Rock Toe and Brush Revetment Update.

Mike Harvey

Interim Protection

- Rock-toe and brush revetment
- Constructed October 2007
- ~ 1500 lineal feet
- Top of the rock El. 119';15,000 cfs (42 % exceedence)
- Wood incorporated within (~ 12000 cfs) and on top of structure
- Between the rock and bank was backfilled to prevent erosion and fish entrapment

Potential Maintenance Issues:Peaks: 56,000, 43,000, 64,000, 104, 000 cfs

- Flanking of upstream end of the structure
- Loss of rock from the structure due to local scour
- Loss of woody material
- Excessive erosion of upper bank
- Excessive erosion off the downstream end of the structure

Upstream end of the site prior to construction

Middle part of the site prior to construction

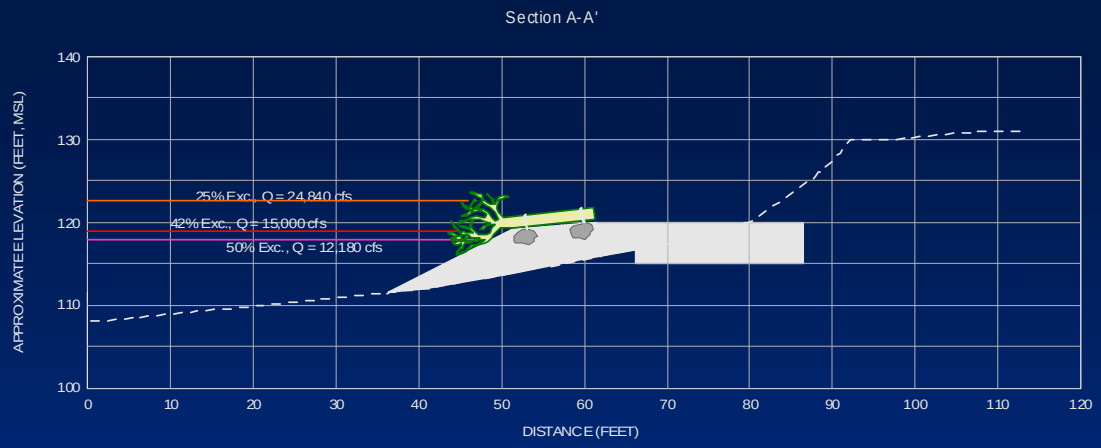
Apex of the eroding bend prior to construction

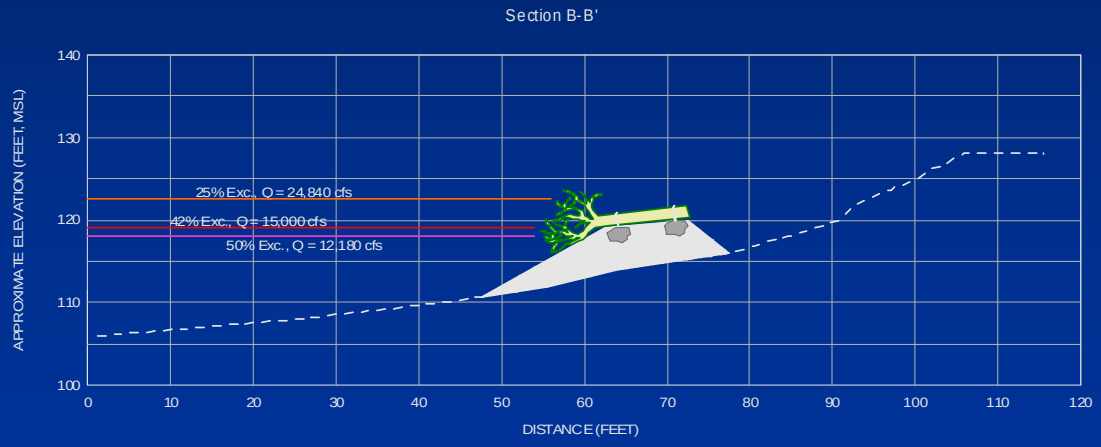
Middle part of the downstream part of the site prior to construction

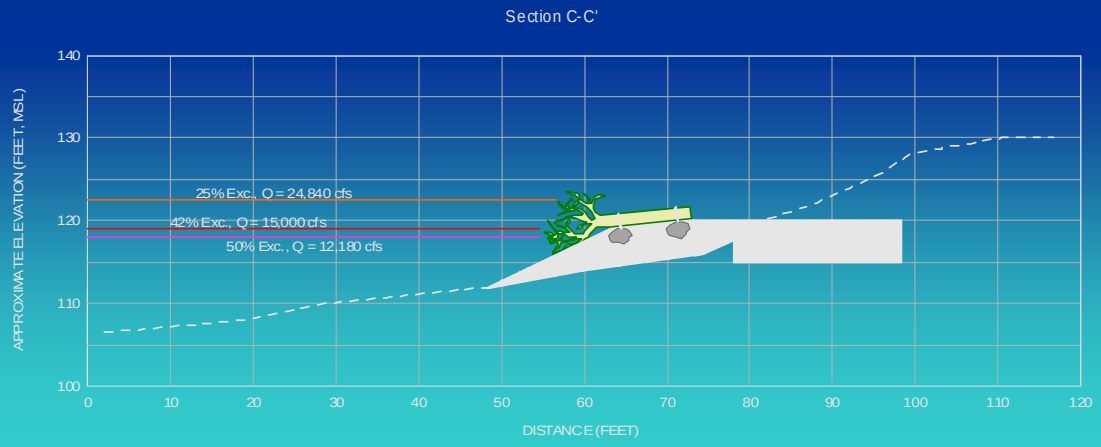
Downstream end of the site prior to construction

M&T/Llano Seco Fish Screen

TETRA TECH

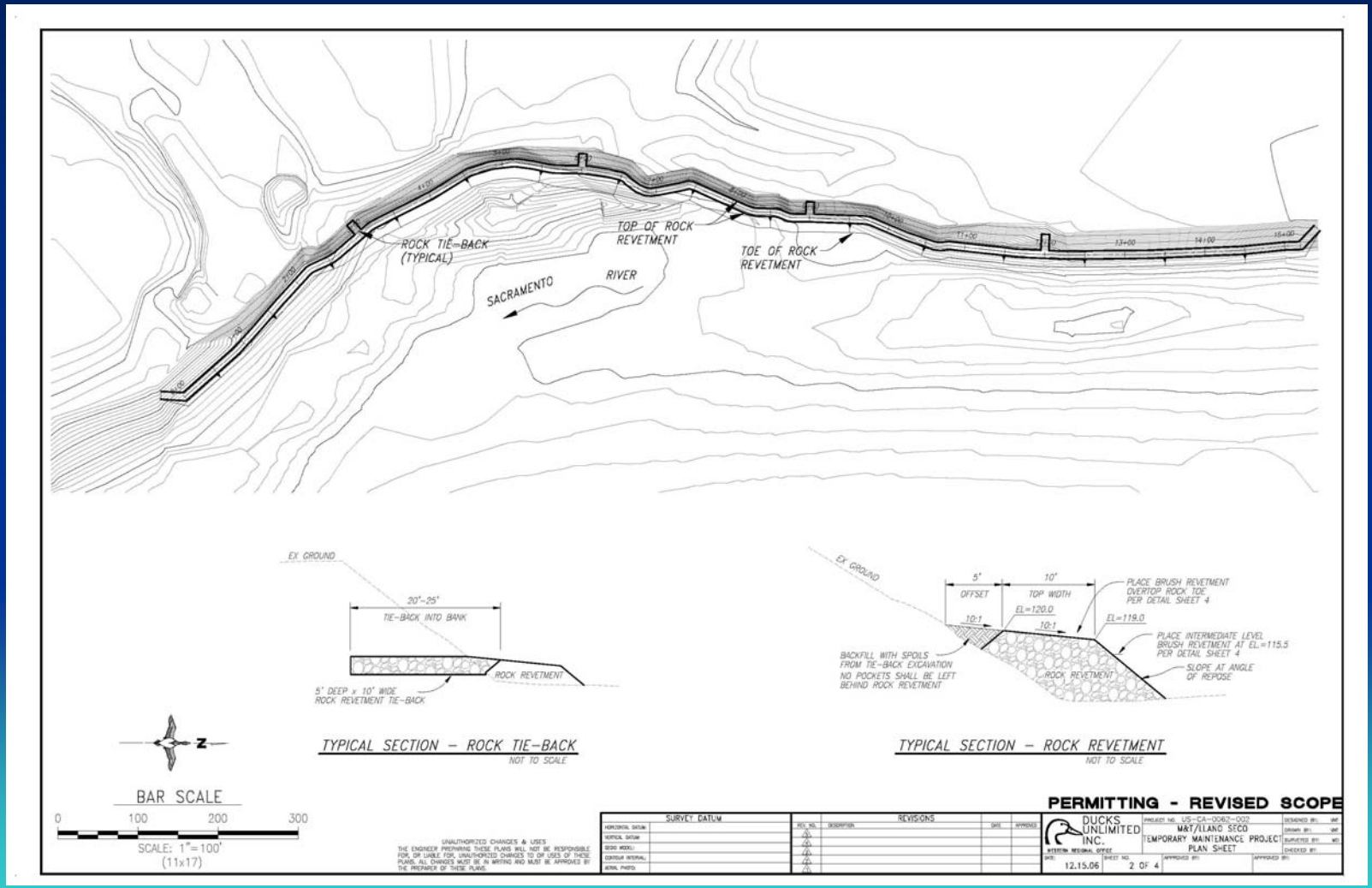






Typical sections of the rock-toe/brush revetment showing design flows and elevations

Rock and Brush Toe Revetment



View downstream of the rock-toe being emplaced, 2007

View upstream of the rock-toe and woody debris, 2007

Woody debris on top of structure, 2007

Backfill behind rock toe, 2007

View upstream of the upstream end of the revetment showing the presence of the pre-construction vegetation on the upstream bank

Woody debris on top of structure, 2008

View downstream of bank erosion caused by Winter 2008 high flows

Woody debris in and on structure in 2008 after high flows

Upstream end of the revetment in 2010

Woody debris piles on top of structure, 2010

Submerged woody debris within the structure, 2010

Woody debris piles on top of structure, 2010

Woody debris pile and new vegetation growth

Upper bank erosion, 2010

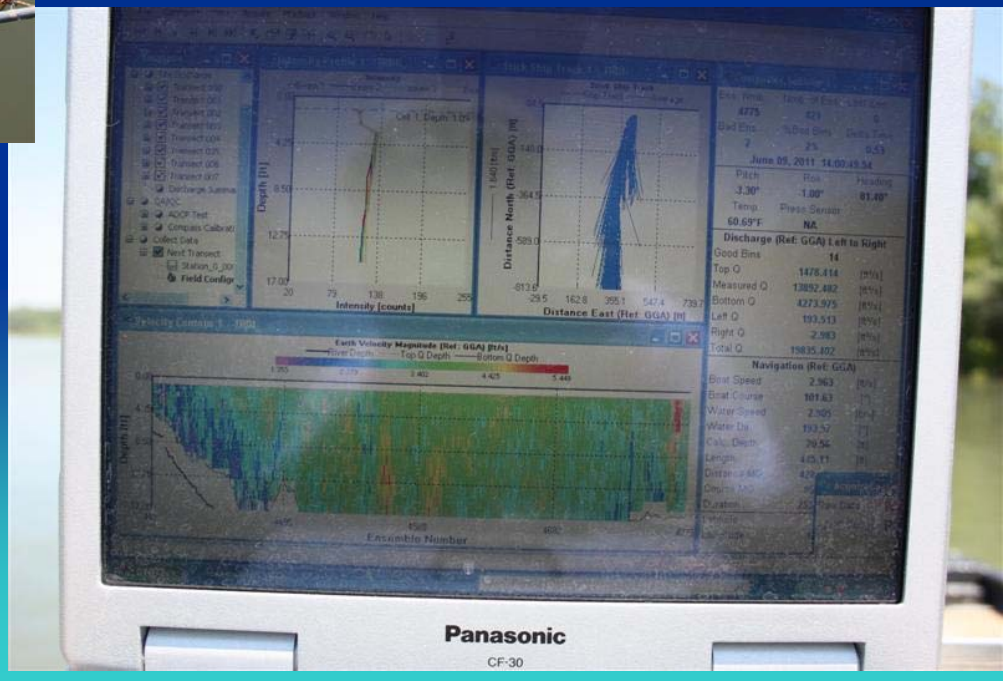
Upper bank erosion, but no backfill scour, 2010

Volunteer willow growth, 2010

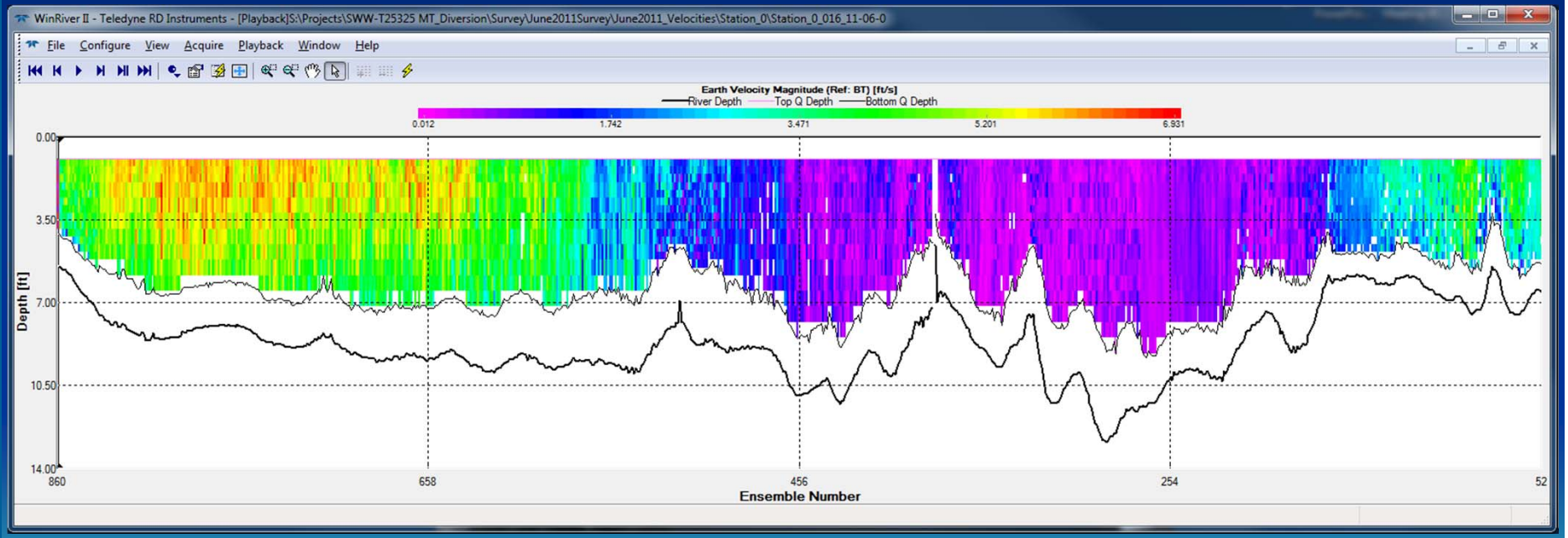
Downstream part of the revetment, 2010

Downstream end of the revetment and tieback, 2010

ADCP UNIT



Longitudinal Profile
Rock/Brush Toe Revetment



Downstream of RTBR
June 2011, ~ 17,000 cfs

Downstream end of RTBR Revetment, June 2011

Lower end of RTBR Revetment
June 2011

Lower end of Apex of RTBR
June 2011

Apex of RTBR Revetment
June 2011

Upper Bank Layback RTBR
June 2011

Brush Pile Recruitment
June 2011

Mid-Upper part of RTBR Revetment June 2011

Upper part of RTBR Revetment June 2011

Upstream part of RTBR Revetment June 2011

Upstream Transition RTBR
June 2011

CONCLUSIONS

- Flanking of upstream end of the structure -- Intact
- Loss of rock from the structure due to local scour – No evidence of loss
- Loss of woody material -- Intact
- Excessive erosion of upper bank -- No
- Excessive erosion off the downstream end of the structure -- No