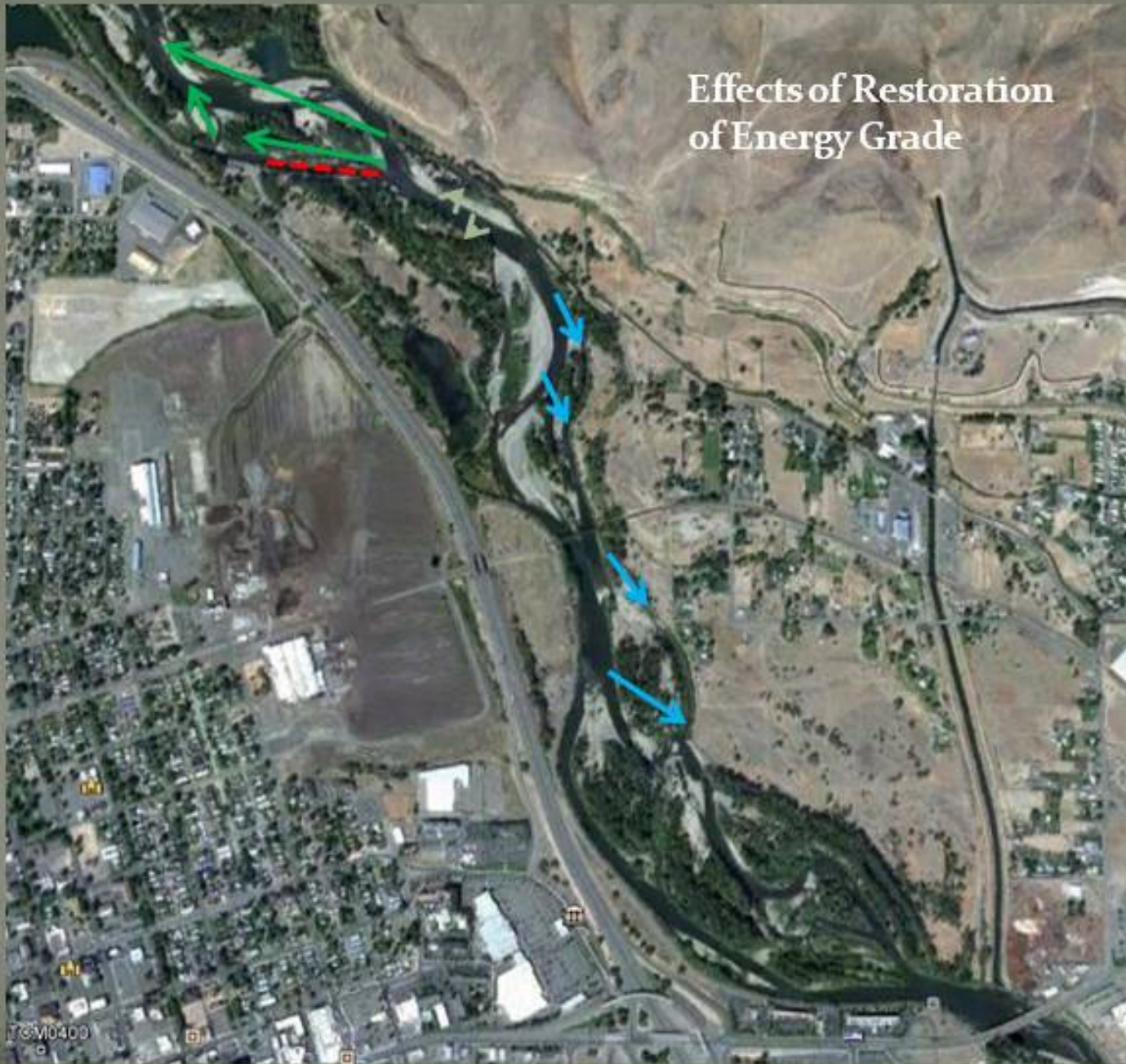
Common Pattern of Increasing Flood Hazard

- Diversions



Insert grade control limiting vertical response to horizontal restraint

Effects of Restoration of Energy Grade



TCM0400

Effects of Restoration of Energy Grade

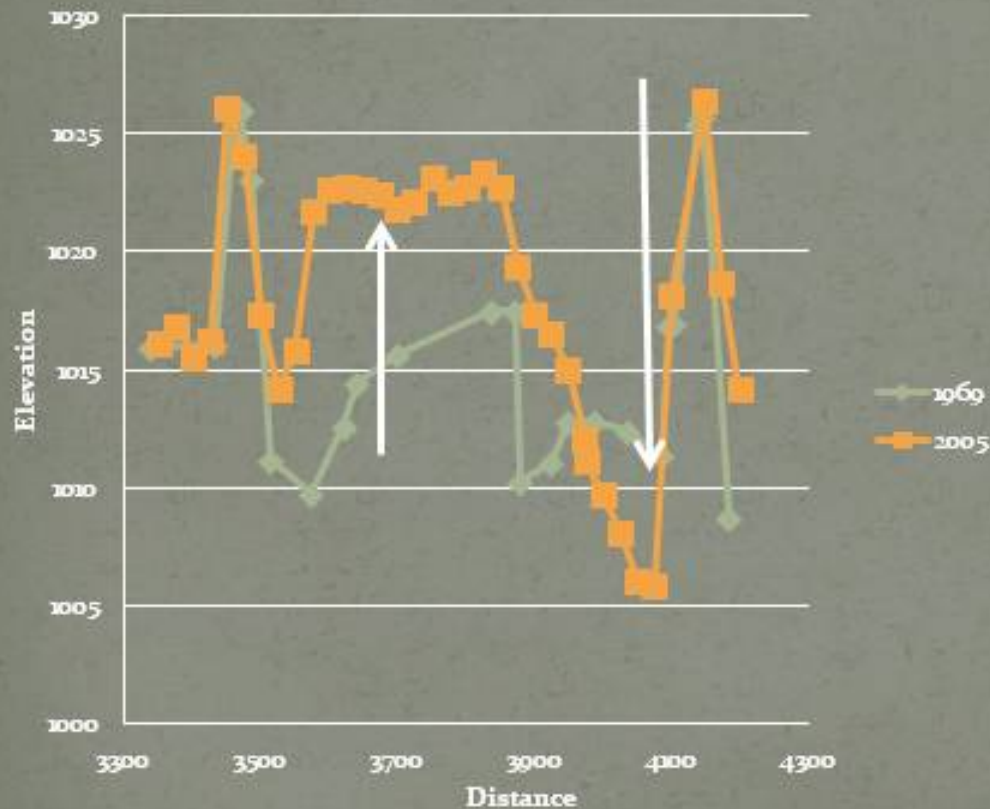
Wapato Island/WDFW Flow Paths - April-May 2012



The Levee Disease

Heightened threats

Cross Section #226



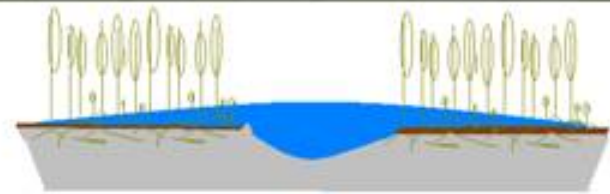
Symptoms – The Riverine Response – planform & vertical change

• Coarse and Fine Sediment Accumulation in Floodplain = **Reduced Conveyance, simplified habitats and substrate**

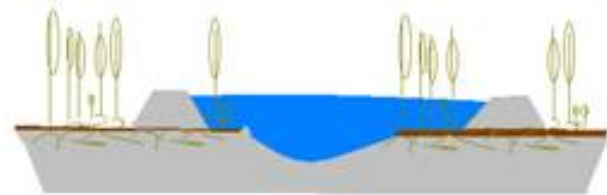
• Channel Incision & Narrowing = **Increased risk of levee failure**

Levees Convert Horizontal Process to Vertical Process

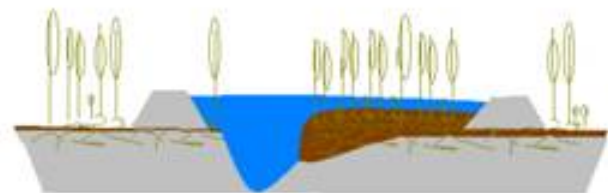
See also: Dean and Schmidt,
https://www.cnr.usu.edu/icrr/files/uploads/AGU_o8.pdf



Flooding is a Horizontal Process



Levees Raise flood Stage, Convert Flooding to Vertical Process



**"Positive Feedback Loop" Develops -
Vegetation Traps Sediment > Stage Rises >
Channel Narrows**

The “Madness”

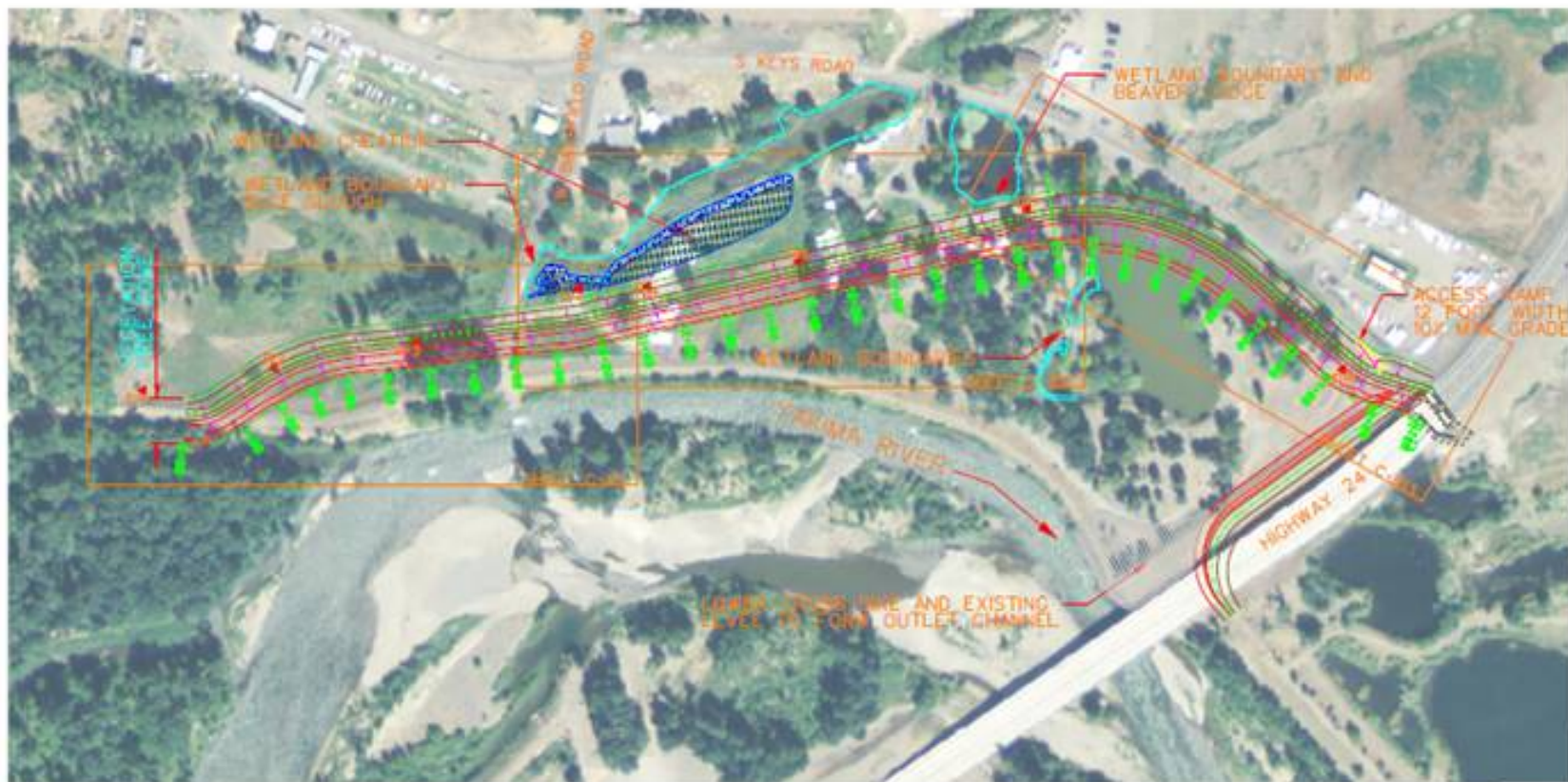
“This looks good, build it here”

- Build Diversion or road crossing
 - Time passes, sediment accumulates, flood stage rise, river threatens to **flank structure (forced avulsion)**
 - First symptom-loss of freeboard @ u/s end of structure, flanking
- Build “Training” structure to protect investment
 - Time passes
- Build Levee to protect investment, houses appear
 - Time passes
- Extend levee **upstream**, protecting community investment
 - Time passes,
- Repeat investment madness until secure!
- Await major flood, call FEMA, sell houses

Moving Forward – Managing and Understanding the Hazard

- Replacement or Improvements largely driven by opportunity – after floods when plan already approved, water conservation issues, service life, financial funding (directives by others including WSDOT)





GENERAL SITE PLAN



LEGEND

TP# TEST PIT NUMBER
 & APPROXIMATE LOCATION

SURVEY NOTE:

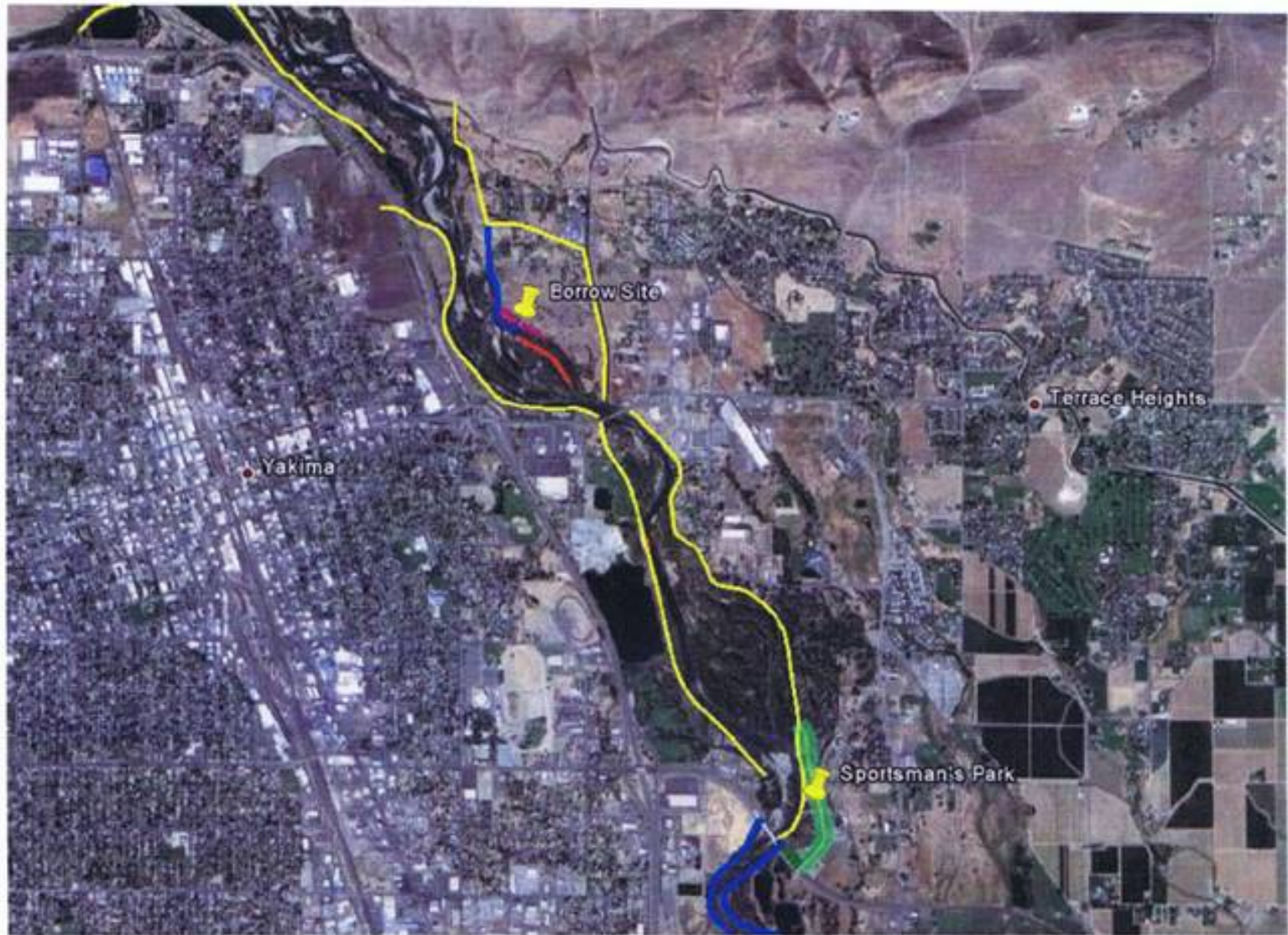
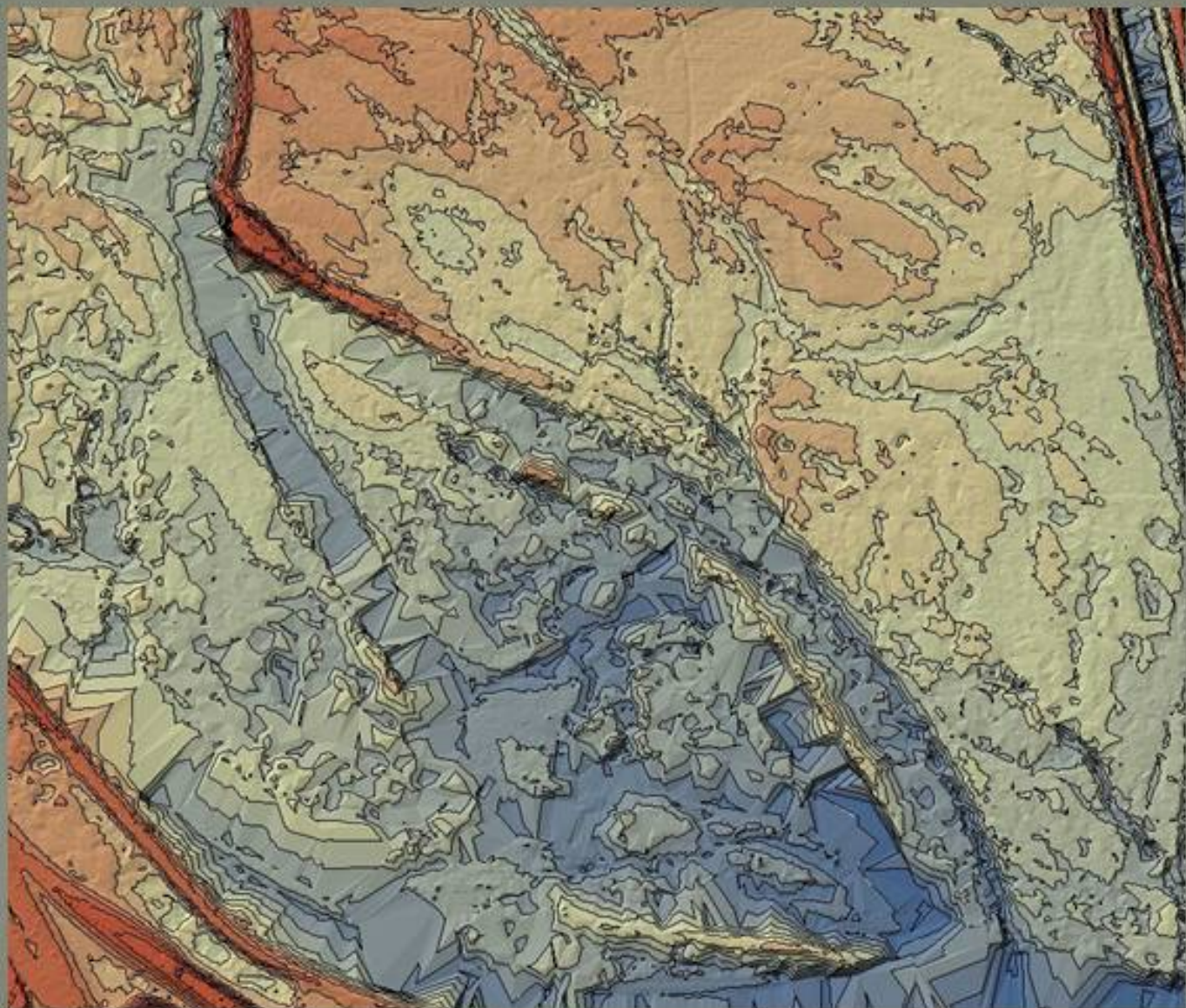
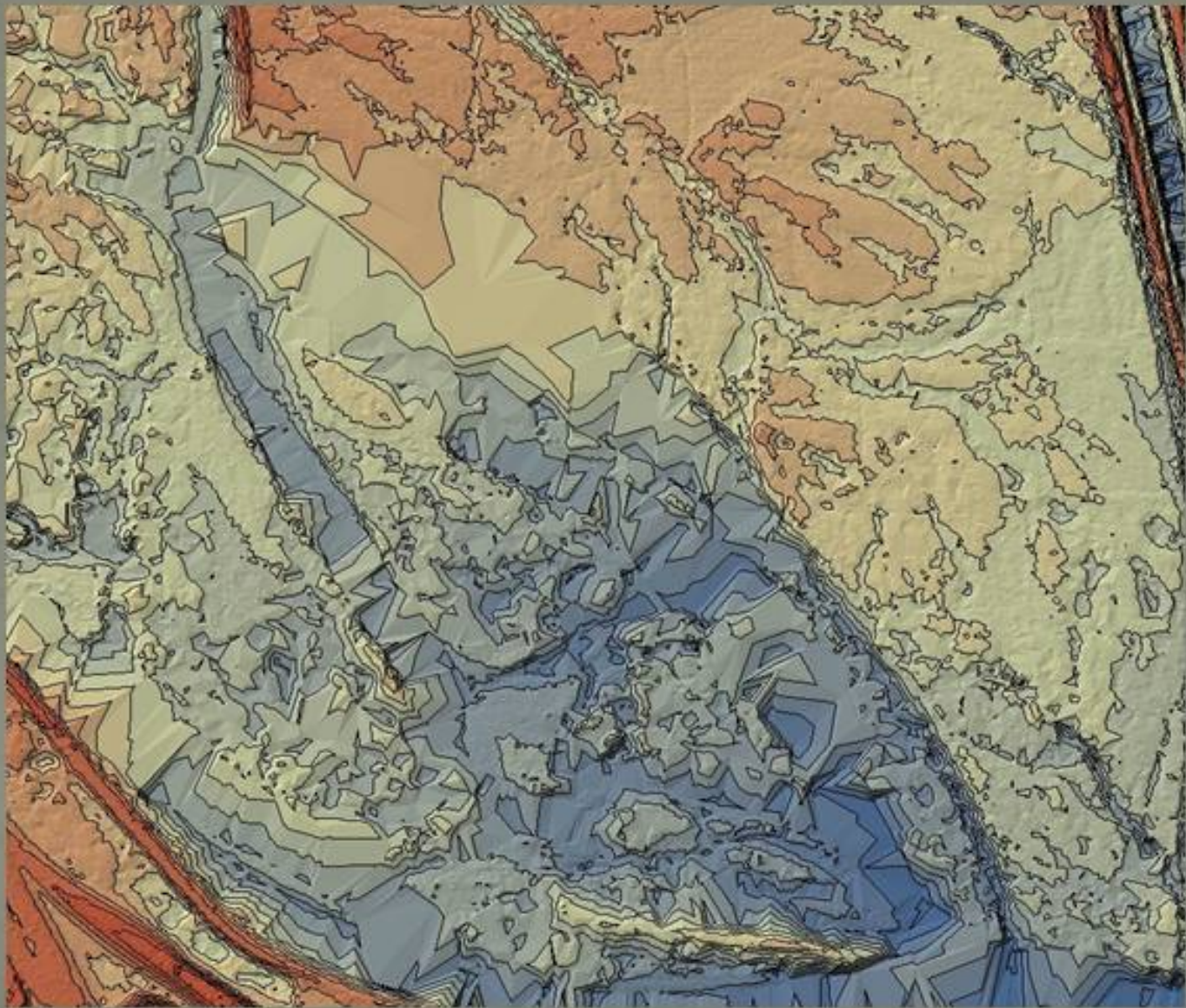


Figure 1. General location of the Sportsman's Park Project and the borrow site.





Initial excavation of gravel pile



WSDOT pit Levee before



Burger King sign rising over the river



Gravel Pile excavated



Setback Levee tie in to existing



Fuel oil Contamination





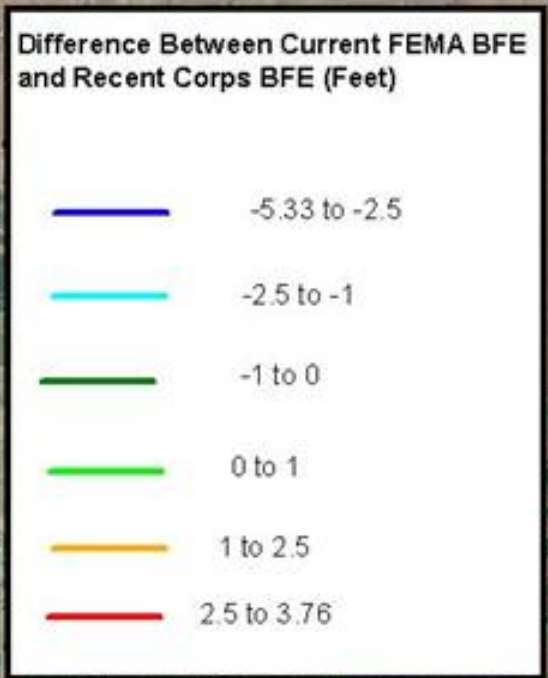
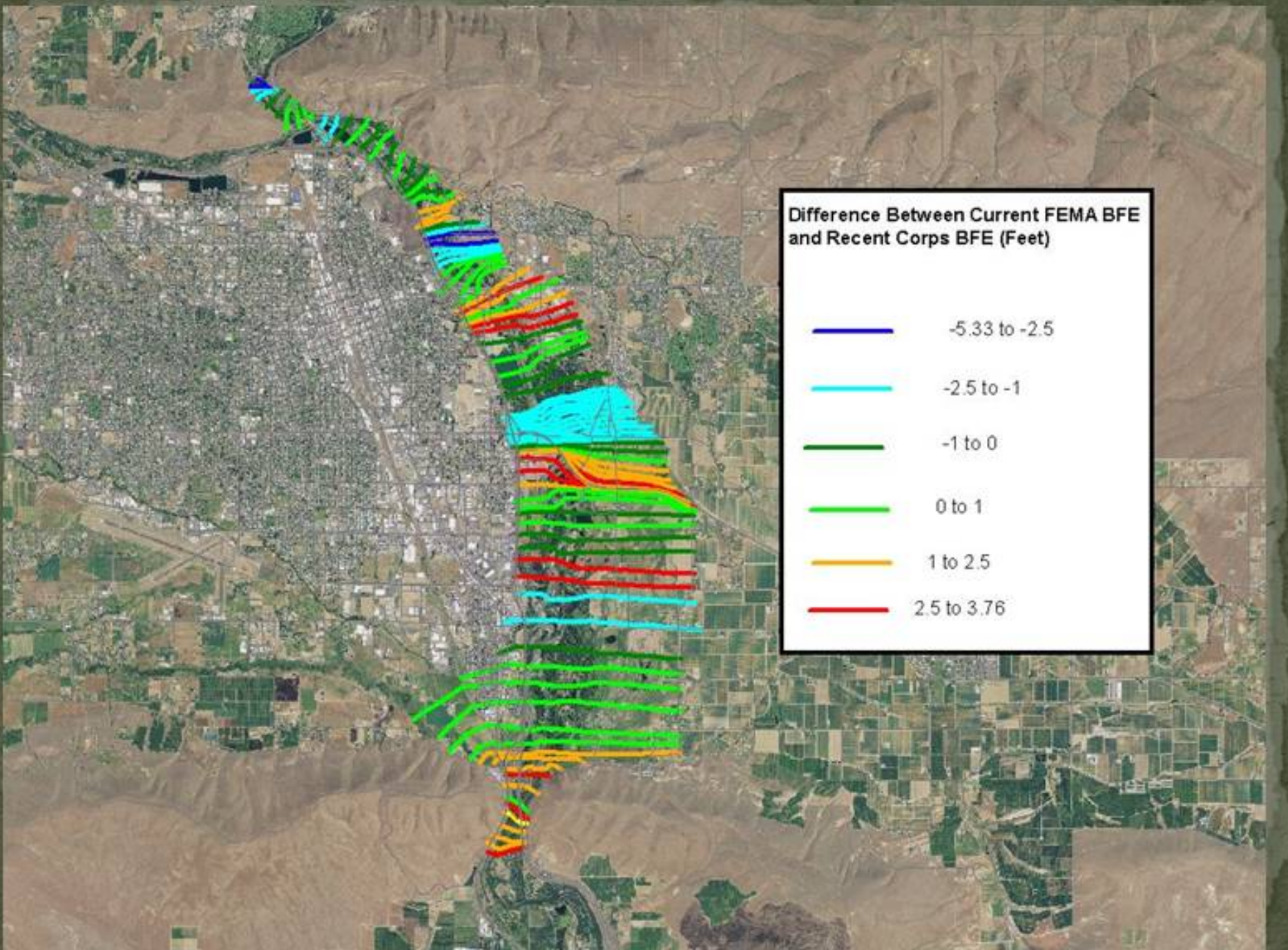


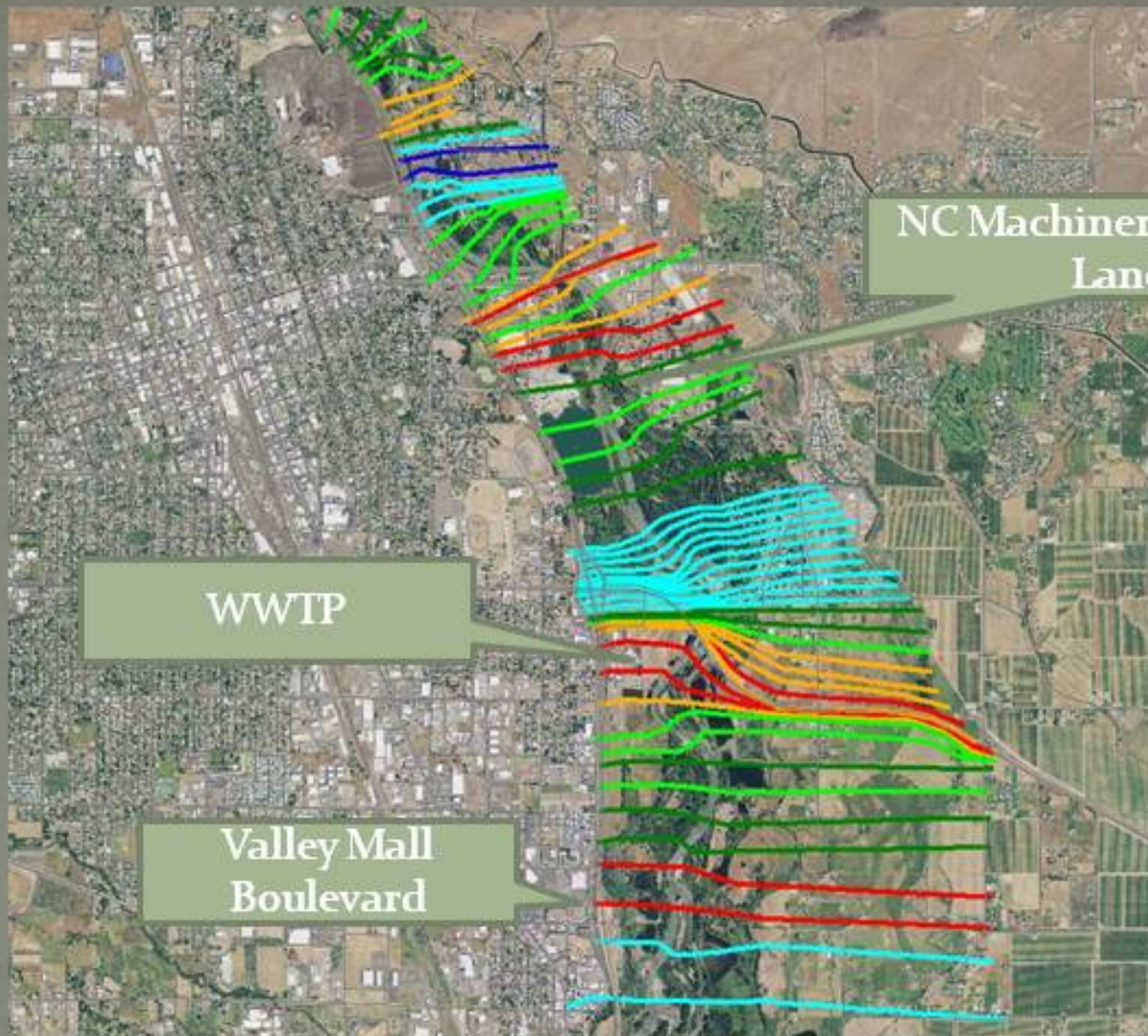
Water enters Floodplain 1 day after rough excavation completion



Finished Grade WSDOT levee





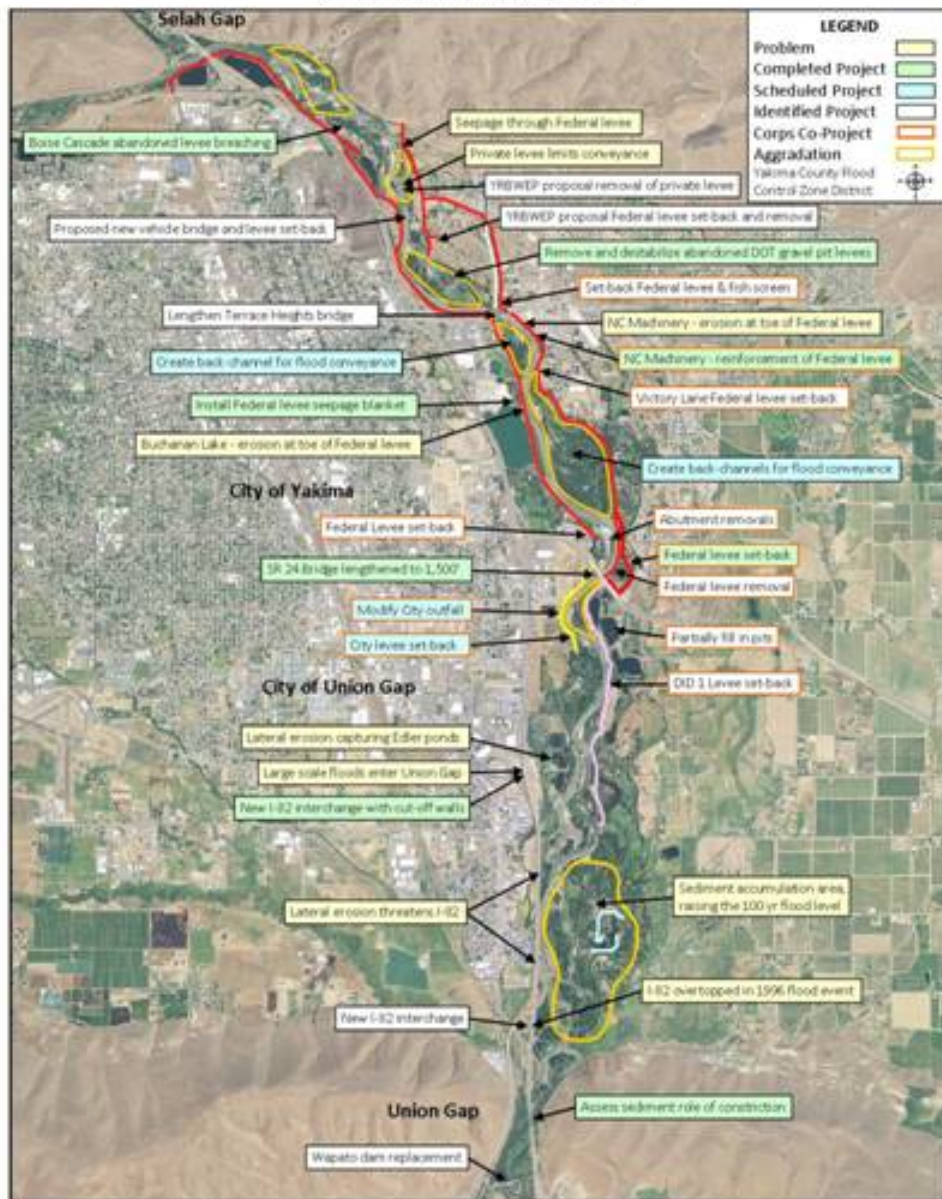


WWTP

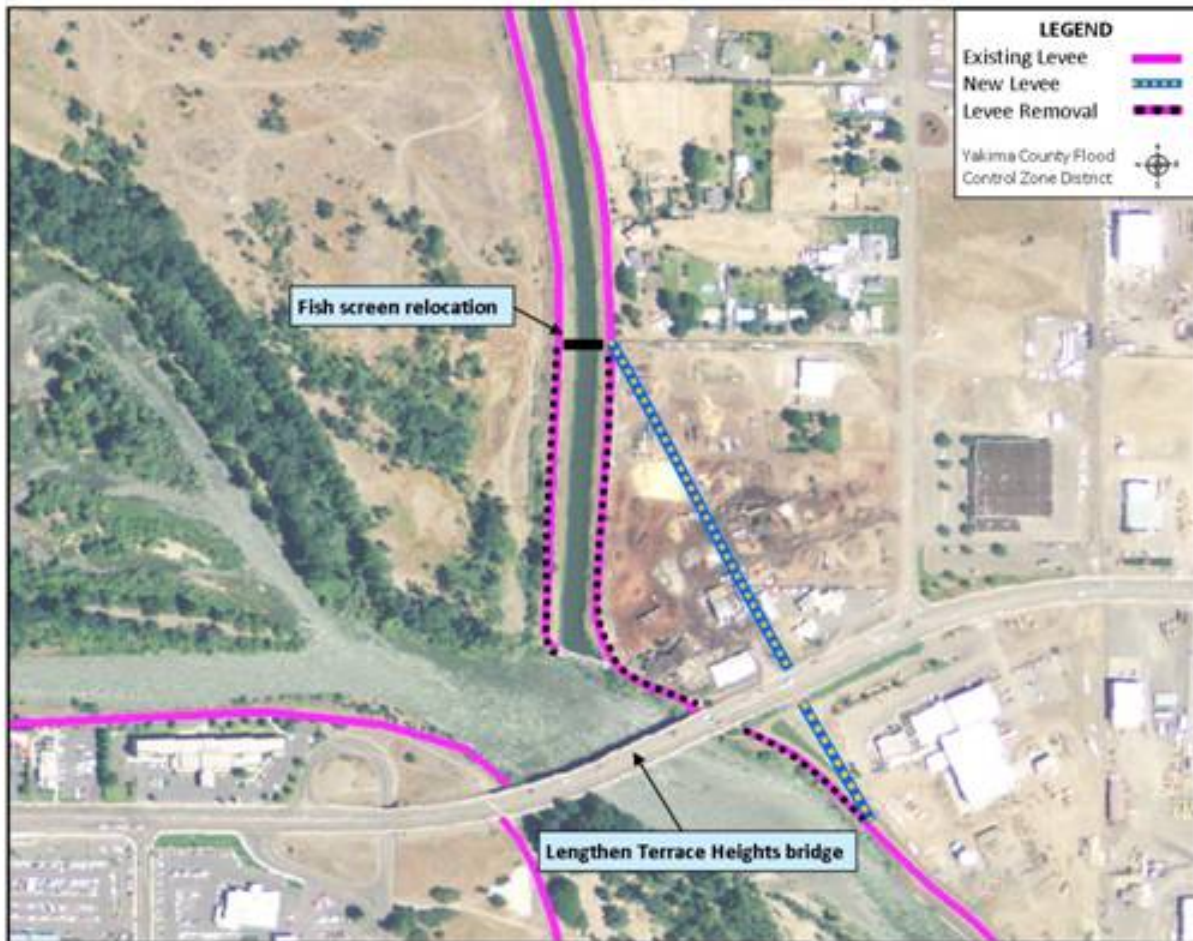
Valley Mall
Boulevard

NC Machinery /Victory
Lane

Gap to Gap Problems & Projects



Gap to Gap Projects - Terrace Heights Bridge



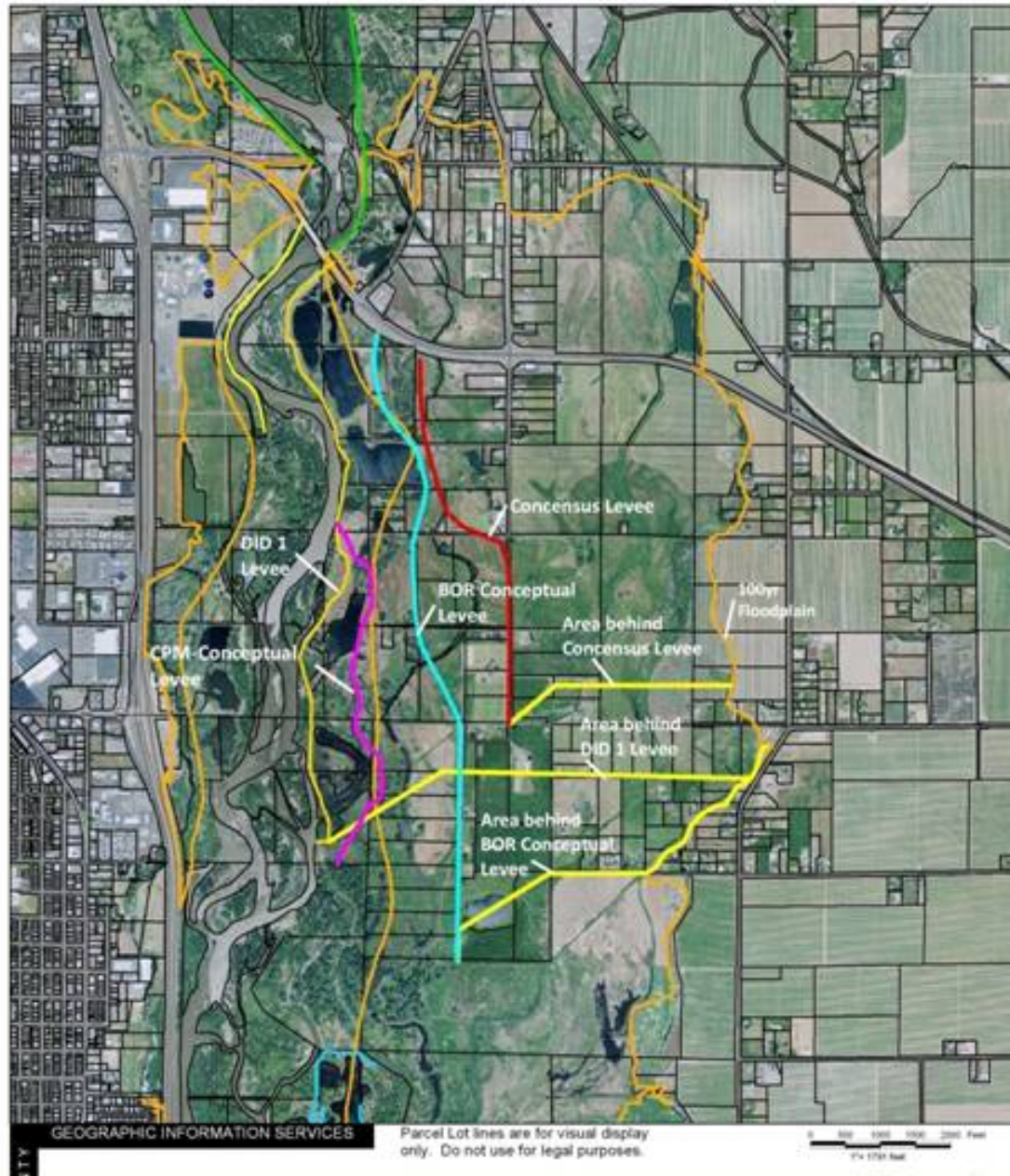
Gap to Gap Projects - Victory Lane



Gap to Gap Projects - North SR 24 Bridge



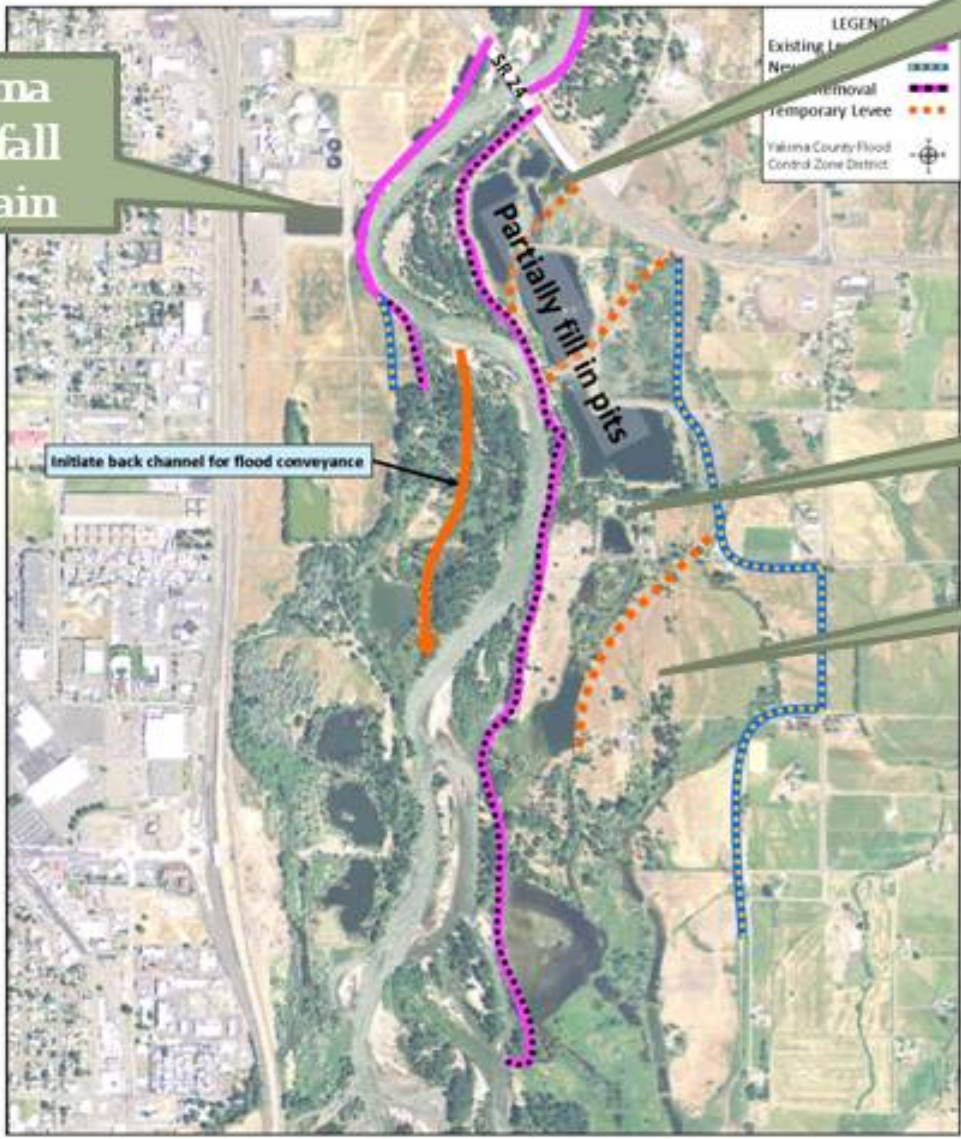
No Adverse Impact Analysis



Gap to Gap Projects - South SR 24 Bridge

Newland

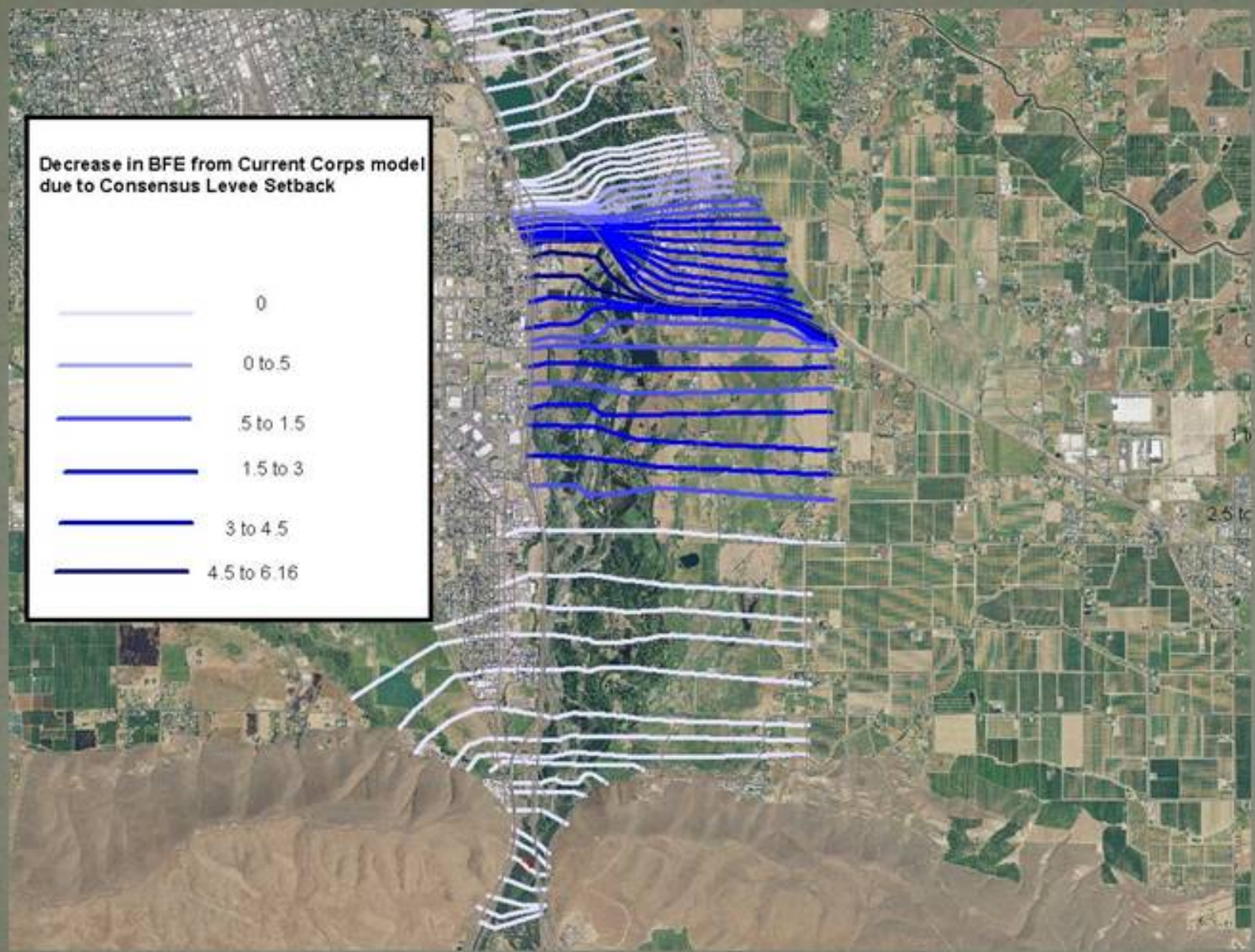
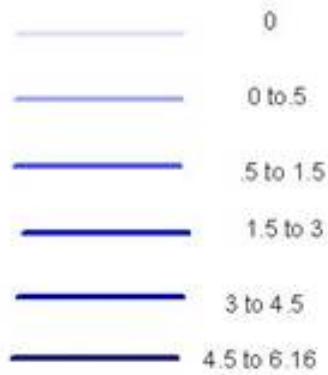
City of Yakima
WWTP, Outfall
and Floodplain



Lester

Central Pre-mix

**Decrease in BFE from Current Corps model
due to Consensus Levee Setback**



DATE: February 7, 2012

PROJECT: 21792

TO: Joel Freudenthal

Yakima County Public Services

Surface Water Management Division

128 North Second St.

Yakima Washington

98901

FROM: Dave McLean, Ph.D., P.Eng. and Peter Brooks, P.E.

SUBJECT: Effect of Wapato Dam Removal on Stream Profile

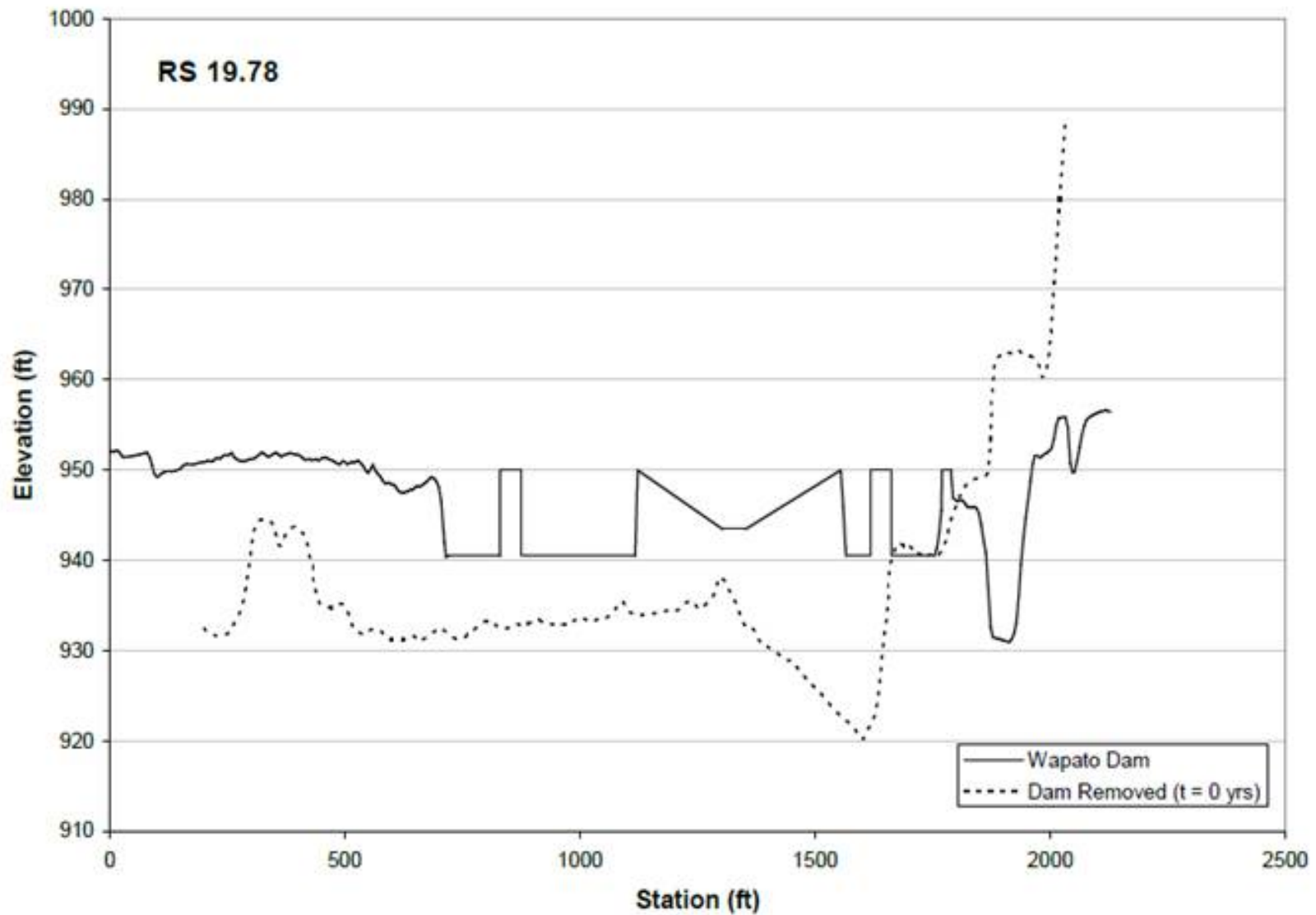


Figure 1. Comparison of downstream boundary cross-section with and without Wapato Dam.

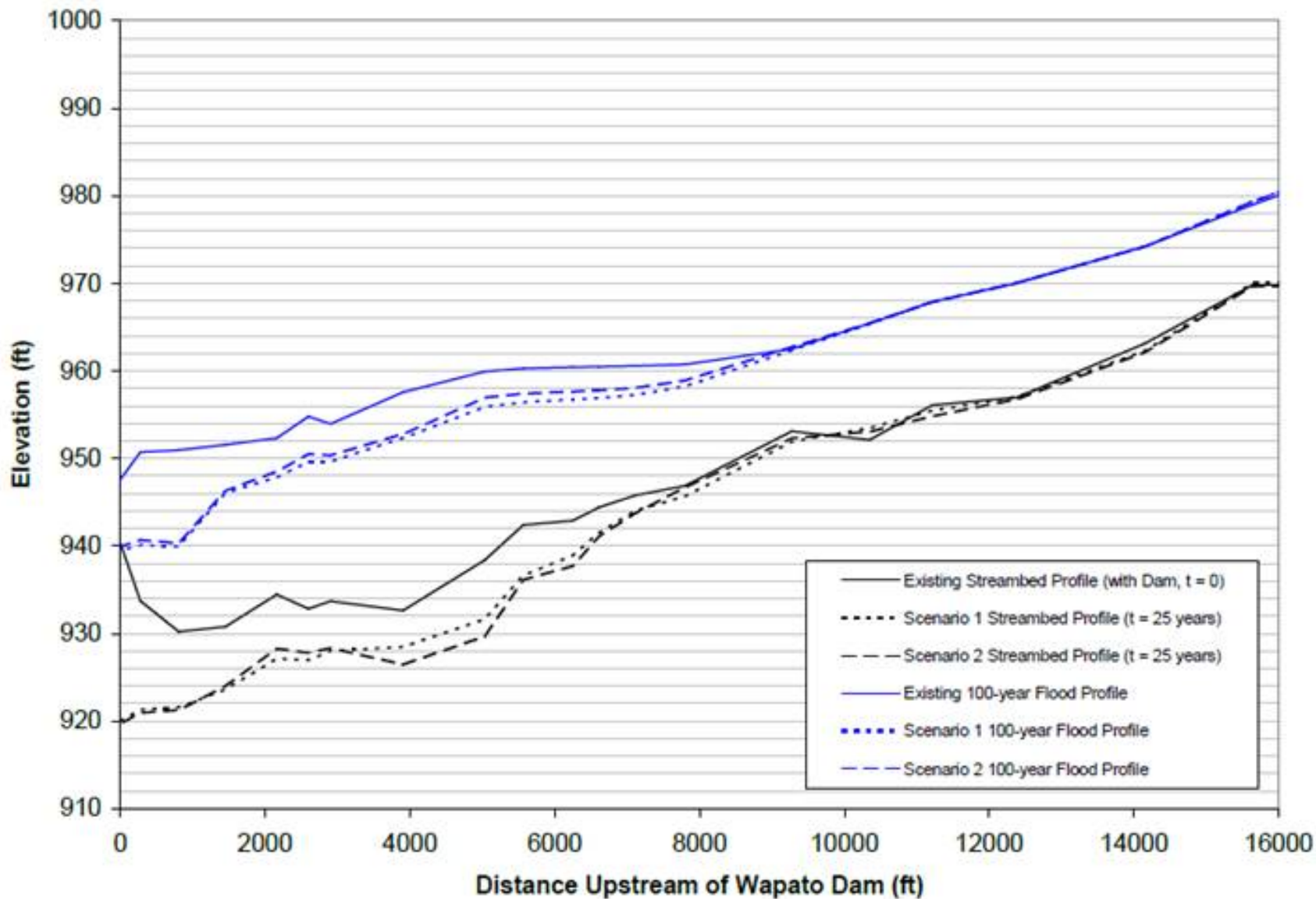


Figure 2. Comparison of streambed and 100-year flood profiles for existing conditions and those computed 25 years after dam removal.

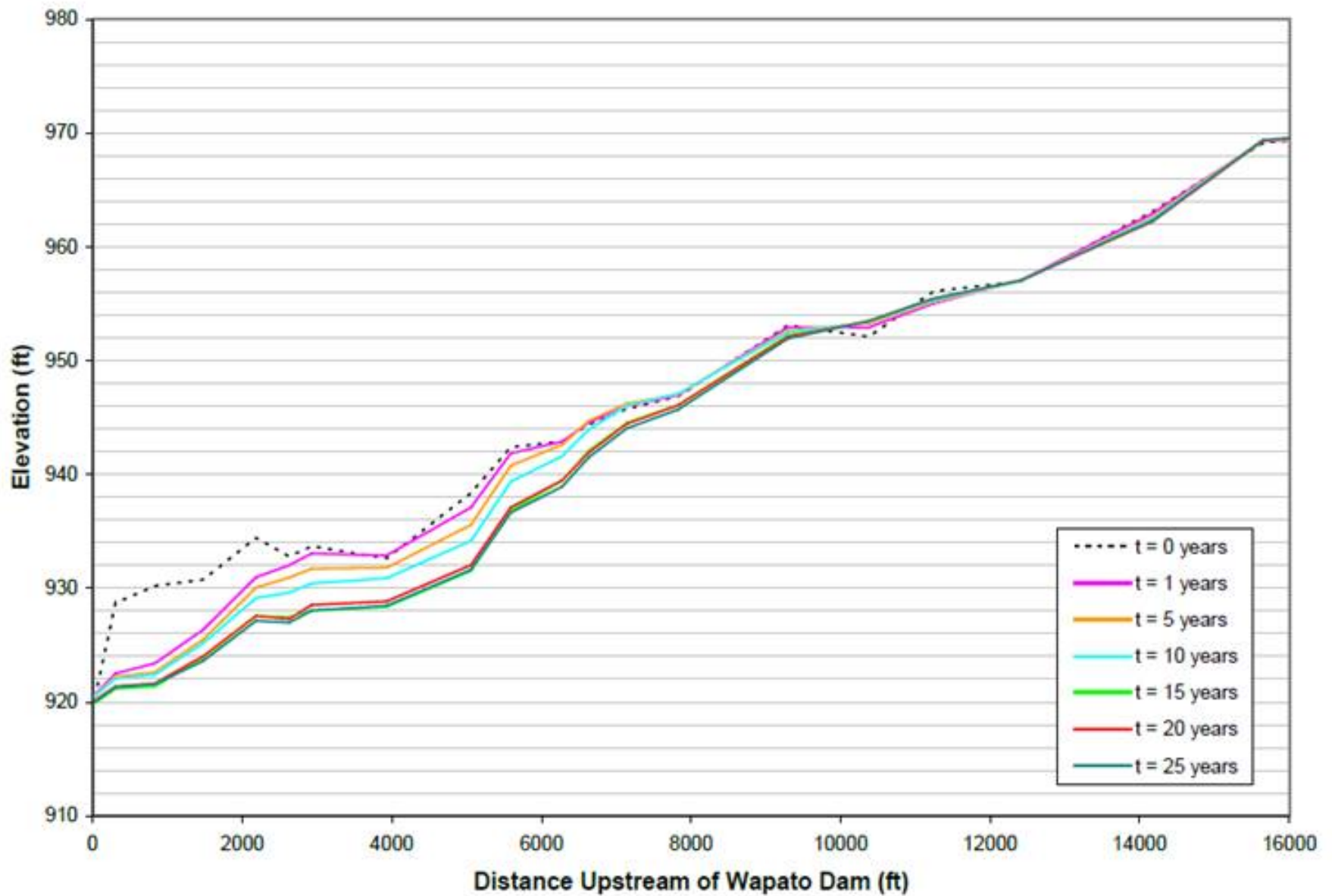
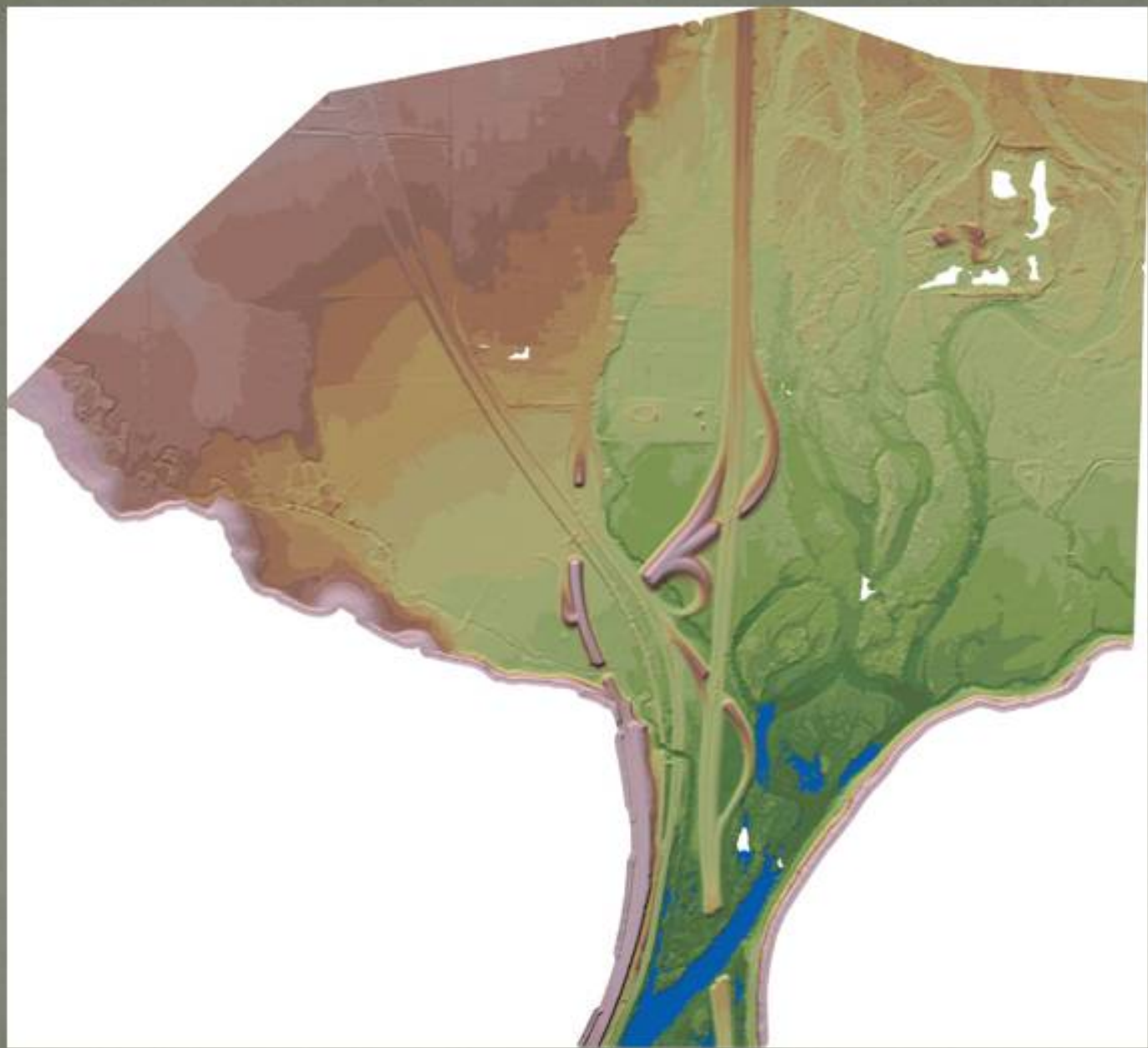


Figure 3. Evolution of the streambed profile.



Next Steps

- Get WWTP outfall moved in cooperation with City of Yakima
- Finalize levee alignment S of SR 24 through property acquisitions and negotiations with Central Pre Mix
- Restart Corps process under continuing Authority
- Start NEPA by September
- Begin/Continue Wapato Dam and Union Gap conversation