

Hydrodynamic Modeling Wapato Reach Yakima River



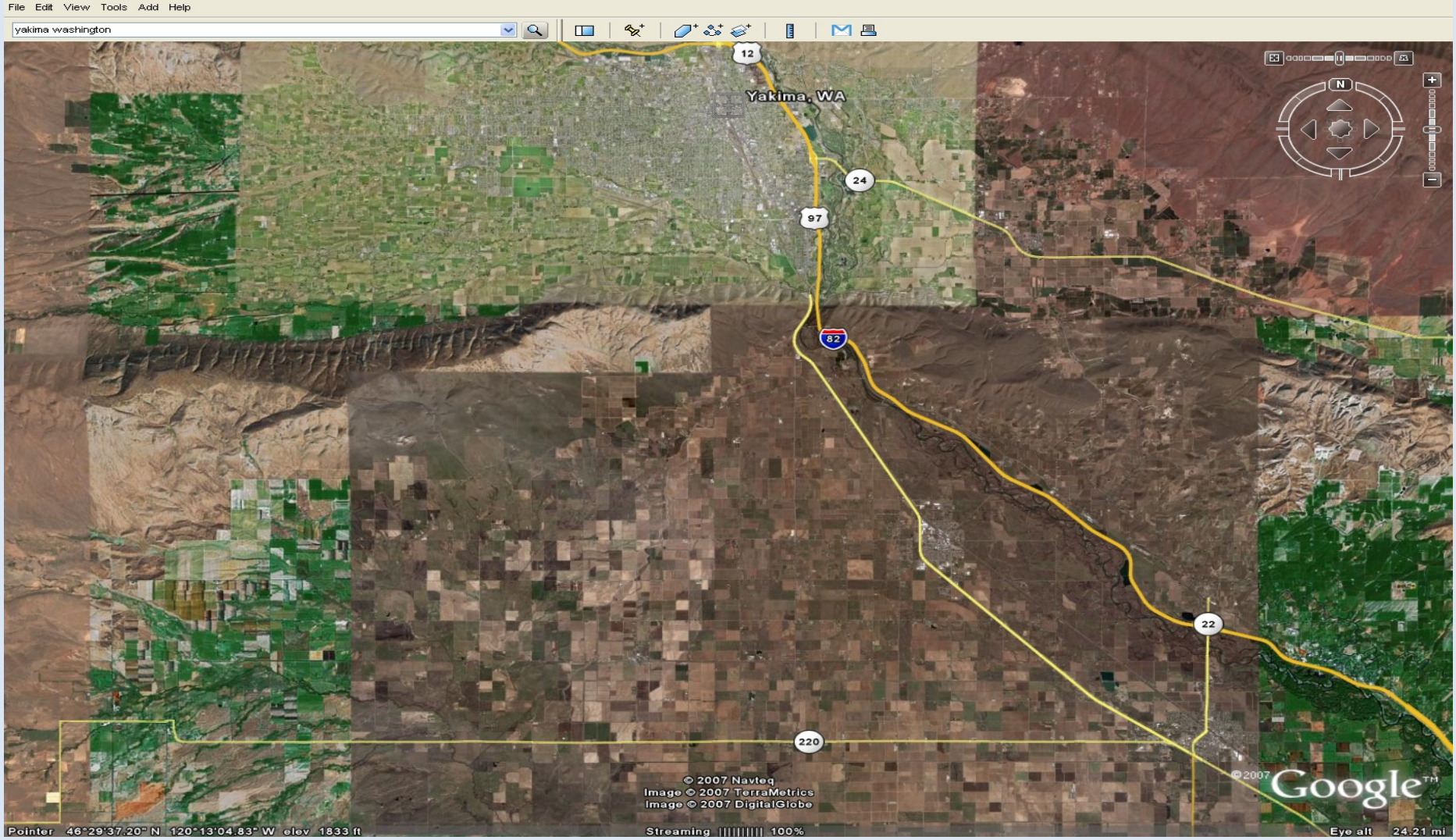
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U.S. Geological Survey
Western Fisheries Research Center
Columbia River Research Laboratory

Study Objectives

- Estimate the hydraulic characteristics of the Wapato Reach over a range of flows, from 300 to 15,000 cfs
- Provide spatially explicit hydrodynamic layers (i.e., velocity and depth) to the USBR as input into a decision support system that will be used to determine suitable spawning and rearing habitat for salmonids

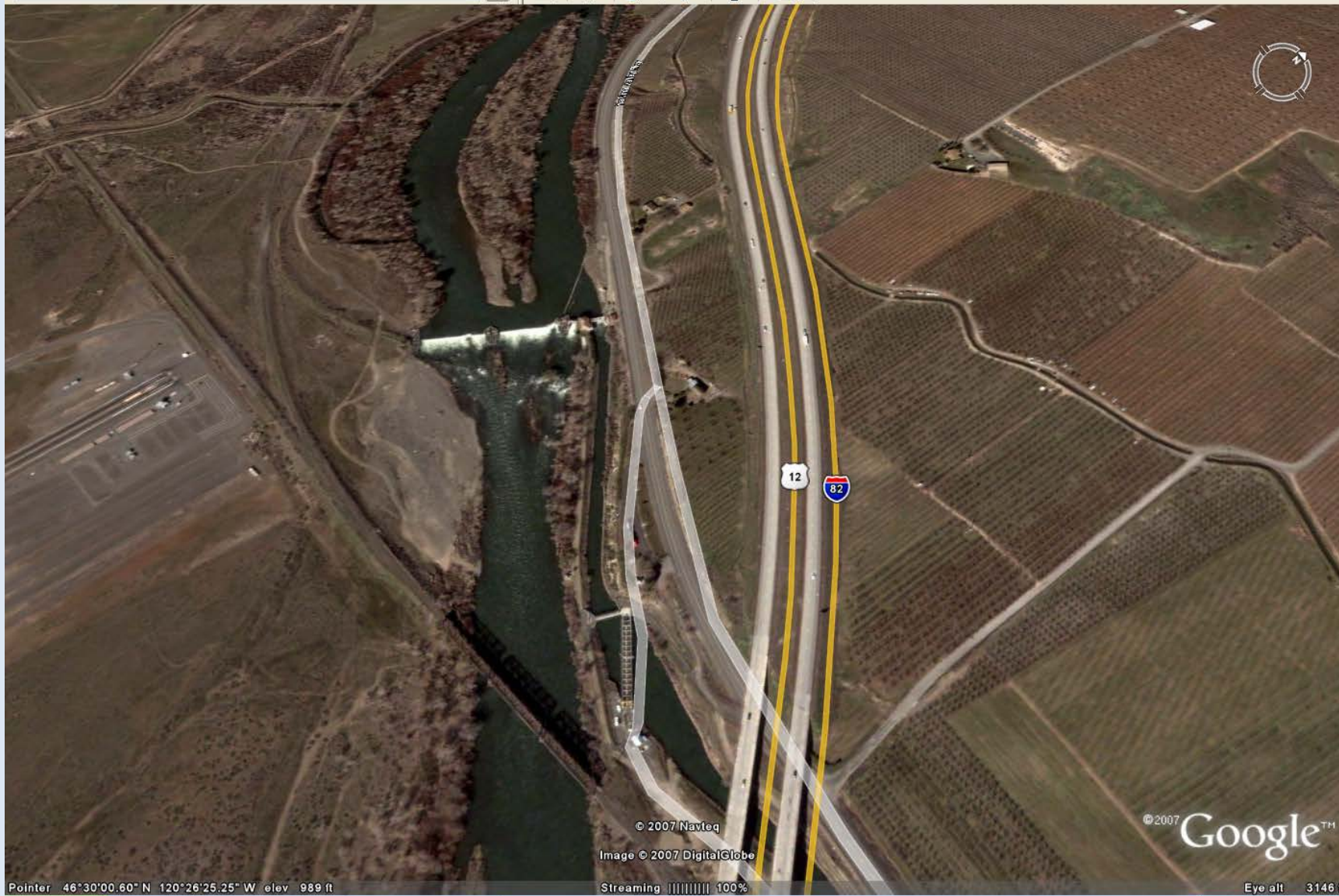
Study Area

Study Area





yakima washington



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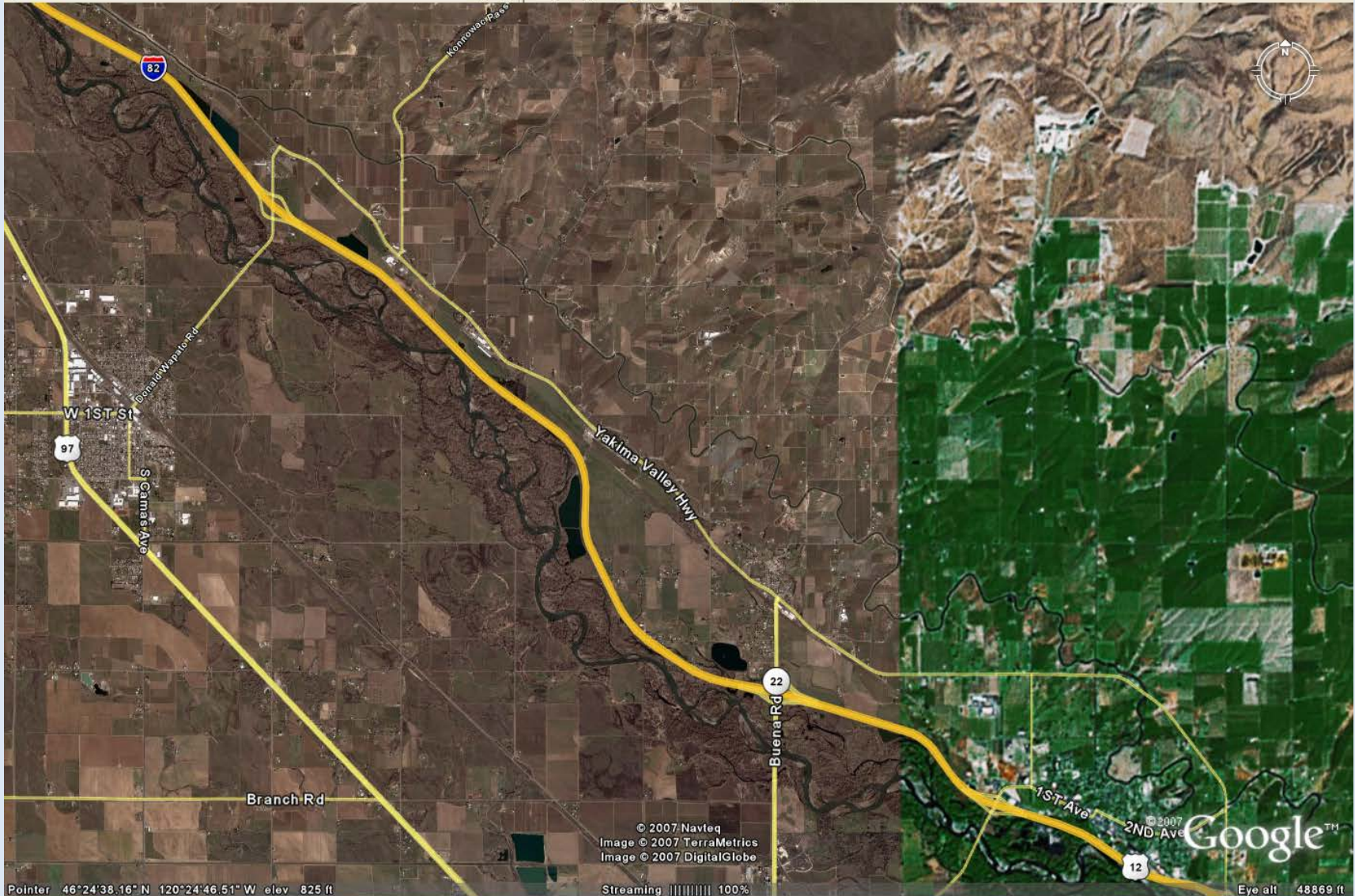
Pointer 46°30'00.60" N 120°26'25.25" W elev 989 ft

Streaming | 100%

Eye alt 3146 ft



yakima washington



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Pointer 46°24'38.16" N 120°24'46.51" W elev 825 ft

Streaming 100%

Eye alt 48869 ft

yakima washington

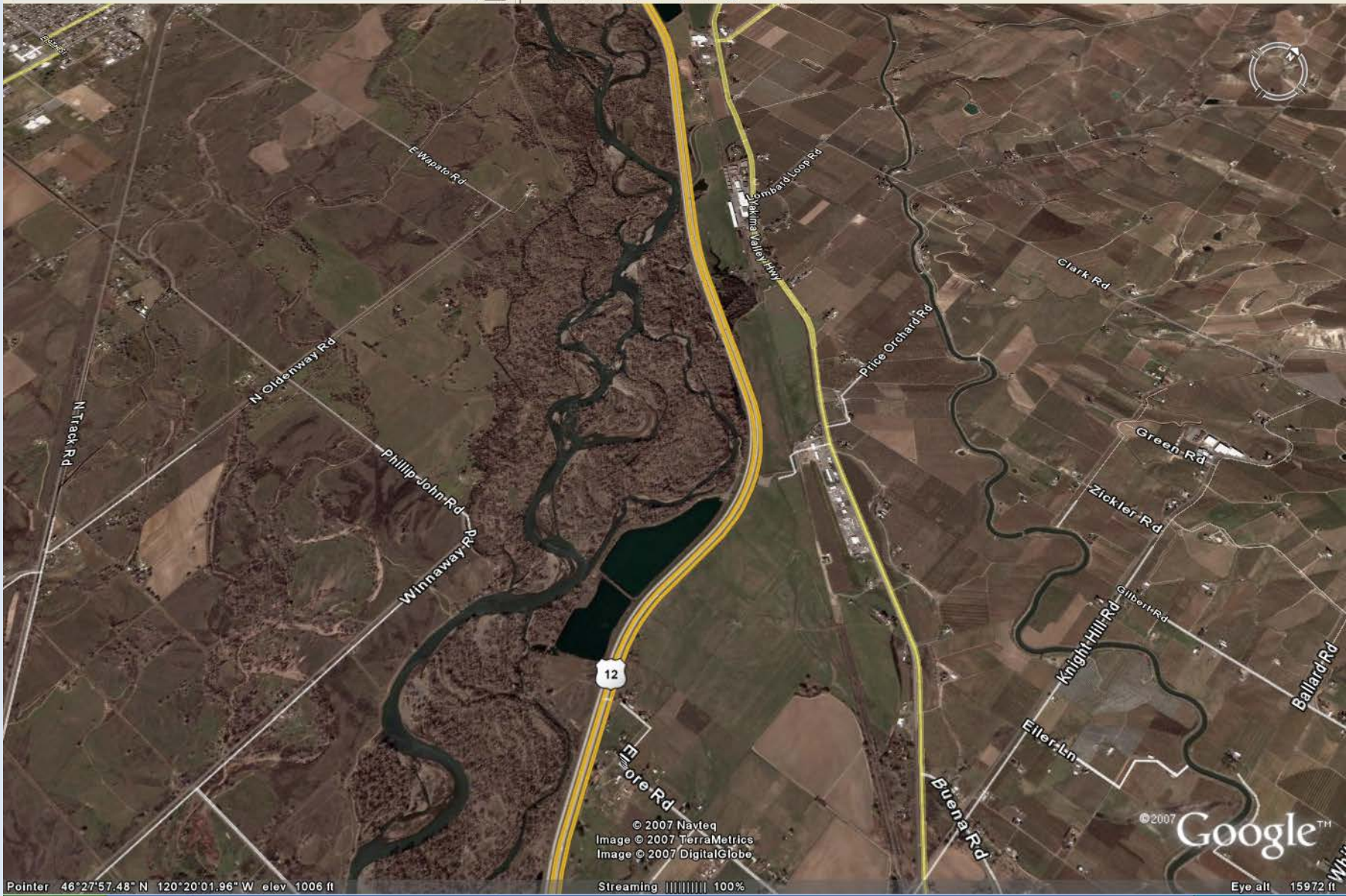


Pointer 46°23'08.86" N 120°24'40.57" W elev 801 ft

Streaming 100%

Eye all 50651 ft

yakima washington



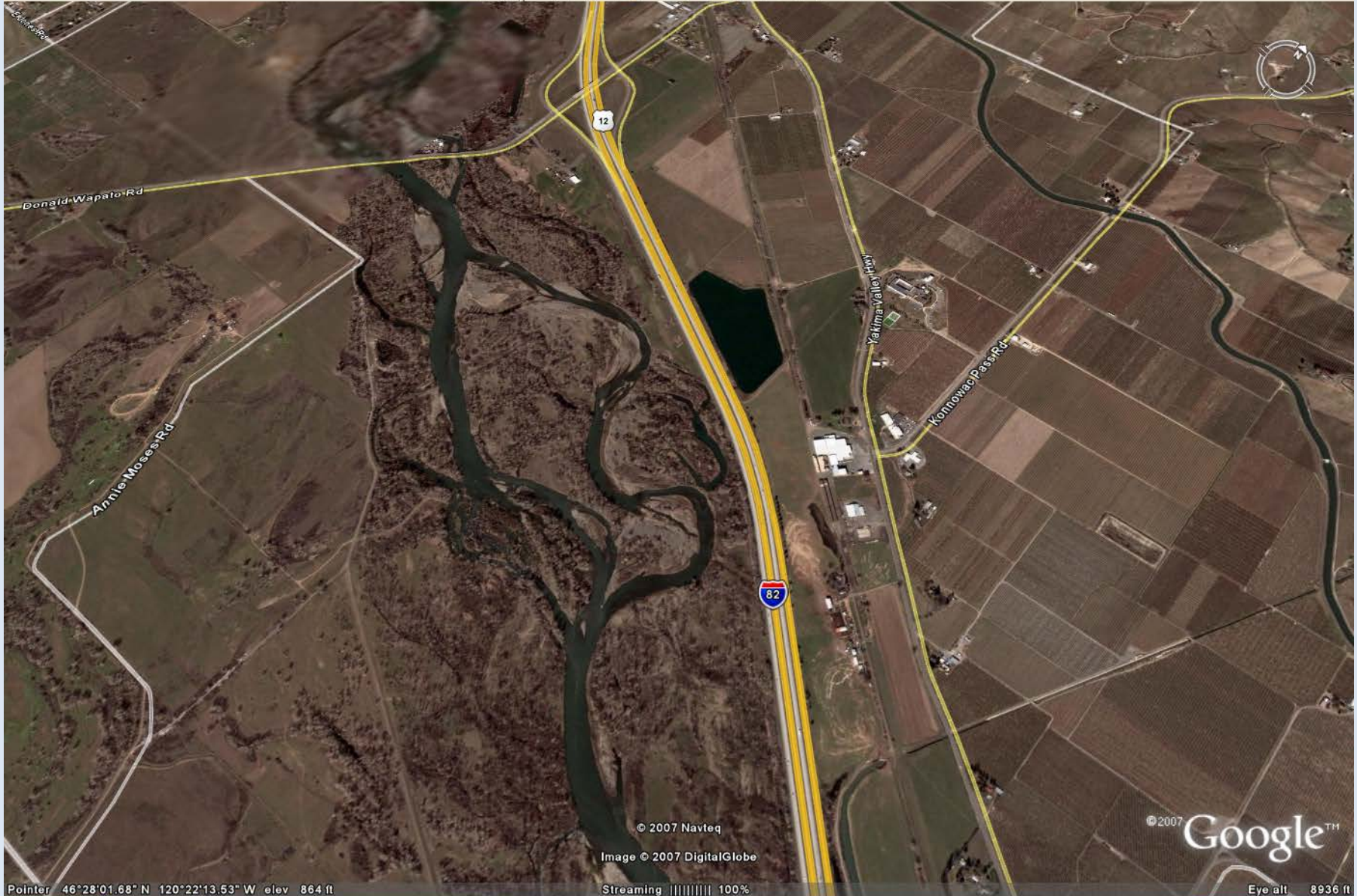
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Pointer 46°27'57.48" N 120°20'01.96" W elev 1006 ft

Streaming ||||| 100%

Eye alt 15972 ft

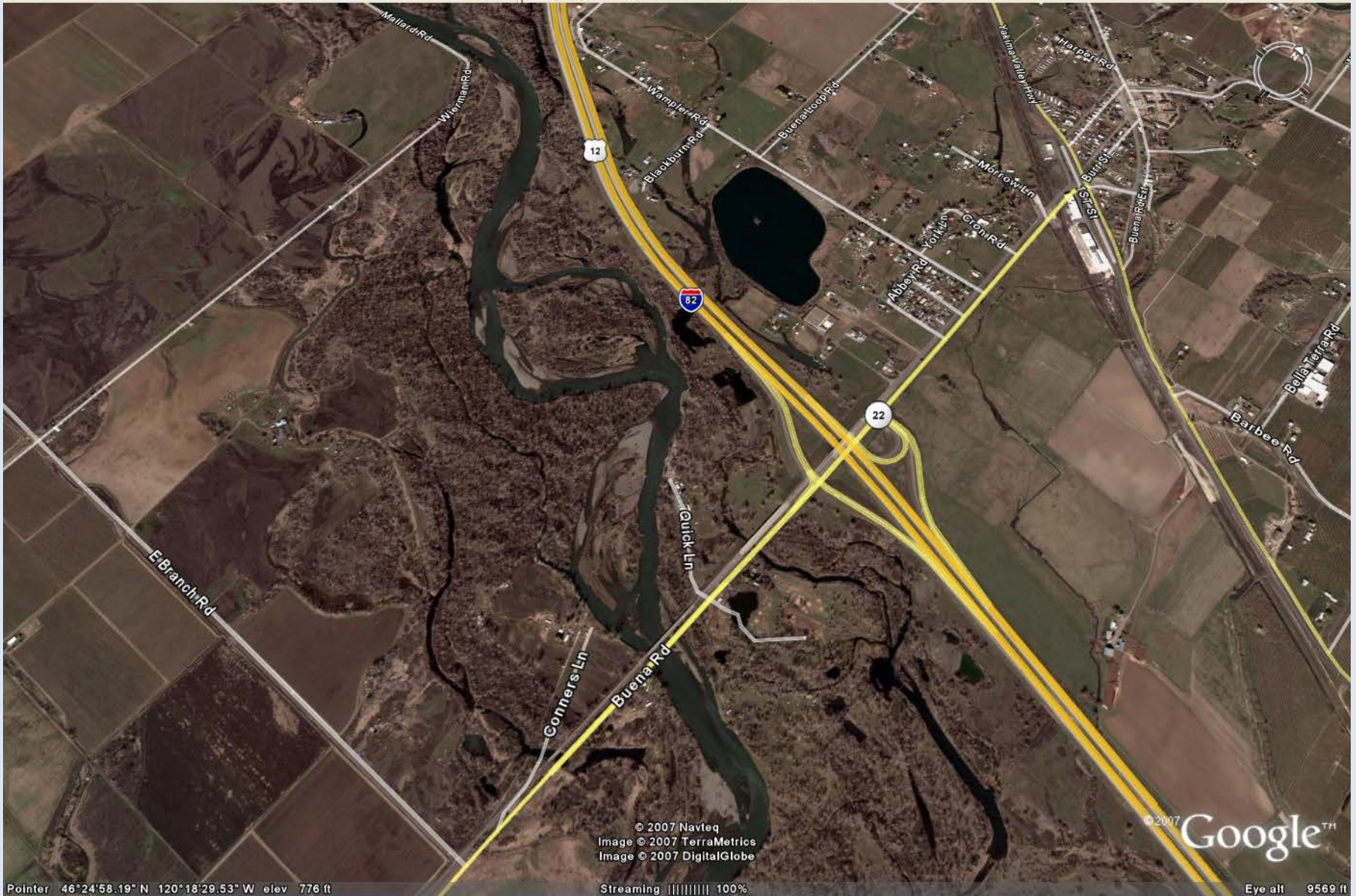


Pointer 46°28'01.68" N 120°22'13.53" W elev 864 ft

Streaming 100%

Eye alt 8936 ft

yakima washington



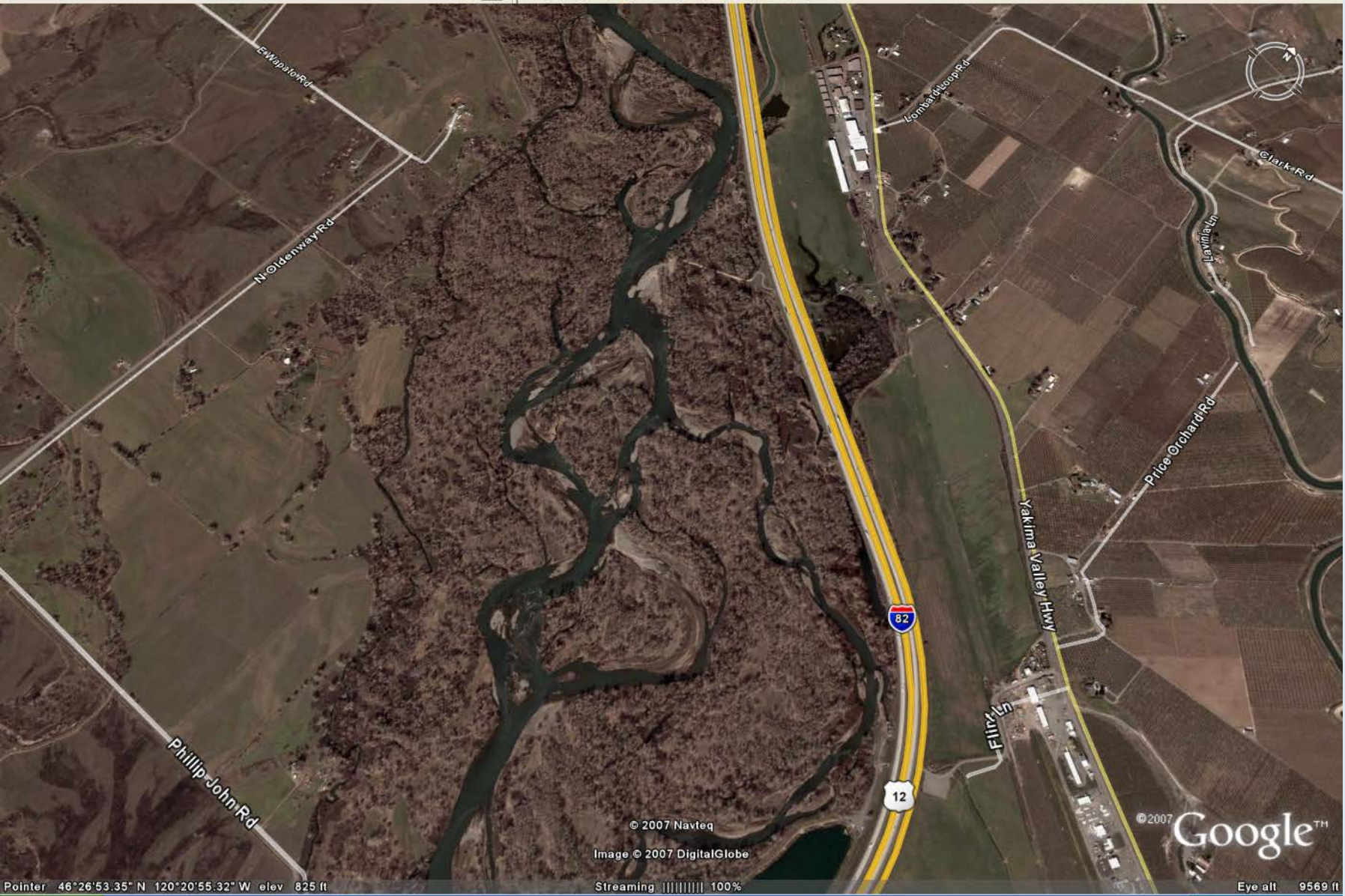
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Pointer 46°24'58.19" N 120°18'29.53" W elev 776 ft

Streaming ||||| 100%

Eye alt 9569 ft



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Image © 2007 DigitalGlobe

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Pointer 46°26'53.35" N 120°20'55.32" W elev 825 ft

Streaming [Progress Bar] 100%

Eye alt 9569 ft

















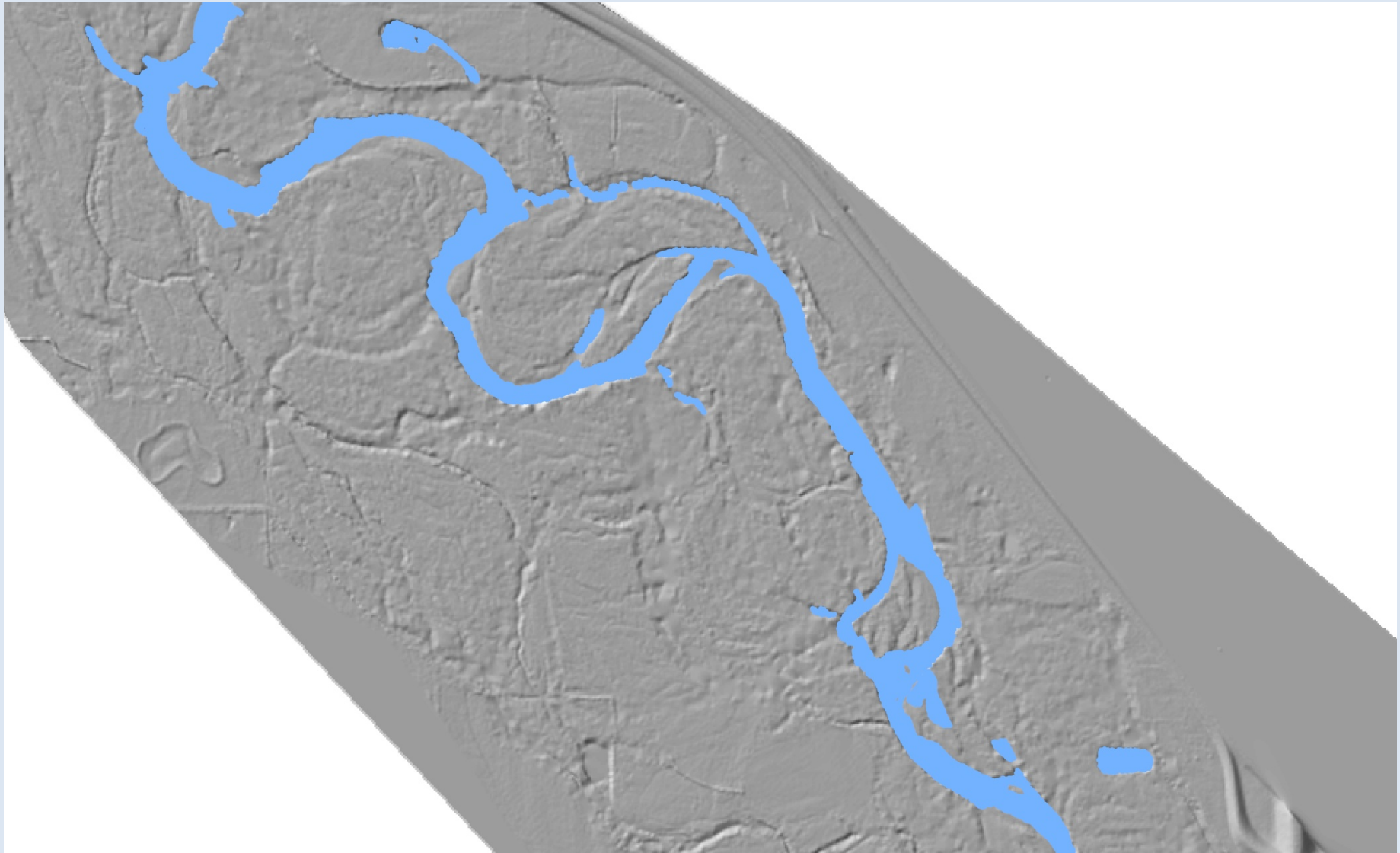


Digital Elevation Model

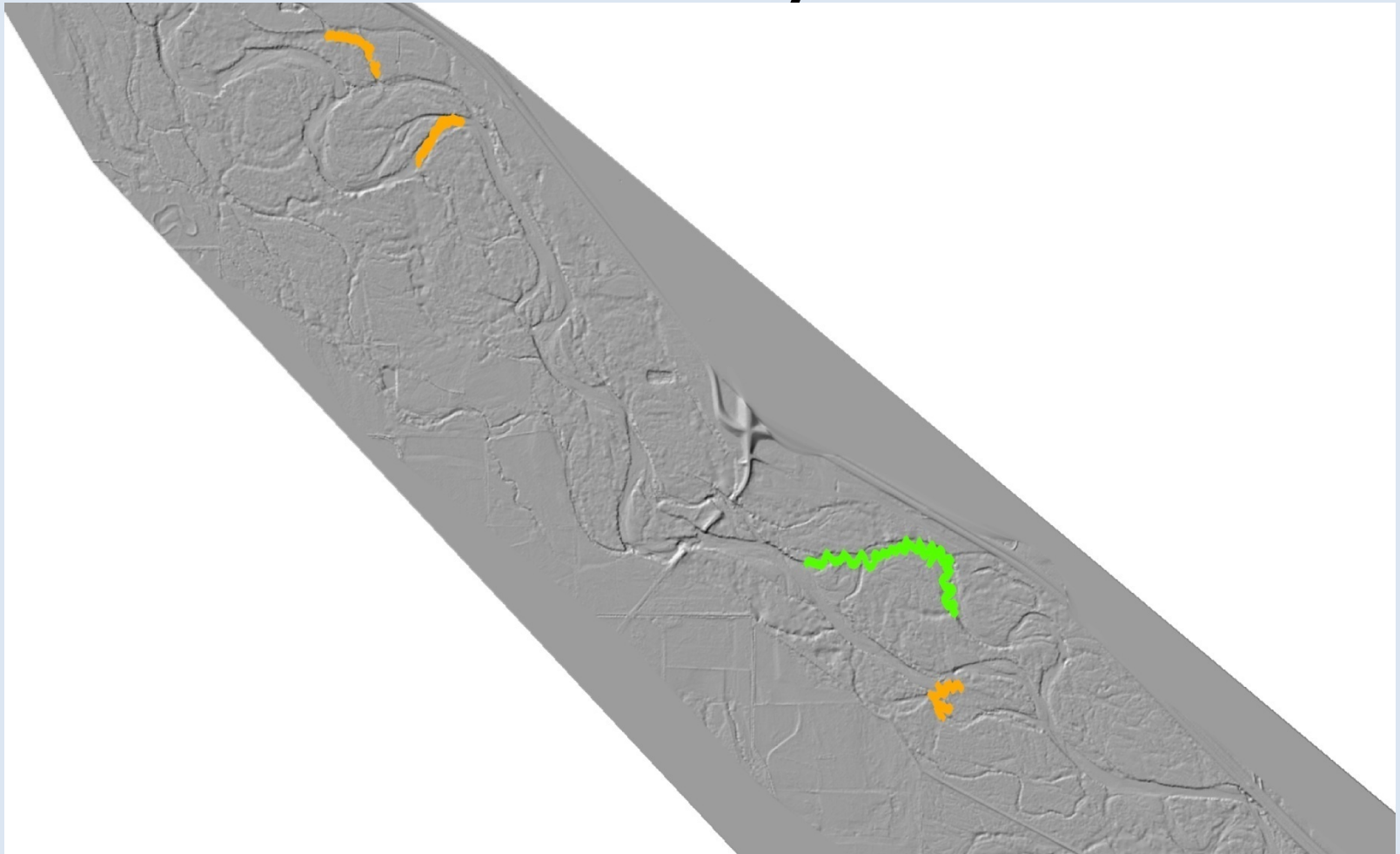
LIDAR + RTK Data = DEM



Terrestrial and bathymetric LIDAR



RTK Survey Data













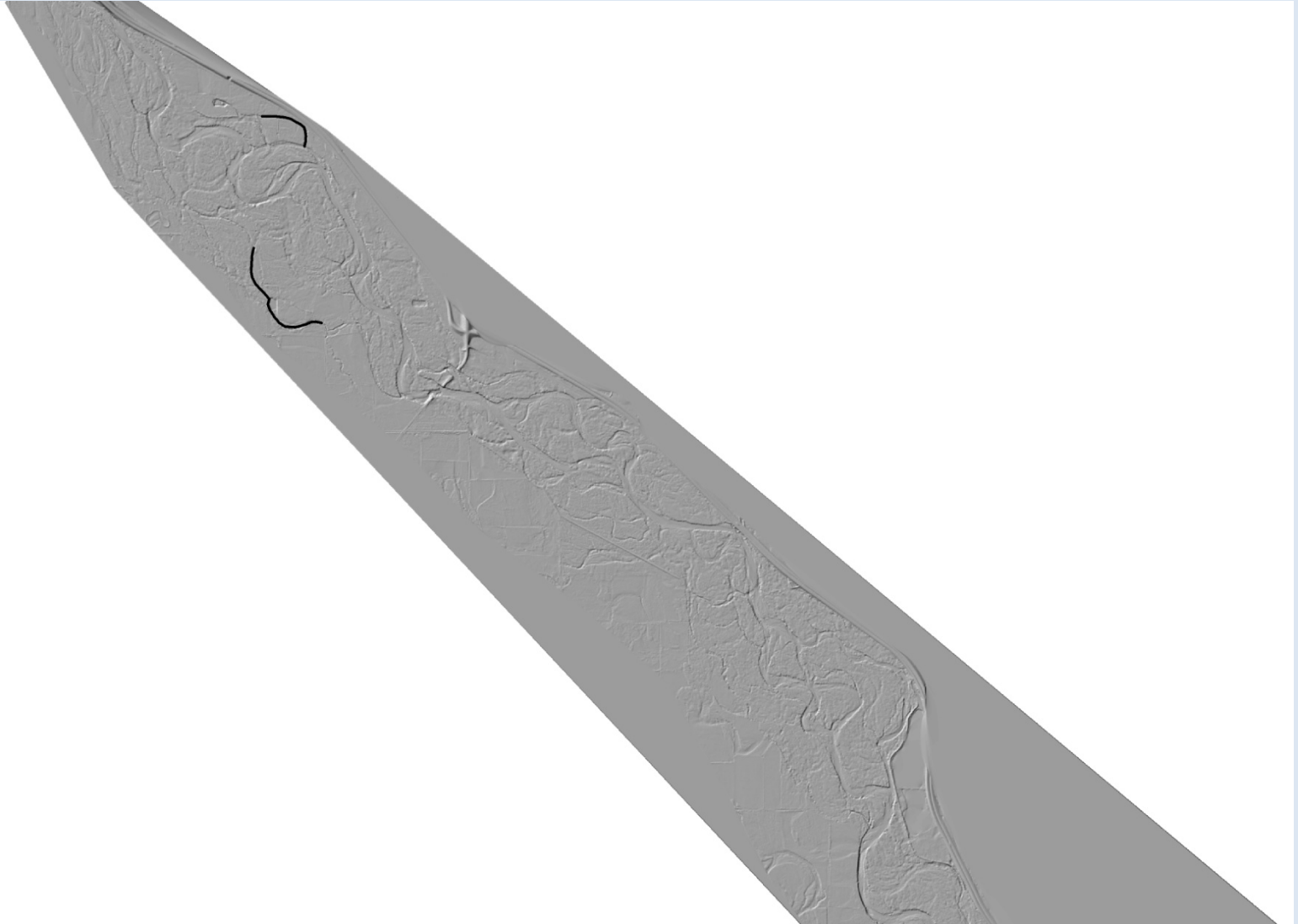




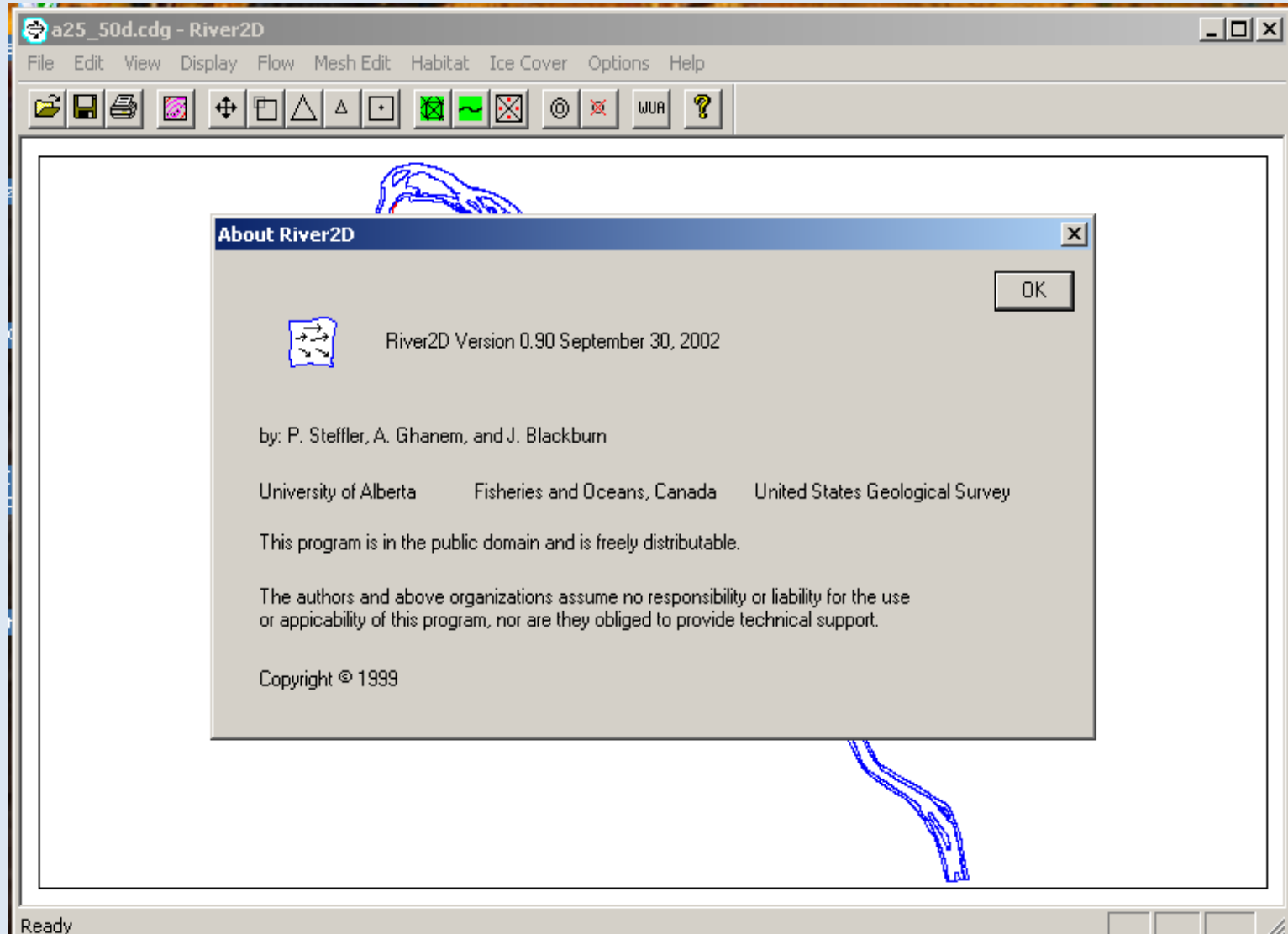




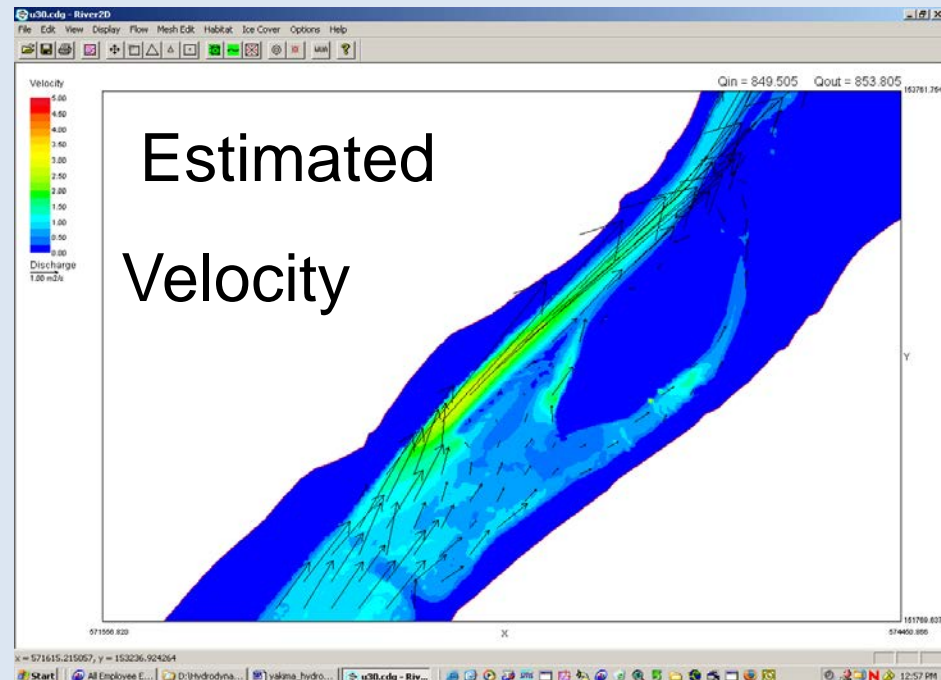
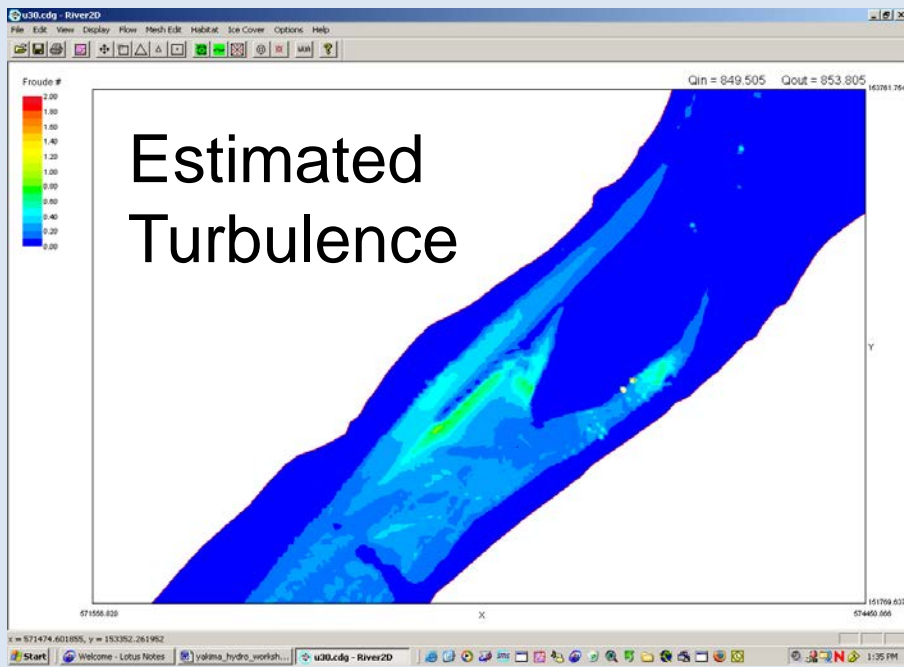
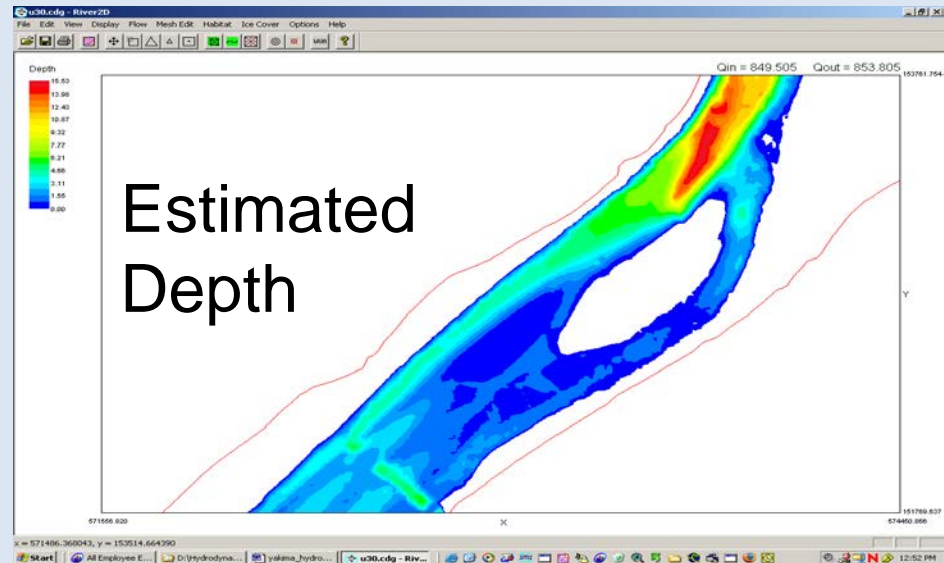
Final DEM



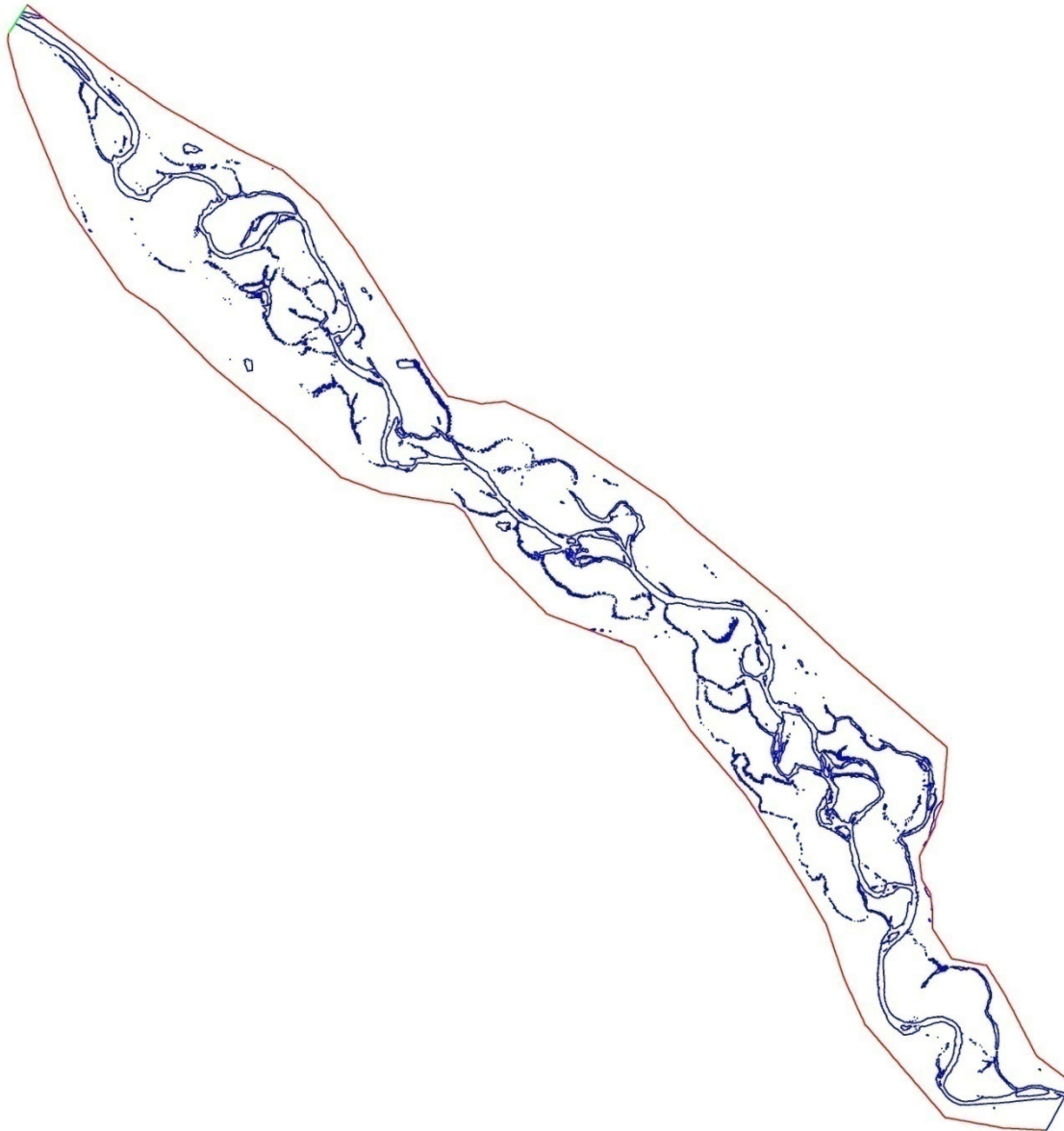
Hydrodynamic Modeling



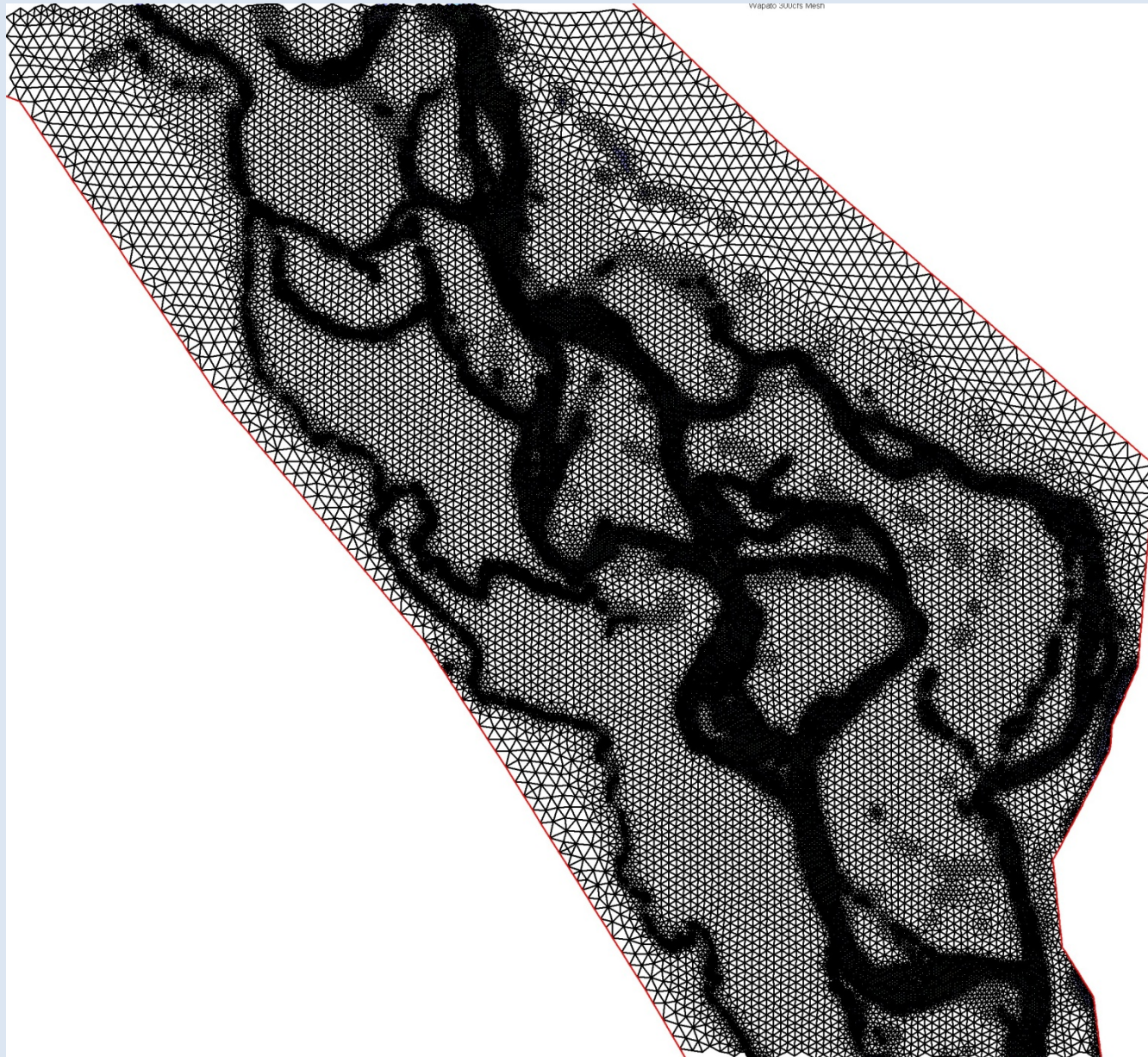
Hydrodynamic Modeling Output



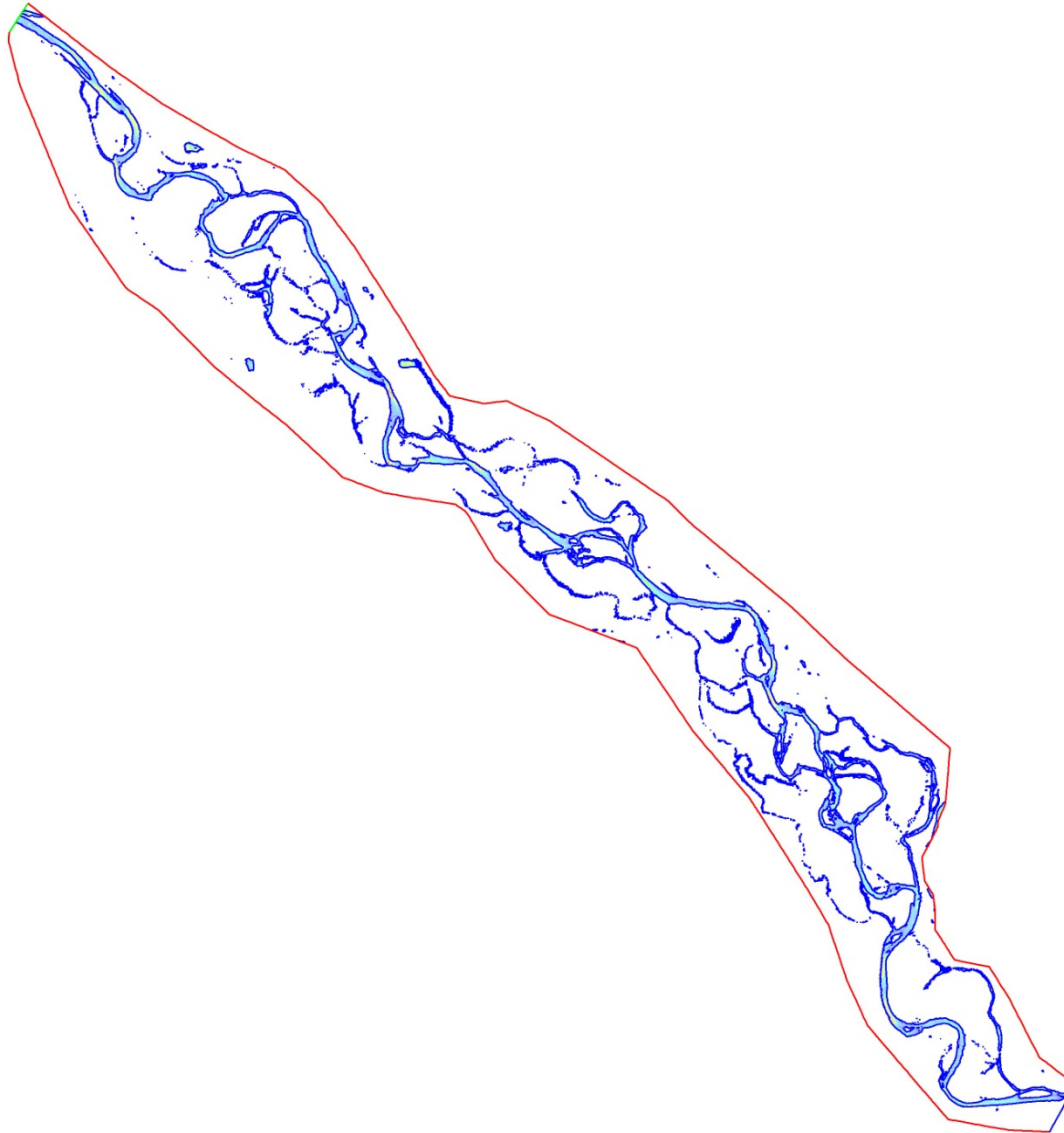
Boundary 300cfs



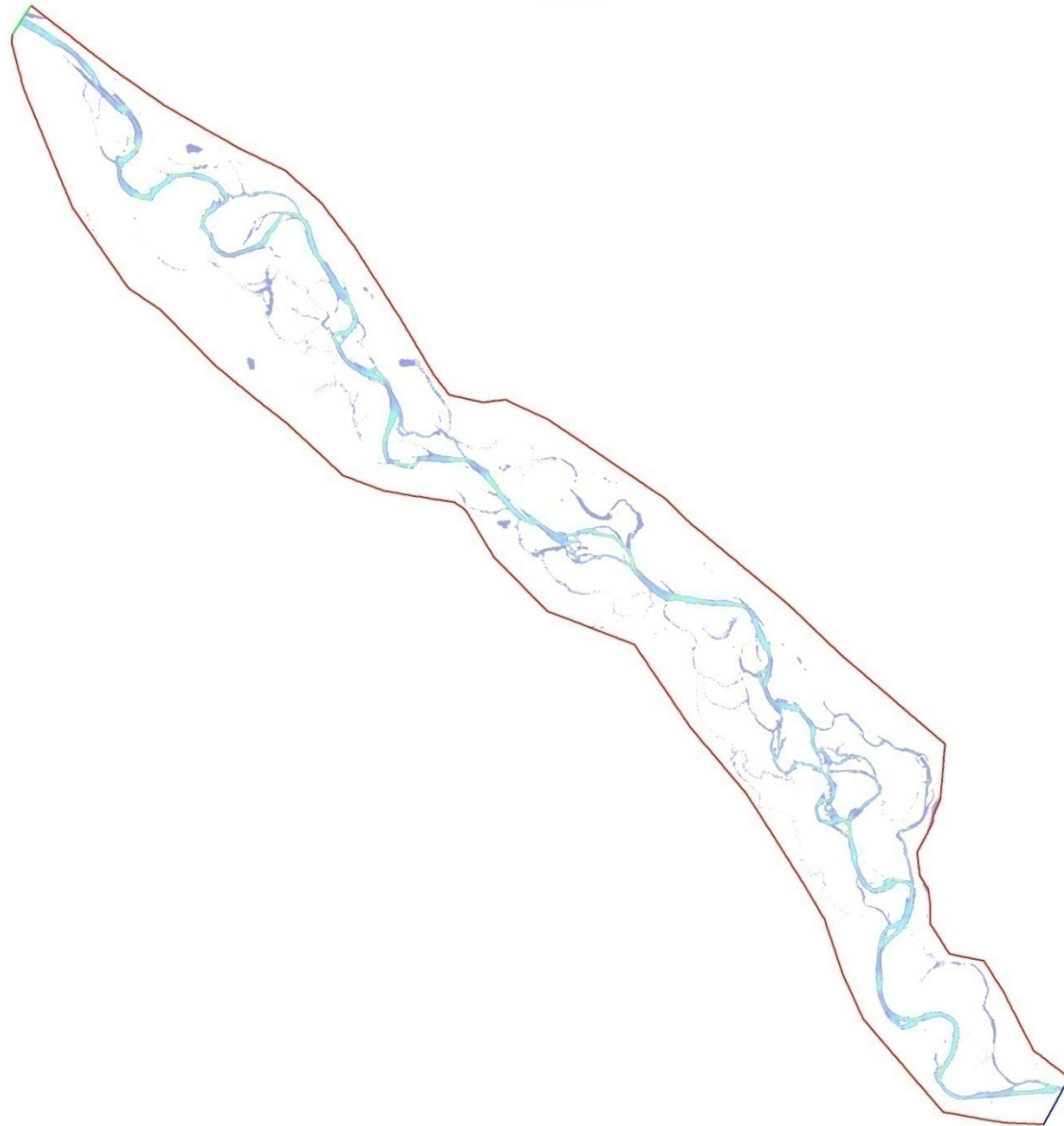
Variable mesh – 300cfs



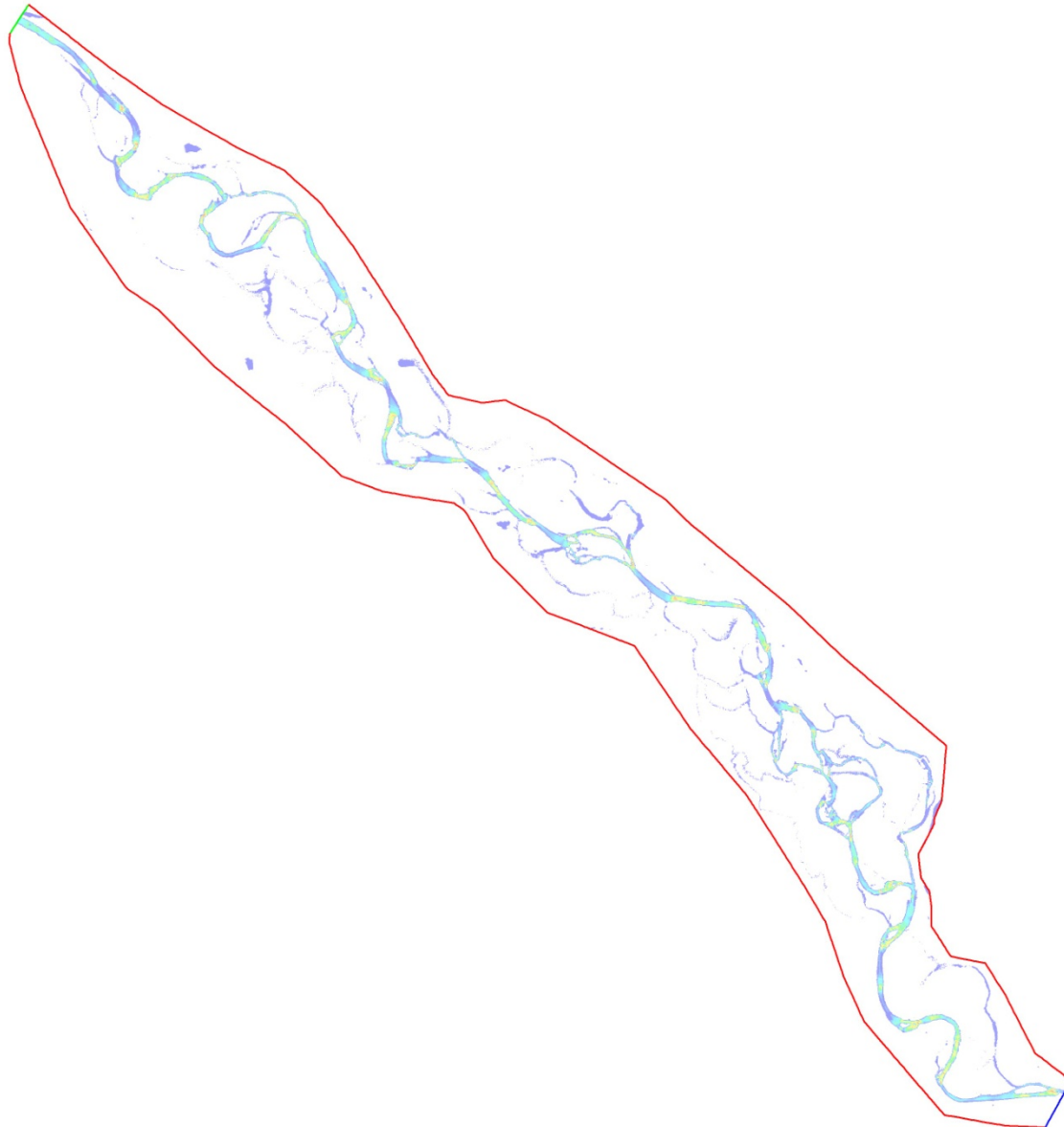
Depth – 300cfs



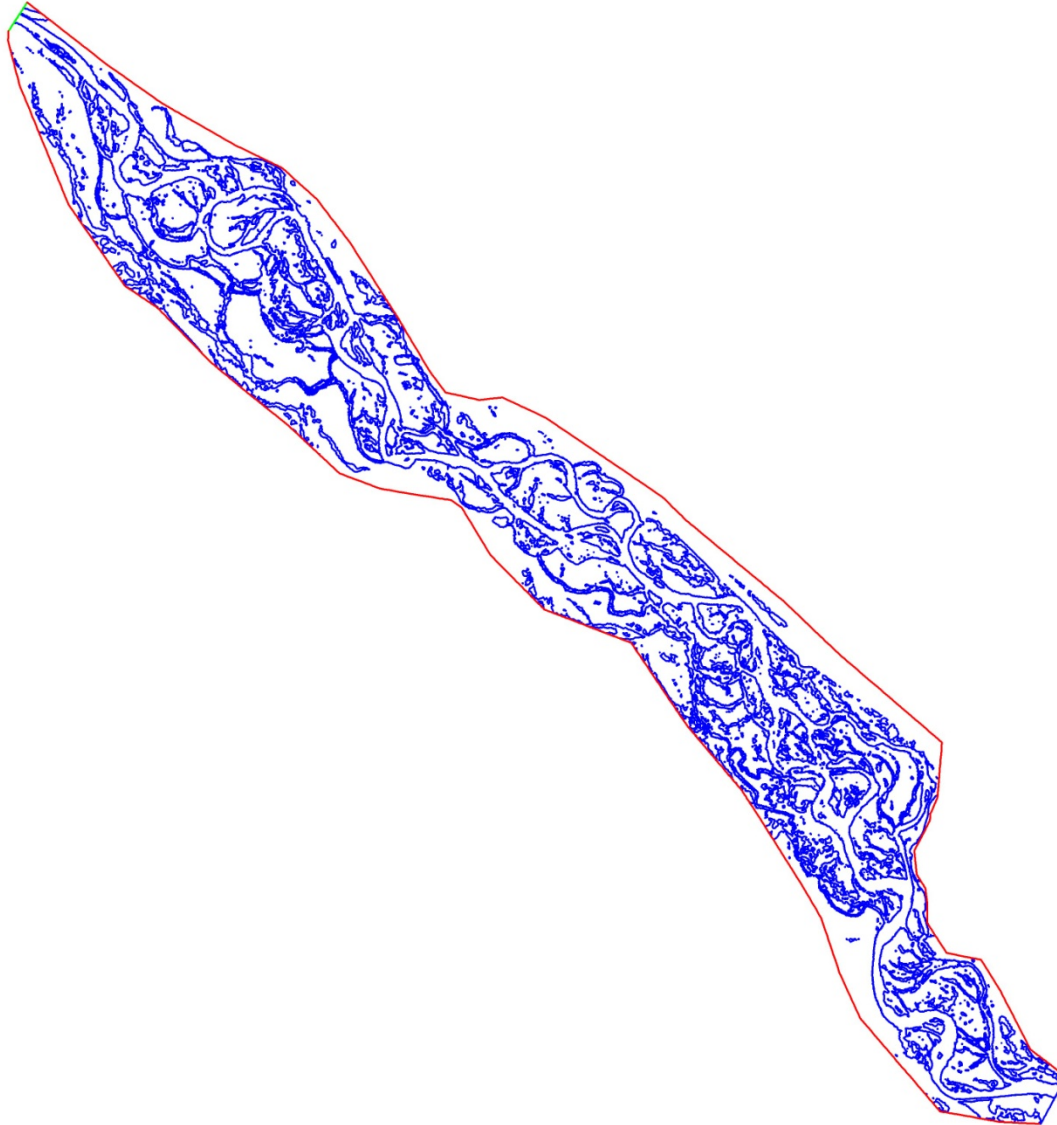
Velocity – 300cfs



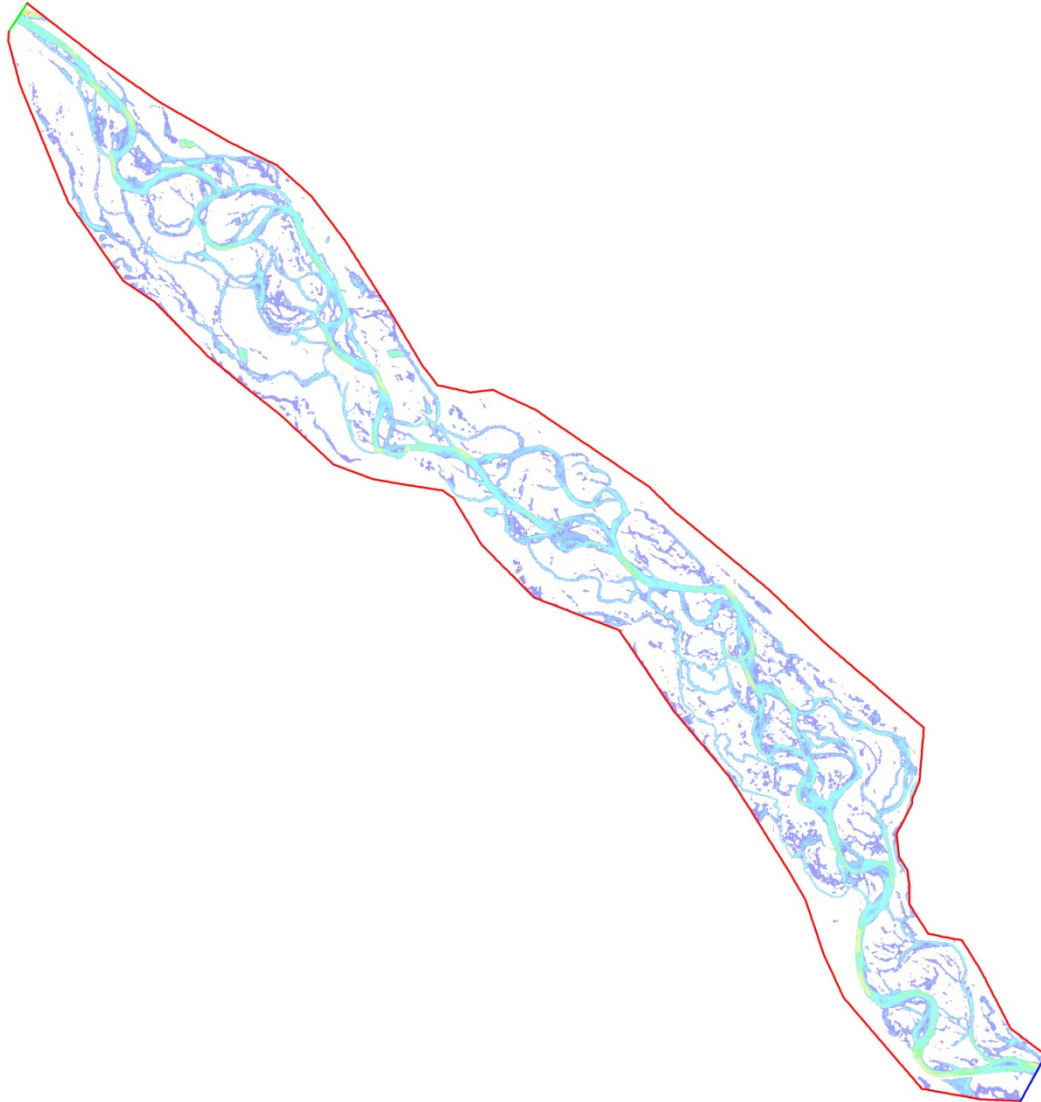
Froude 300cfs



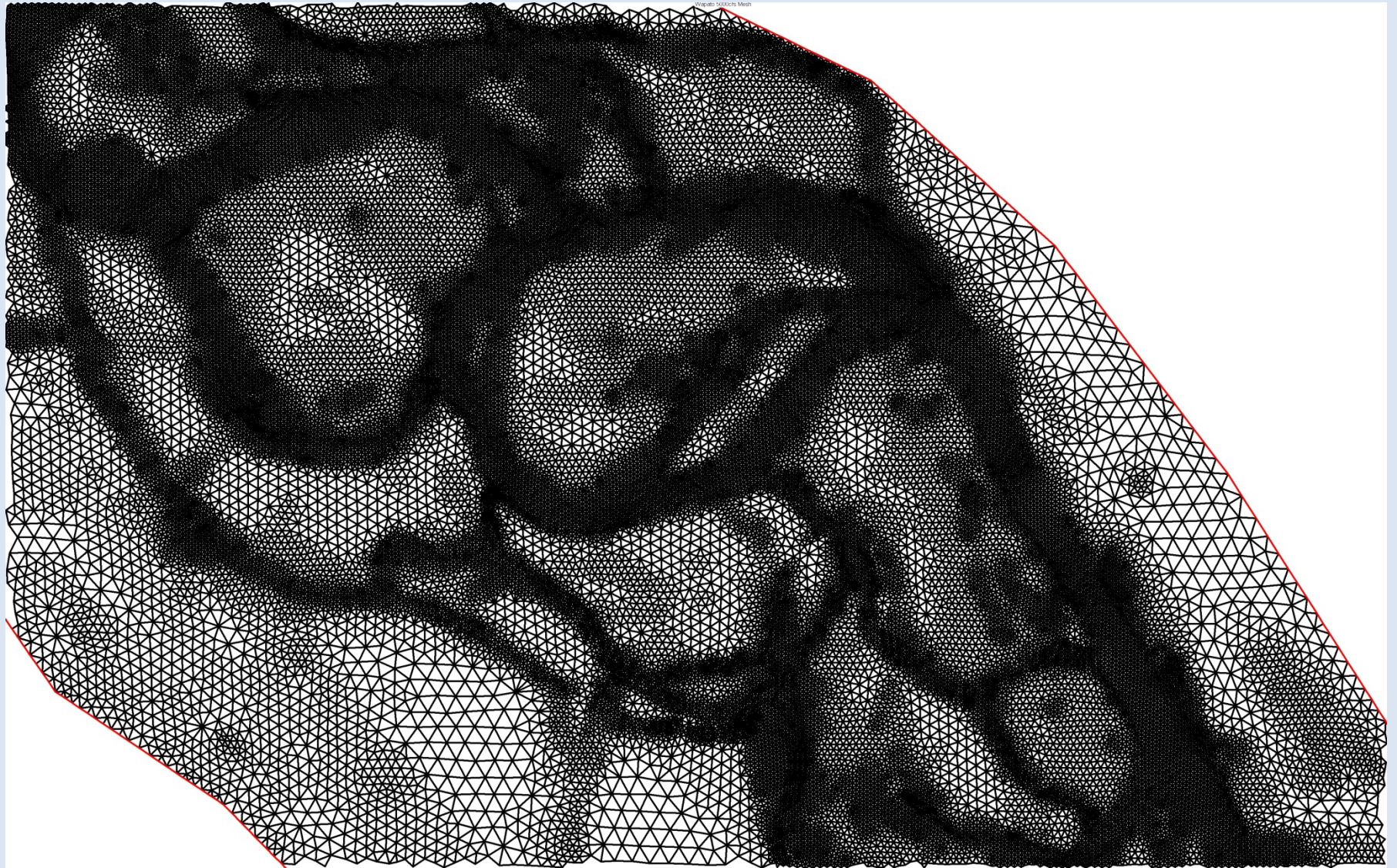
Boundary Conditions 5kcf



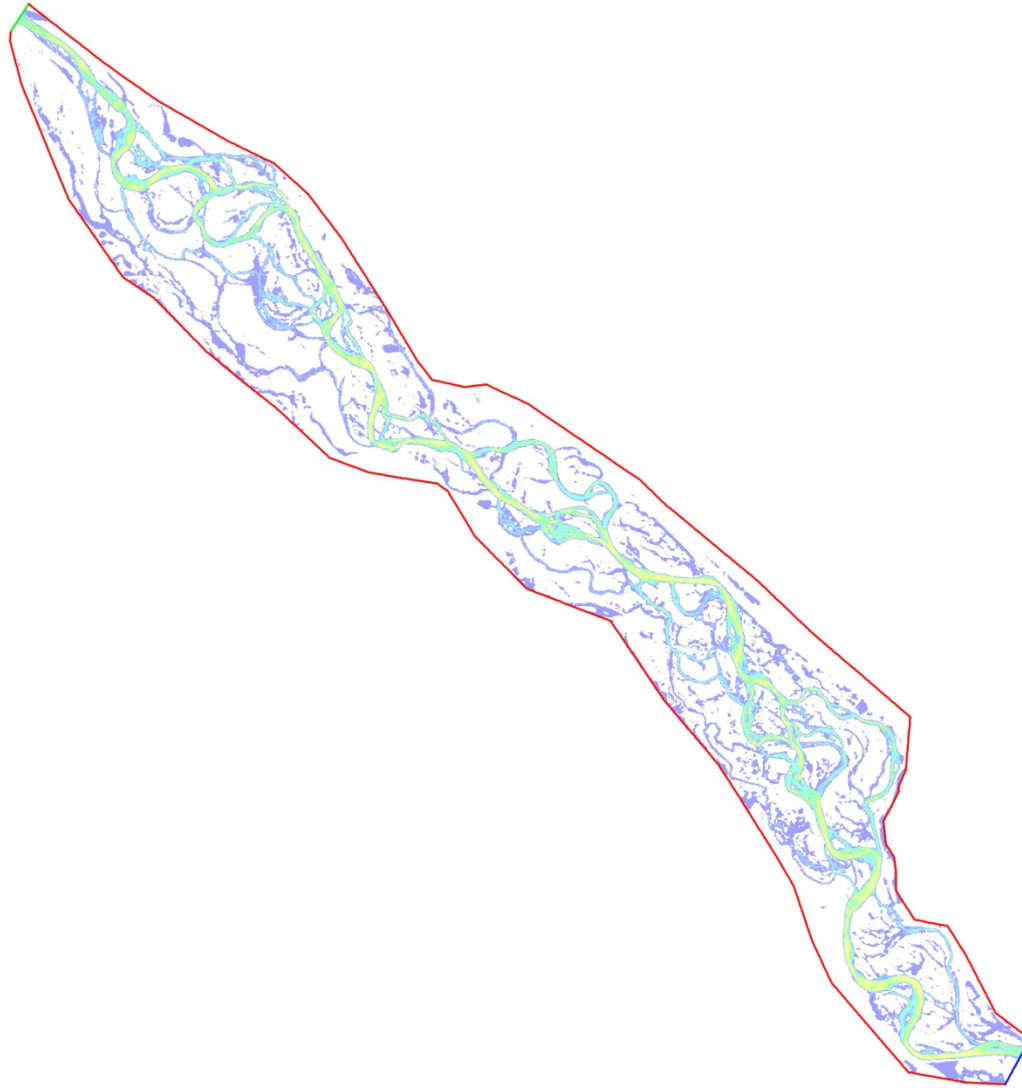
Depth – 5kcfs



Variable Mesh



Velocity – 5kcfs

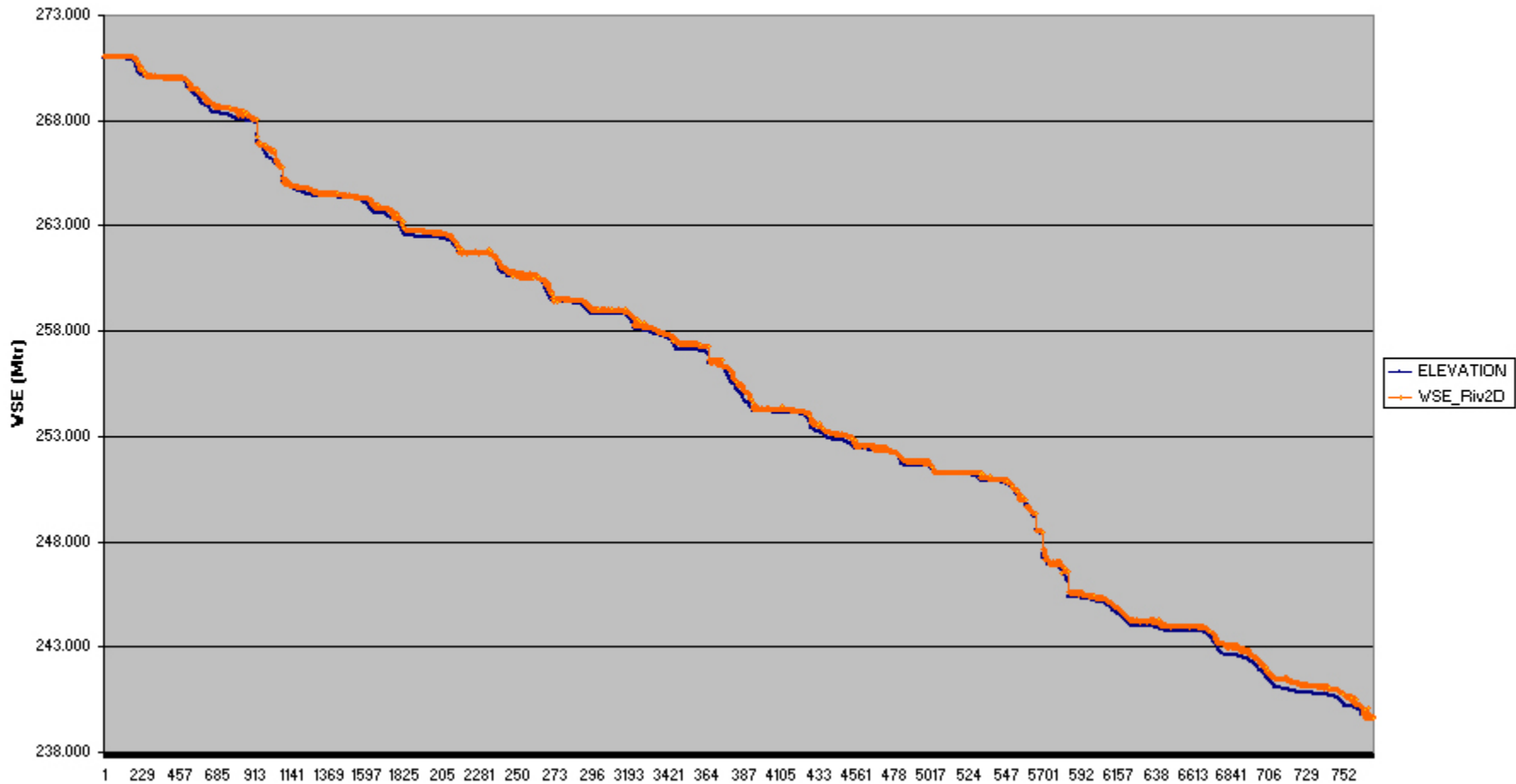


Froude – 5kcfs

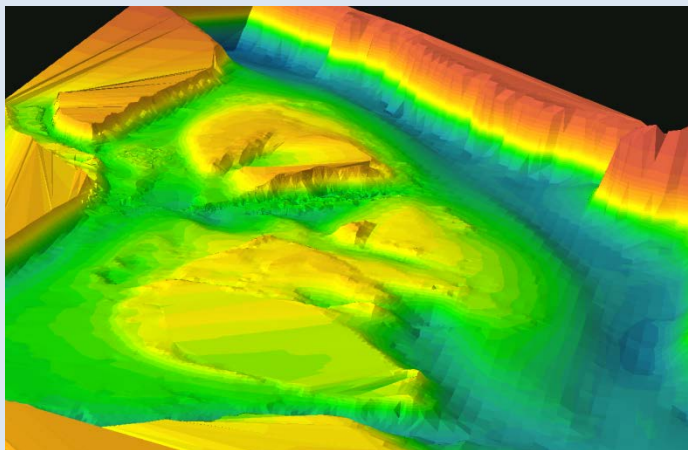


Model Calibration

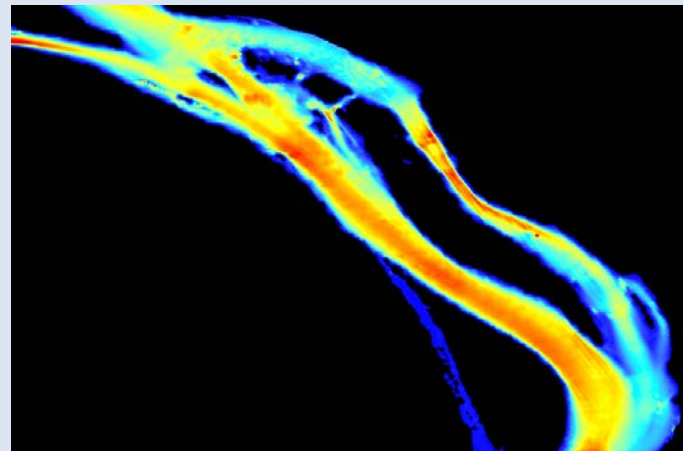
Wapato WSE 1491 18Apr07



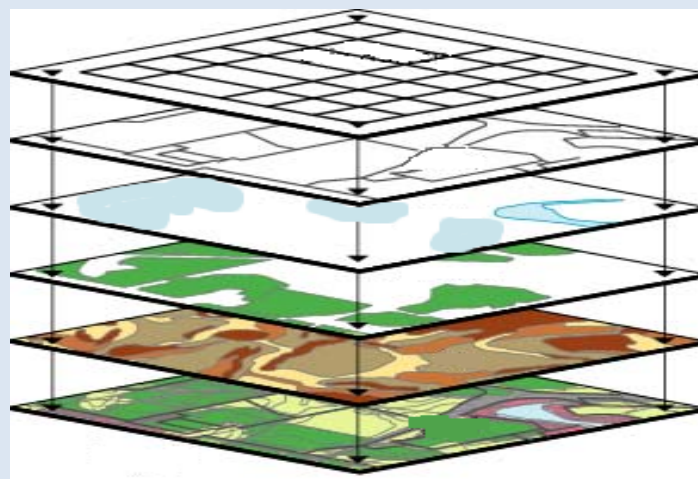
Developing Spatially Explicit Habitat Models by Integrating GIS, River2D, and Habitat Criteria



Bathymetry



Hydraulic Model Output



GIS: cell-based modeling