

Phase I- Jordan River, Utah, Riparian Restoration for the Midvale Slag Superfund Site

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Midvale
Slag

Sharon
Steel

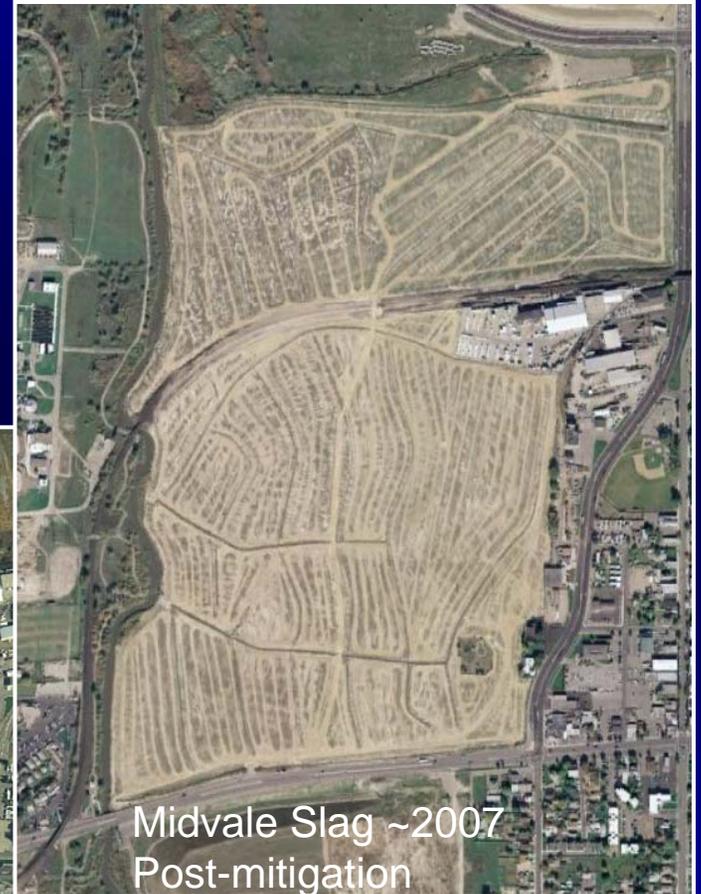
Midvale Slag Superfund Site, Salt Lake County, Utah

-12 mi south of Salt Lake City

-446 acres



Midvale Slag early 2000's pre-mitigation



Midvale Slag ~2007
Post-mitigation

Smelter 1871-1971

- Wastes on site: slag, tailings, arsenic and calcine, lead and other mining and smelting materials
- The Jordan River was channelized by the USACE in 1950's – much of the bank is severely vertical or even undercut
- Goal - Maintain river bank stability along the Midvale Slag Site to prevent river bank erosion which would release buried contaminants to the river and adjacent properties

The obstacles – bridges, roads, redevelopment, heavy use (recreational-storm drainage) and flood conditions (limited time to conduct work)



Return to Use Initiative - 60% of the 446 acres capped

Site re-developed

60% of the riparian work is completed

Partner w/Jordan River Stakeholders to improve river-riparian corridor

EPA hired USGS to survey the river channel and develop a two dimensional hydraulic model to evaluate they hydraulic characteristics of the river under different stream flows.

- locate areas susceptible to erosion as well as areas where the holding capacity could be increased.

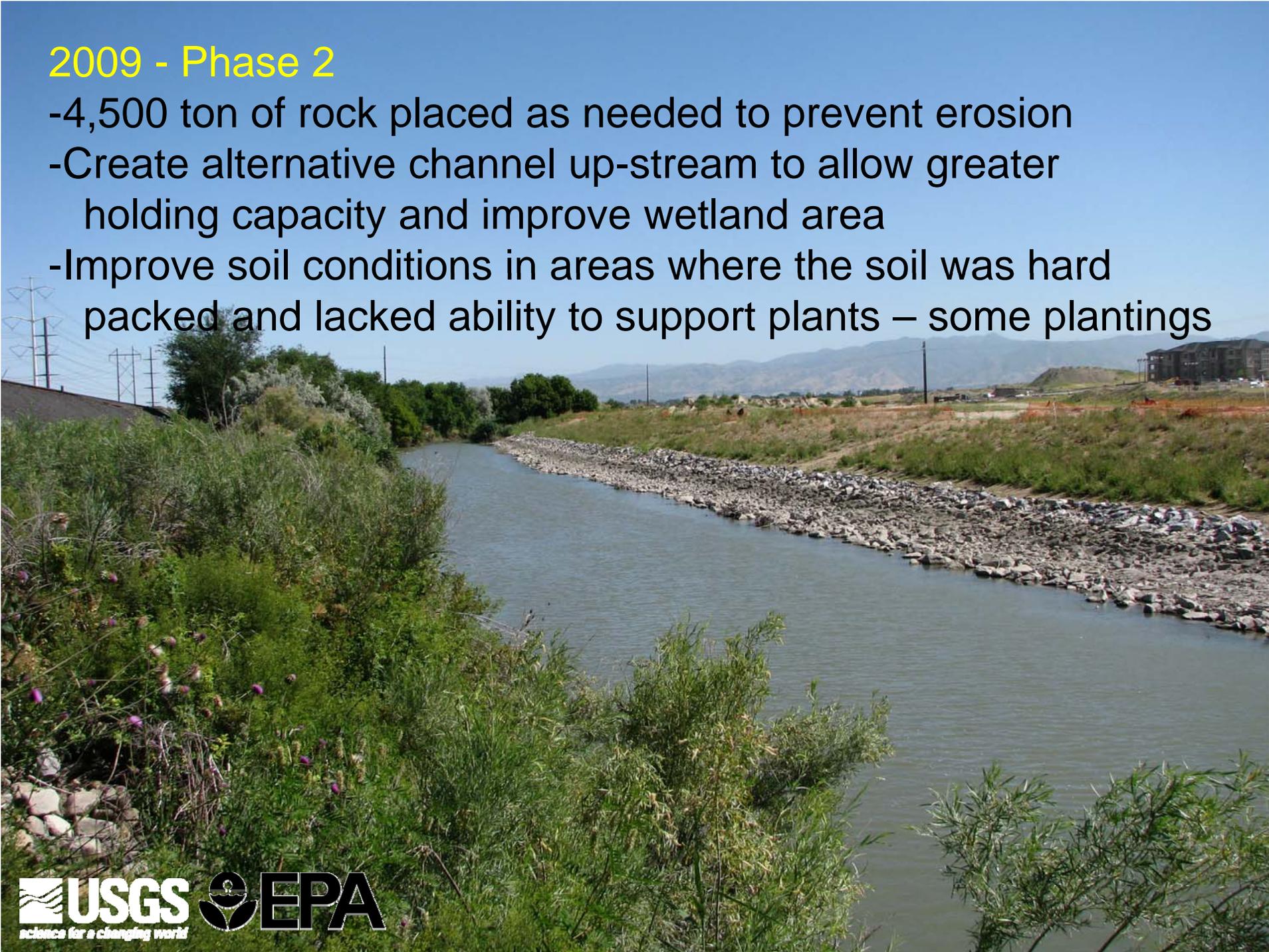
2008 - Riparian Design/Build Phase 1 – 6 month project

- Remove/replace damaged sheet pile dam
- Removal of 1000 cubic yards of slag along the river corridor – reduces undercutting and erosion
- Slow down and hold the water in the area of the sheet pile dam
- 90,000 ton of rock placed along the bank to prevent erosion of the cap
- J-dam construction to reduce stream bank erosion and improve meandering



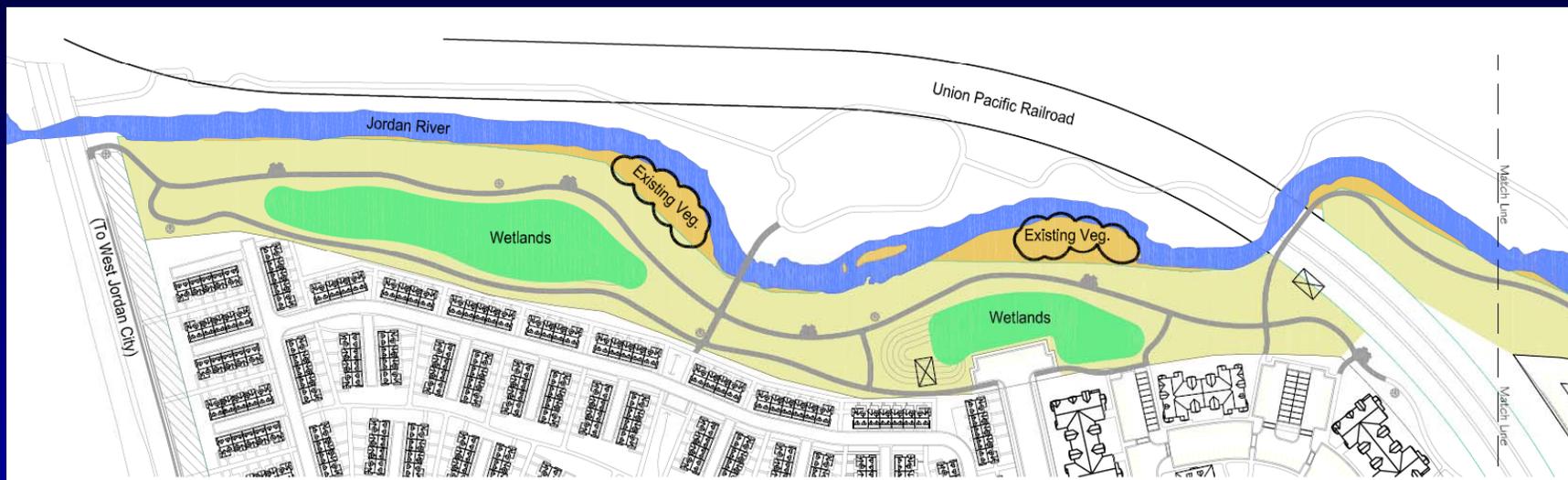
2009 - Phase 2

- 4,500 ton of rock placed as needed to prevent erosion
- Create alternative channel up-stream to allow greater holding capacity and improve wetland area
- Improve soil conditions in areas where the soil was hard packed and lacked ability to support plants – some plantings



2010 - Phase 3 underway with Salt Lake County

- Construction of emergent bench planting designs as well as placement of trail systems and some rock placement to prevent erosion.
- Improve ecological health of the corridor;
- Improve water trail/park features, storm water detention basins and connection to bridge construction



- What are the hydraulic characteristics of the sheetpile dam? Proposed structure?
- Is the mitigation effort susceptible to erosion? If so where? What can be done?
- What can be learned to aid in future river corridor management?

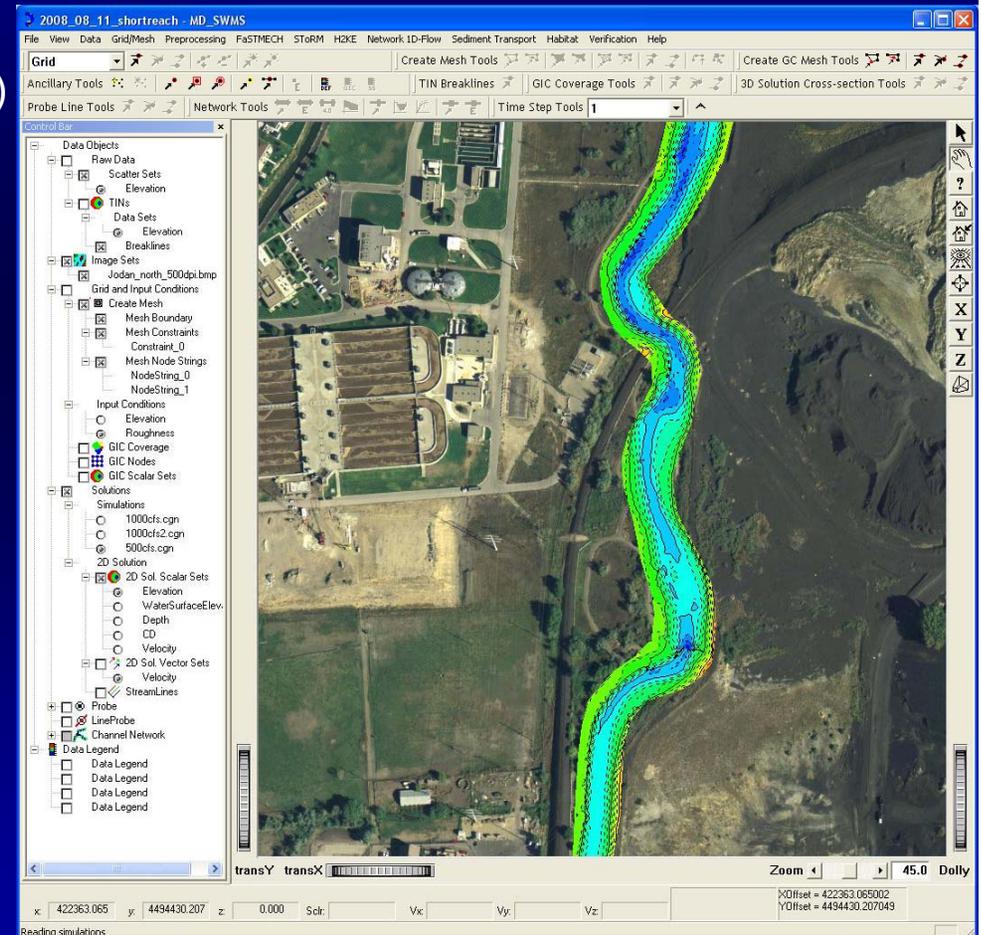


How can we answer these questions?

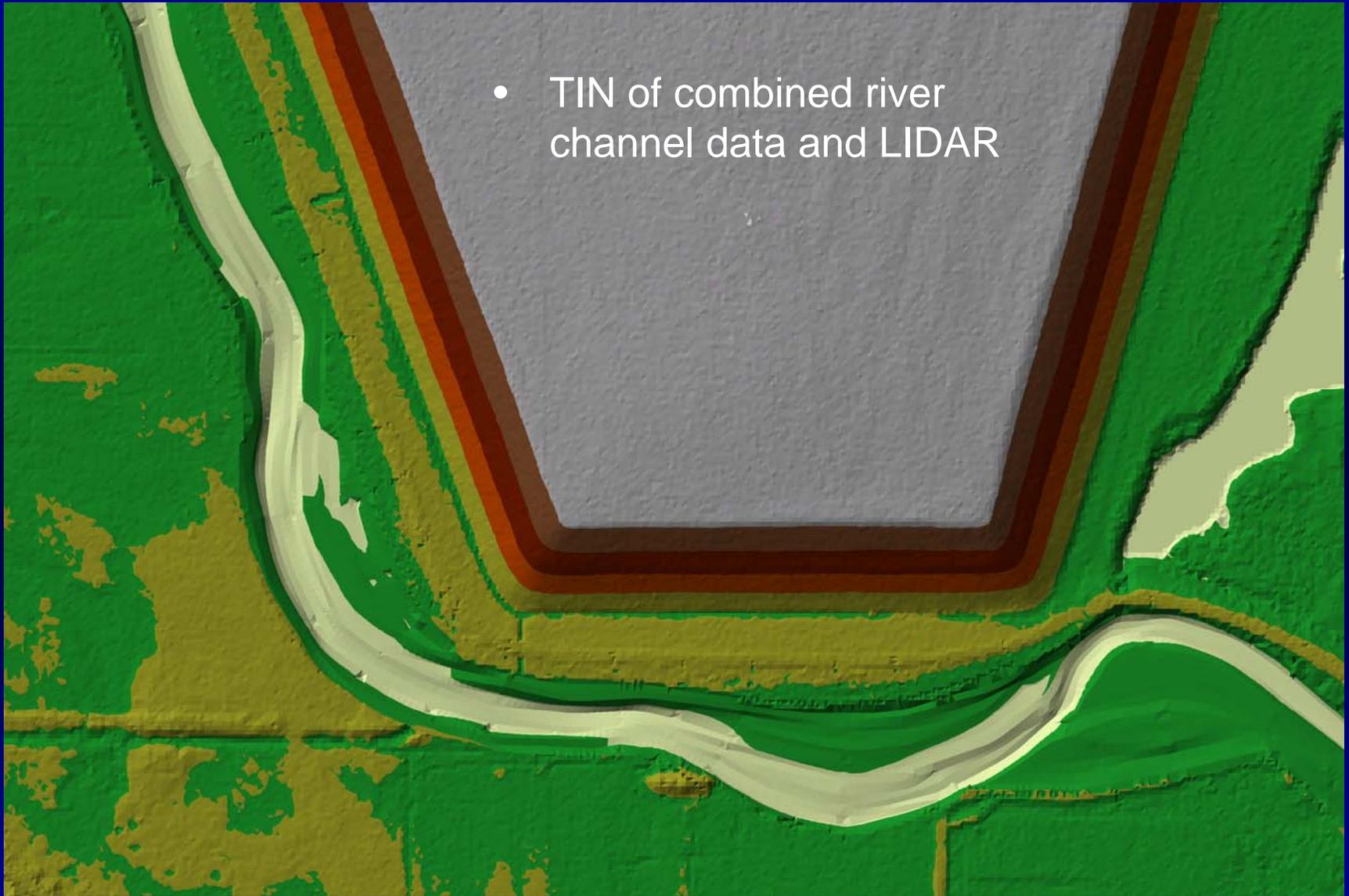
- 2-dimensional hydraulic modeling
 - Water-surface elevations
 - Water-velocity distributions
 - Computed shear stress distributions

Modeling System used

- USGS MD_SWMS incorporating
 - SToRM (System for Transport and River Modeling) model (Simones, Nelson, McDonald) and FaSTMECH (Nelson)
 - Unstructured grid/mesh (SToRM)
 - Blend of Finite Volumes and Finite Elements
 - Steady state and unsteady
 - Depth integrating
 - Main input parameters required:
 - Discharge to simulate
 - High resolution topography
 - Surface material roughness (drag coefficient)

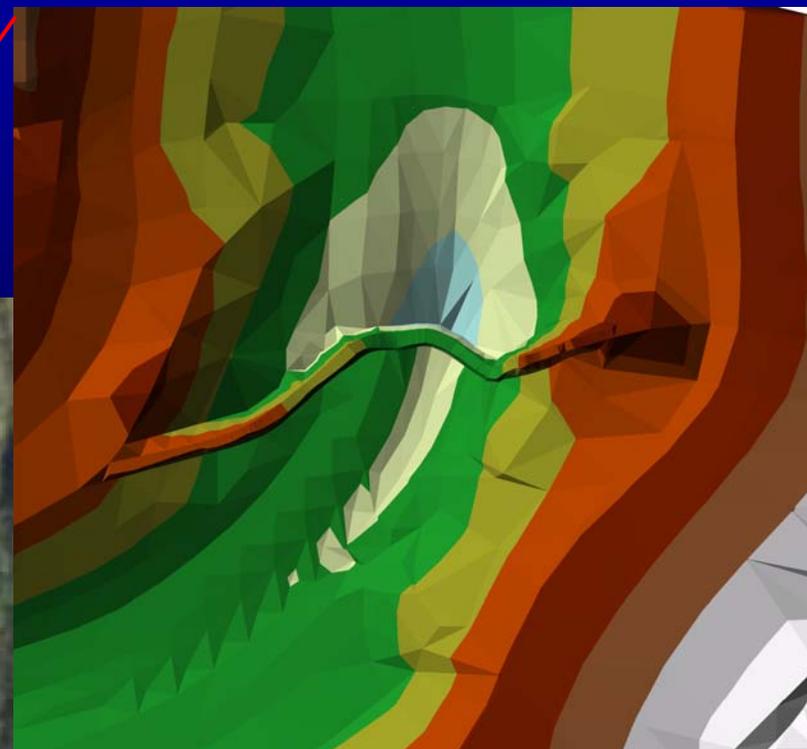


- TIN of combined river channel data and LIDAR



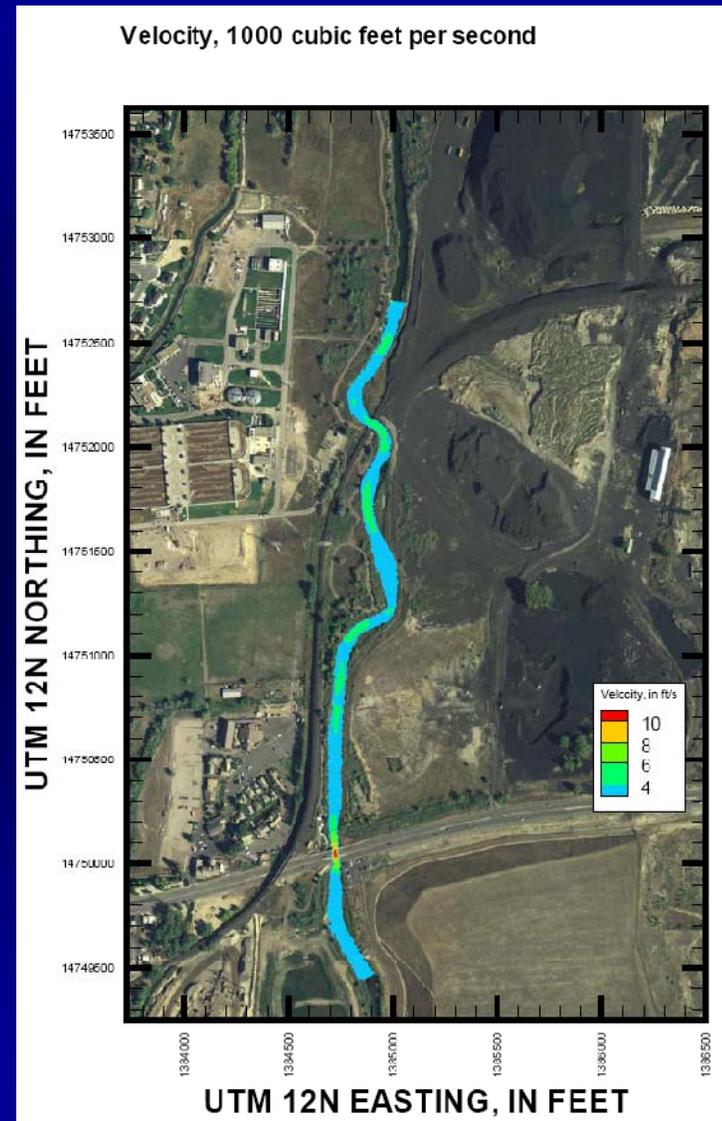
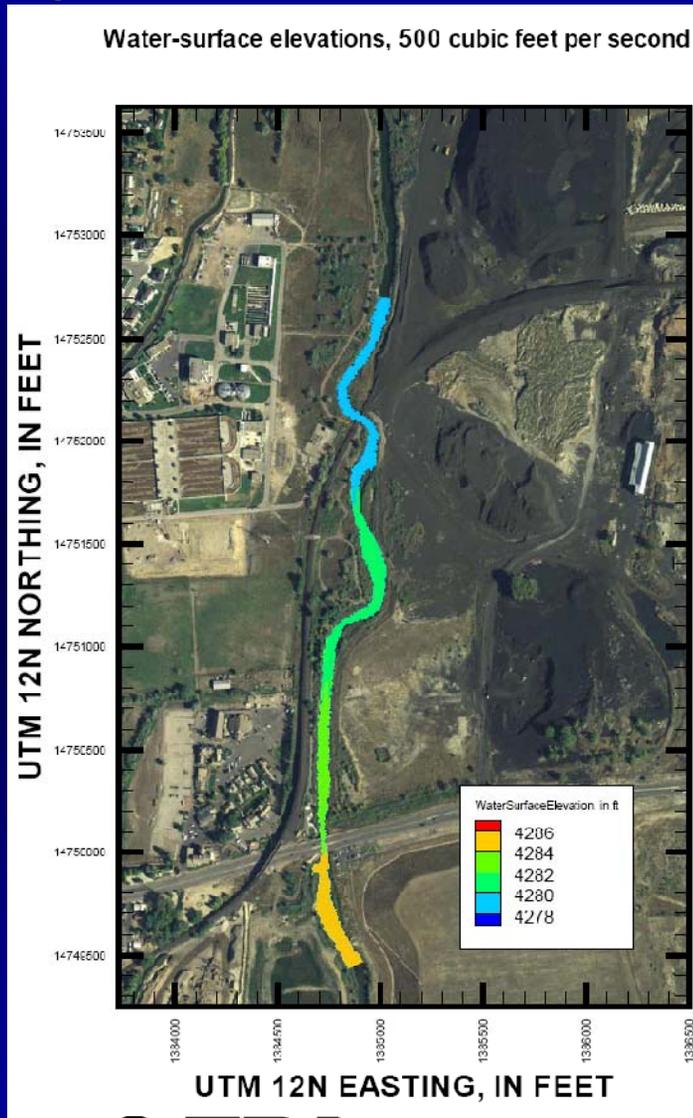
South end of Sharon Steel site

- Aerial photograph of sheetpile dam at Midvale Slag

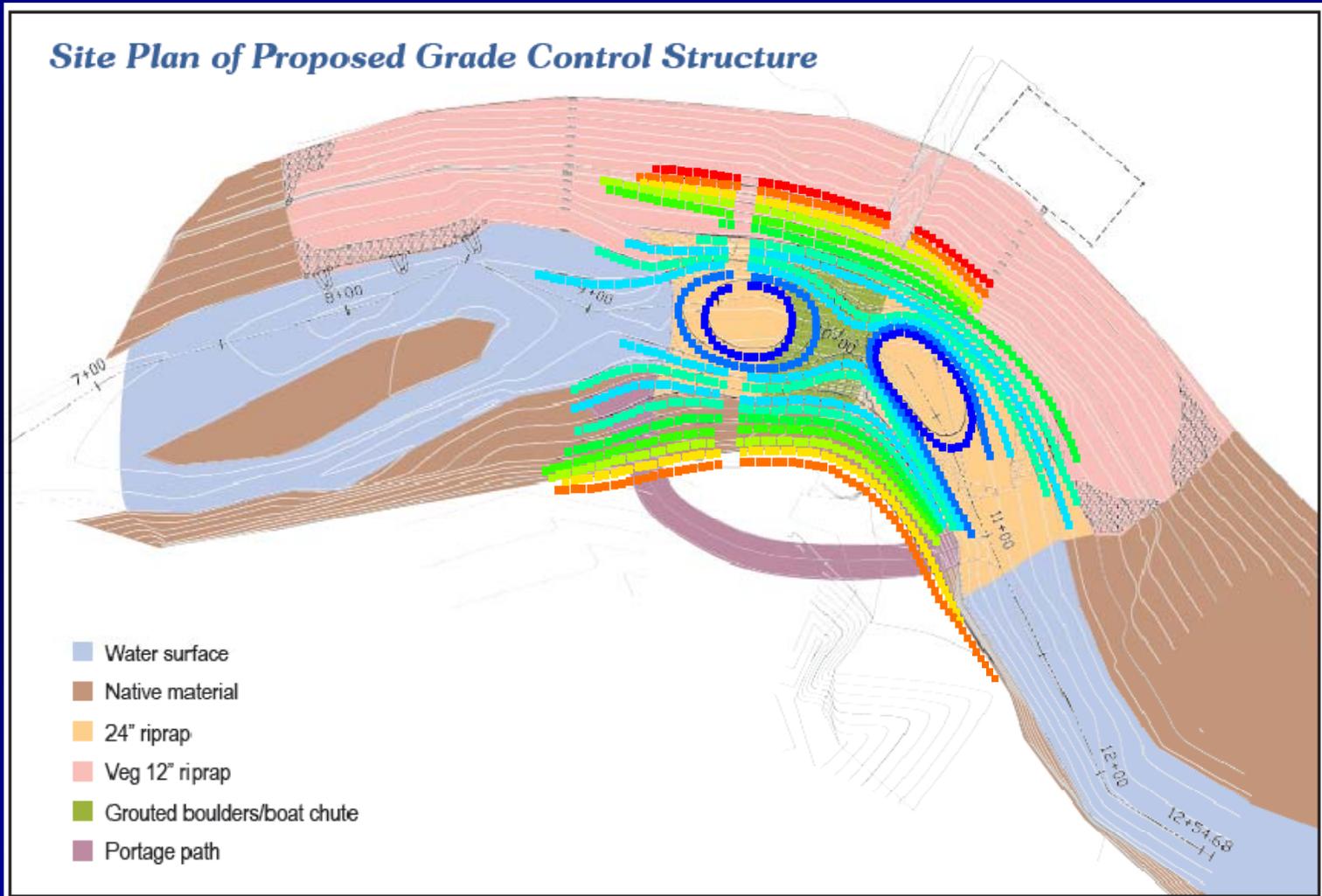


TIN of existing sheetpile dam

Examination of hydraulic characteristics of existing sheetpile dam



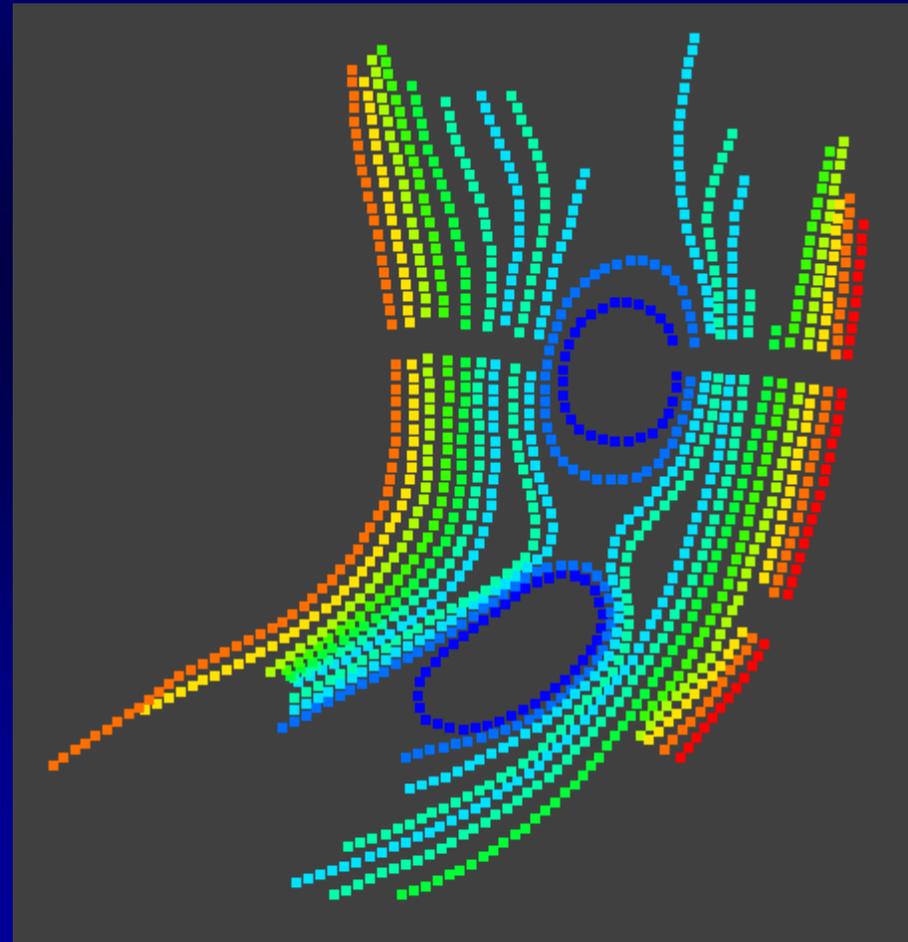
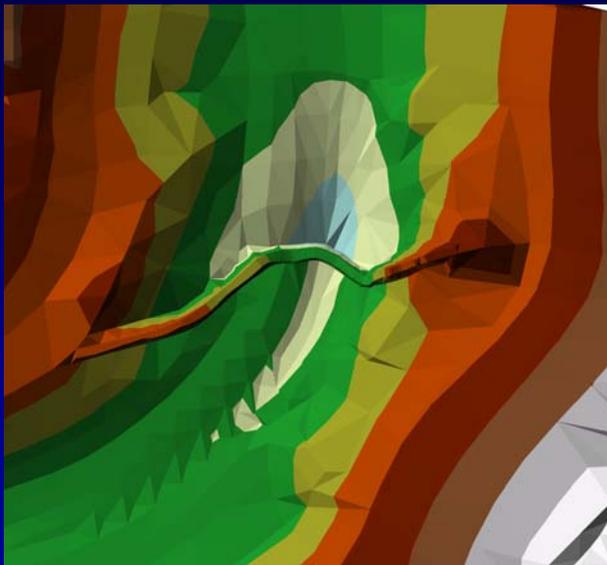
Proposed structure:



Comparison of hydraulic characteristics between existing sheetpile and proposed structure:

EPA desired an examination of the proposed structure:

- as designed
- plus 0.5 ft
- plus 1.0 ft
- plus 1.5 ft
- plus 2.0 ft

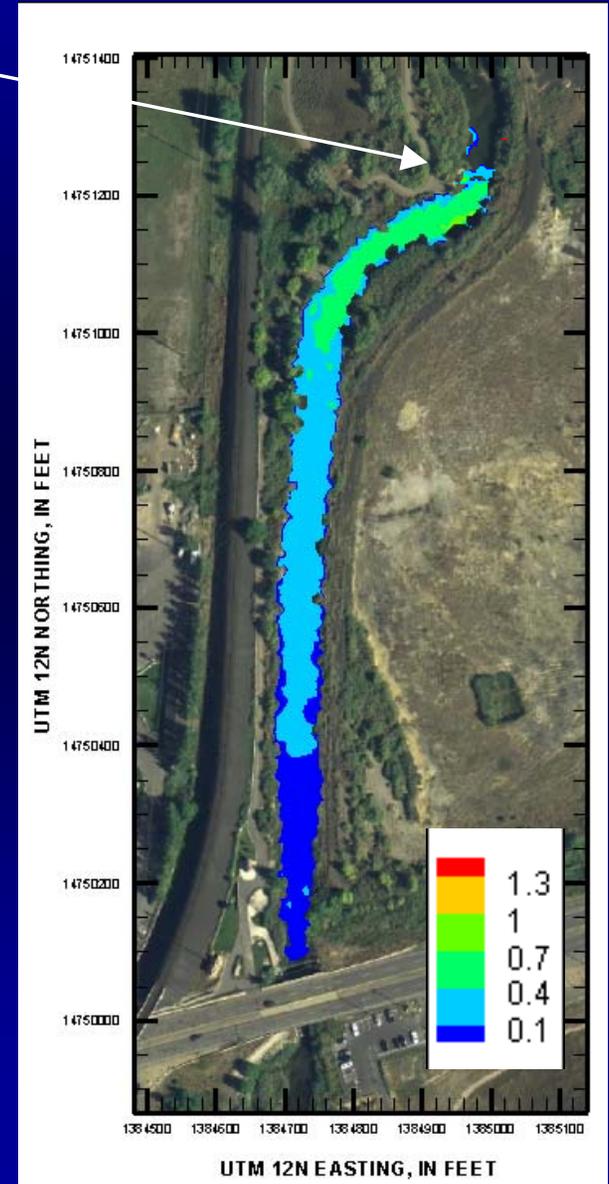
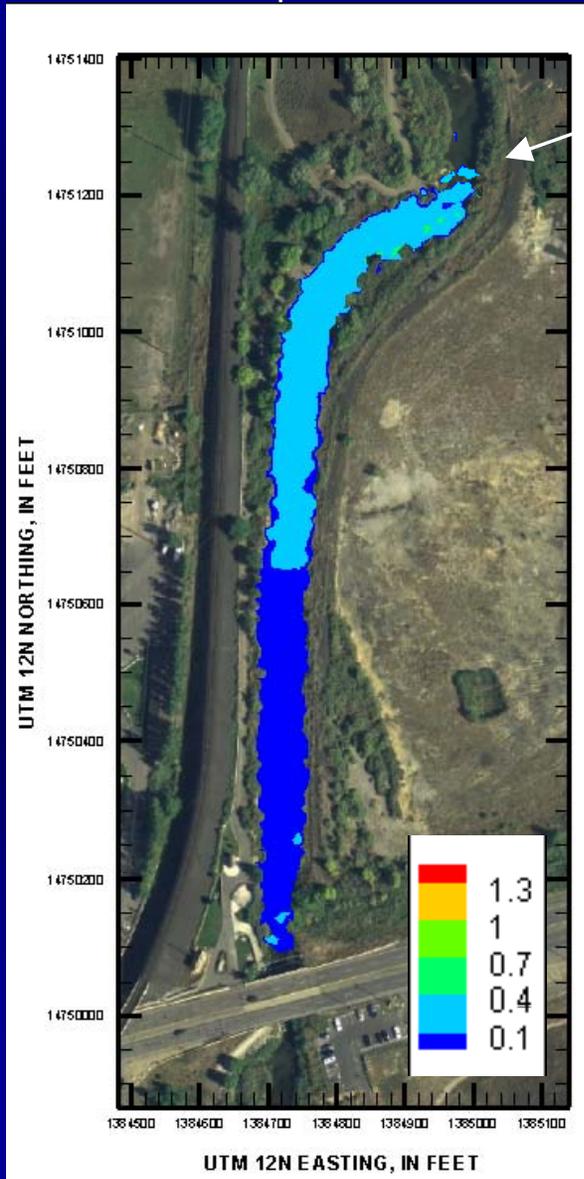


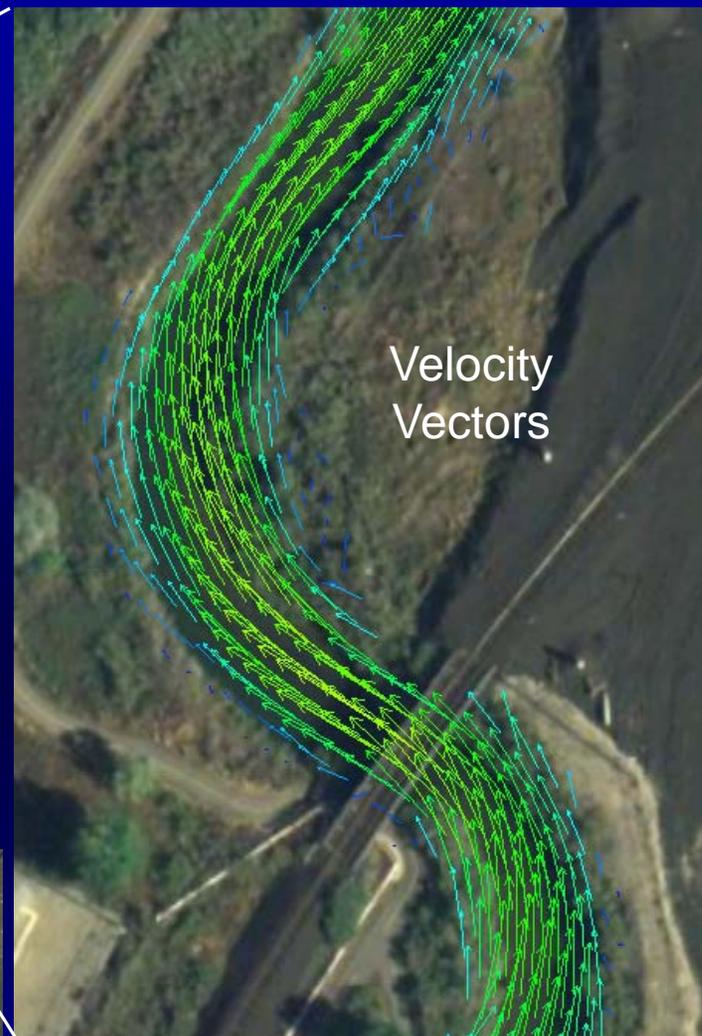
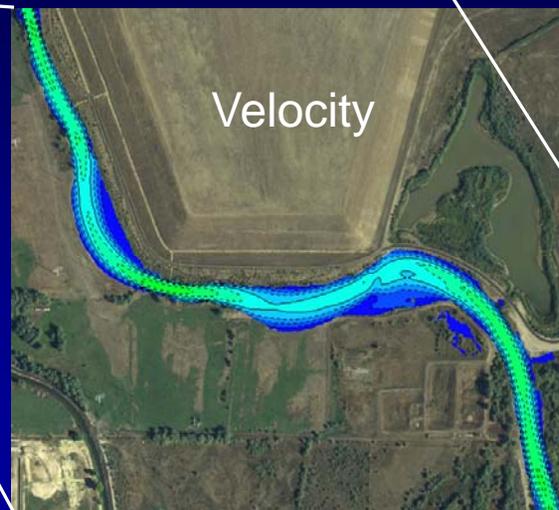
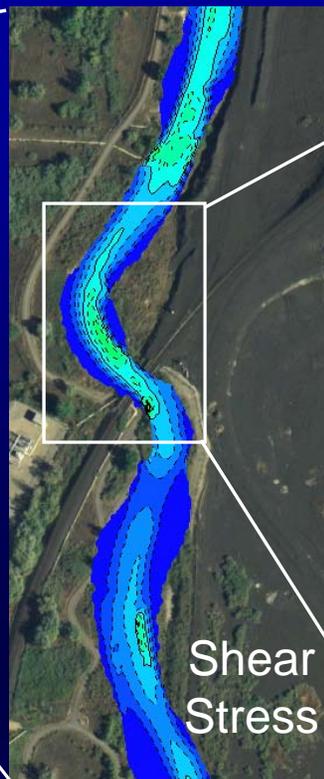
Developed change maps of results: Water-Surface Elevation

1,000 cubic feet per second
Proposed plus 1.5 ft minus
Sheetpile Dam

500 cubic feet per second
Proposed plus 1.5 ft minus
Sheetpile Dam

Location of
structure





Questions?