

**URS**

south river
SCIENCE TEAM

October 8, 2014

Map of the Sacramento-San Joaquin River Delta

Legend:

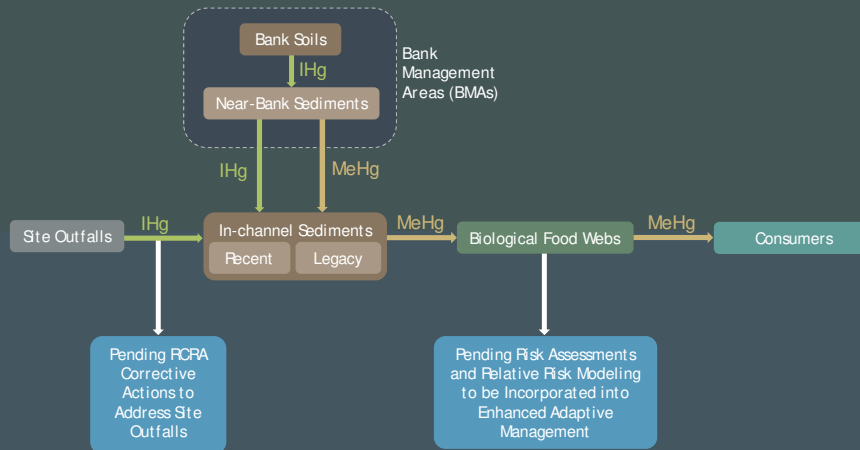
- Conveyance Study Area
- Waterways (Blue line)
- Waterway Easement (Blue outline)
- 10000 Footing Levee (Thick black line)
- Waterway Surface Water (Blue area)
- Waterway Surface Water (Blue area)
- Ground Water (Blue area)

Map Labels:

- Colusa
- Yuba City
- Marysville
- Sacramento
- Delta
- Delta Conveyance Project
- Delta Levee
- Delta Easement
- Delta Surface Water
- Delta Ground Water



Basis for Remediation Conceptual Site Model



3



Short-Term Remedial Action Objectives

- General response objectives
 - Reduce mercury transport and exposure and improve bank habitat functions within the upper 2 miles of the South River
- Performance objectives
 - Conduct and/ or maintain bank remediation actions to achieve sustainable reductions in mercury concentrations and improve water quality and bank habitat functions
- Measurable metrics
 - Incorporated into short-term monitoring plan

4



Corrective Measure Implementation

- Test hypothesis that reducing bank loading to the channel will accelerate recovery
- Use proven bank remediation technologies
- Phased implementation, monitoring, and adaptive management over 5 to 10 years
 - Beginning with Phase 1 interim measures in RRM 0 to 2
- Future phases will include downstream corrective actions and terrestrial/ floodplain evaluations

5



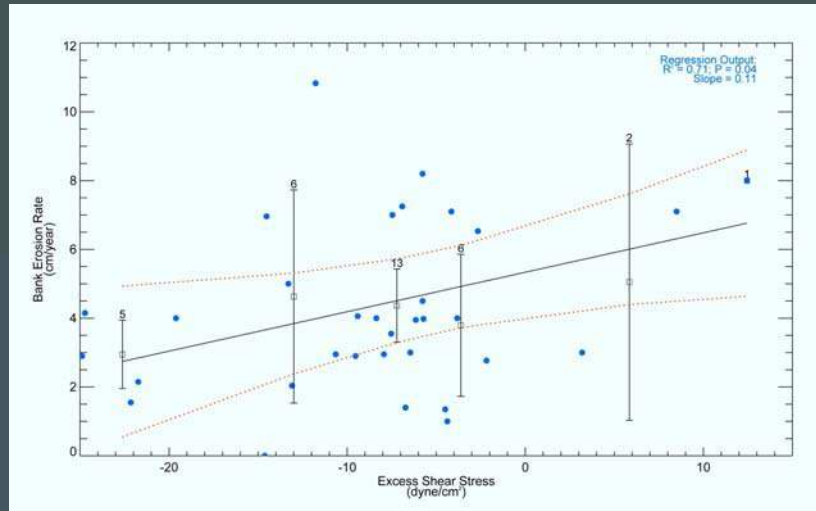
Refinement of Phase 1 BMAs

- Erosion rate correlation analysis
 - Recent Univ. of Delaware LiDAR resurveys of 12 banks in RRM 2 to 10 evaluated in 2006/ 2007
 - Supplements detailed tree root analyses
 - Broader application of laser survey methods
- THg concentrations in bank soils
 - Detailed characterization completed in 2014
- Refined THg loading estimates
 - Address erosion rate uncertainties to identify BMAs in RRM 0 to 2

6

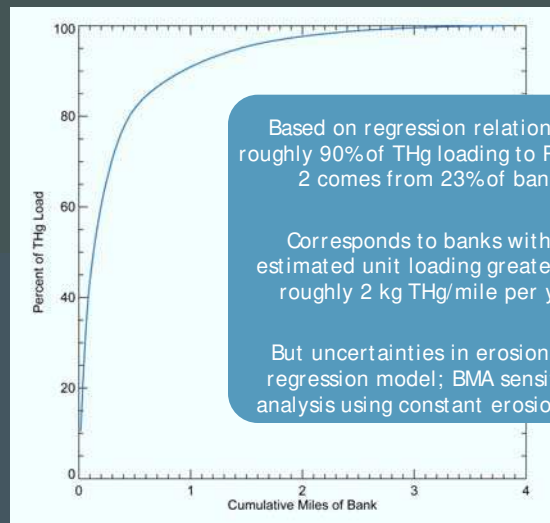


Bank Erosion Rate Regression: RRM 2 to 10



7

Cumulative Bank THg Loading: RRM 0 to 2



Based on regression relationship,
 roughly 90% of THg loading to RRM 0 to
 2 comes from 23% of banks

Corresponds to banks with an
 estimated unit loading greater than
 roughly 2 kg THg/mile per year

But uncertainties in erosion rate
 regression model; BMA sensitivity
 analysis using constant erosion rate

8

RRM 0 to 2 BMA Sensitivity Analysis



Refinement of Phase 1 BMAs

- Address erosion rate uncertainties by applying both the regression model and constant erosion rate sensitivity analysis to identify BMAs
- Results in a total of 1.3 miles (0.9 mi + 0.4 mi) of BMAs within RRM 0 to 2
 - Phase 1A (City-owned) BMAs total 0.7 miles
 - Includes banks adjacent to City of Waynesboro parks and wastewater treatment plant
 - Design and implementation agreements currently under development



Phase 1A & B BMAs and Near-Bank Deposits



Constitution Park Reach BMAs



North Park Reach BMAs



13



Wastewater Treatment Plant Reach BMAs



14



Interim Measures Objectives	BMA Alternatives	Technologies/Design Features/Components
Reduce Mercury Loading to the South River from Bank Erosion	Institutional Controls and Monitoring	- Conservation easements - Long-term bank monitoring
	Enhanced Vegetative Stabilization	- Enhance root penetration - At-risk tree management - Toe protection (live stakes, tree stumps, etc.) - Live stakes
	Structural Stabilization	- Minor bank reshaping - Slope stabilization - Enhance vegetative stabilization options - Structural options - Toe protection (rock/stone toe)
	Removal and Disposal	- Slope reconstruction - Removal of historical release age deposits
Reduce Mercury Loading to the South River from Leaching and Seepage from the Bank Face	Enhanced Vegetative Stabilization	- Infiltration controls - Soil conditioning - Enhance vegetative evapotranspiration - Reactive amendments
	Structural Stabilization	- Infiltration controls - Soil conditioning - Minor bank reshaping - Reactive amendments
	Removal and Disposal	Removal of historical release age deposits
Decrease Shear Stress on Banks with High Erosion Potential	Enhanced Vegetative Stabilization	Canopy management
	Structural Stabilization	Toe protection (rock/stone toe)
	Removal and Disposal	Slope and channel reconstruction
Improve Habitat Functions	Institutional Controls and Monitoring	Conservation easements
	Enhanced Vegetative Stabilization	Enhance native vegetation (on top of banks and on slope)
	Structural Stabilization	Toe protection (rock/stone toe)

Summary of Interim Measures Objectives, Alternatives & Components

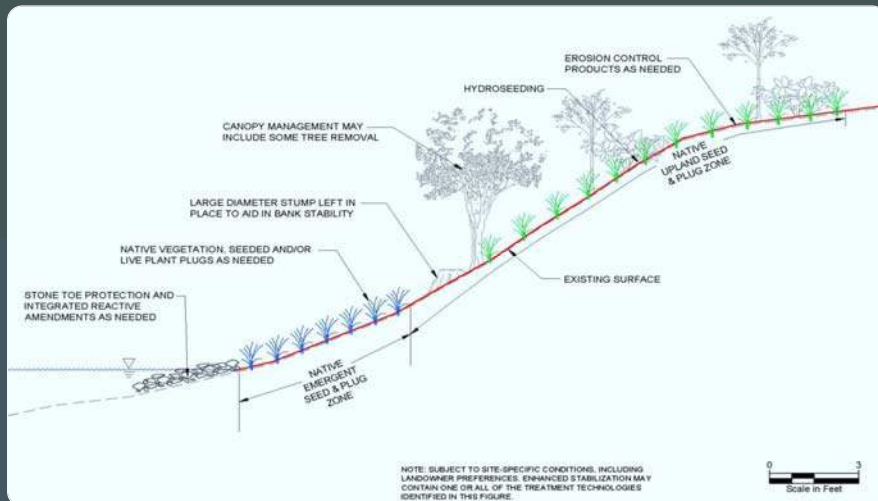
15

URS



ANCHOR QEA

Enhanced Vegetative Stabilization



16

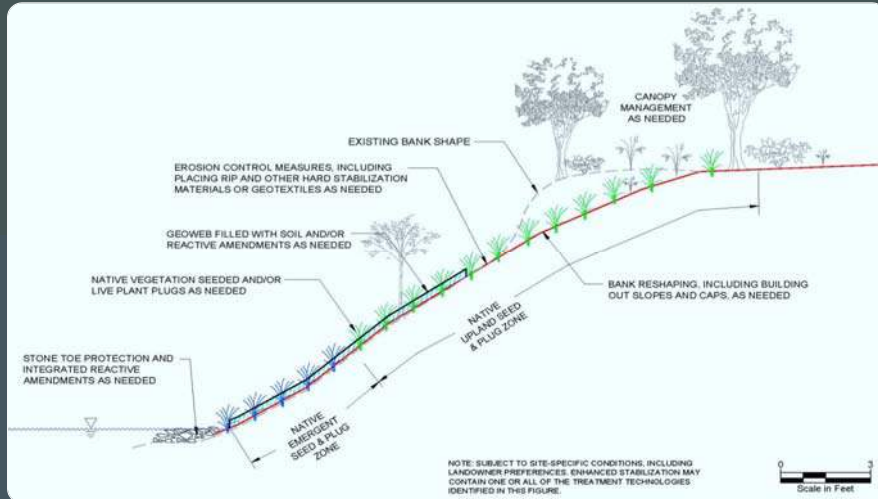
south river
SCIENCE TEAM

URS



ANCHOR QEA

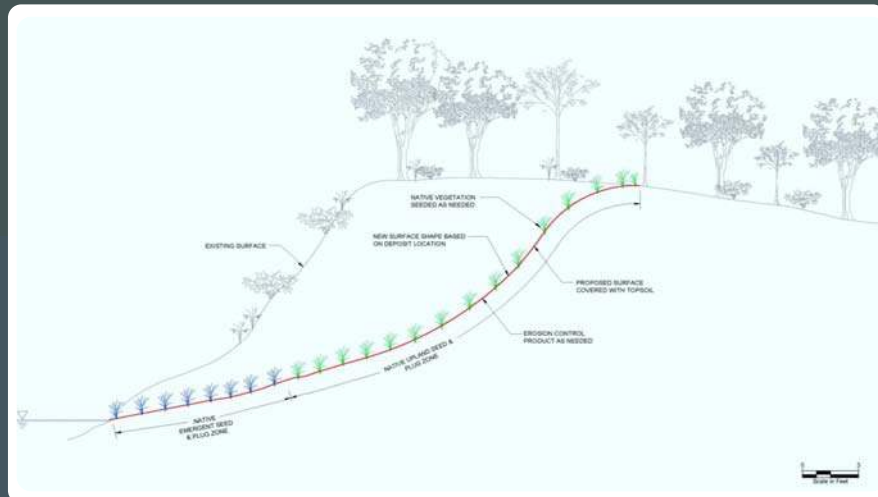
Structural Stabilization



17



Removal and Disposal



18



Pilot Bank Stabilization Project, RRM 0.1



19

south river
SCIENCE TEAM

URS

ANCHOR
QEA

Enhanced Vegetative Stabilization (Tittabawassee River, Michigan; lower energy)



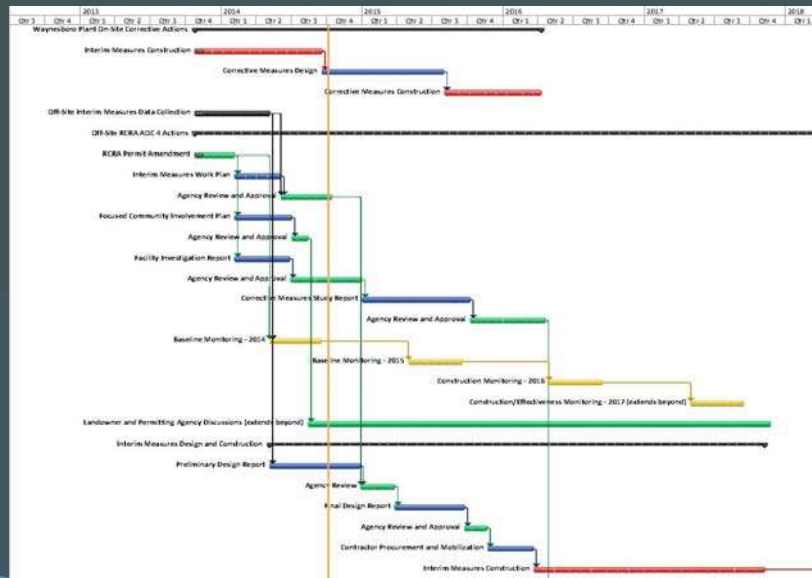
20

south river
SCIENCE TEAM

URS

ANCHOR
QEA

Current Project Schedule



21



Key Next Steps

- Focused bathymetric, geotechnical, and bank soil data collection in October/ November to inform Phase 1A bank remediation designs
- Location-specific corrective action designs
 - Designs tailored to bank characteristics
 - Collaborative development with City of Waynesboro
- Develop preliminary designs over next 6 months
- Permitting and final design in 2015
- Implementation agreements
- Target Phase 1A construction beginning in 2016

22

