




Phase 1 Interim Measures

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Discussion Outline

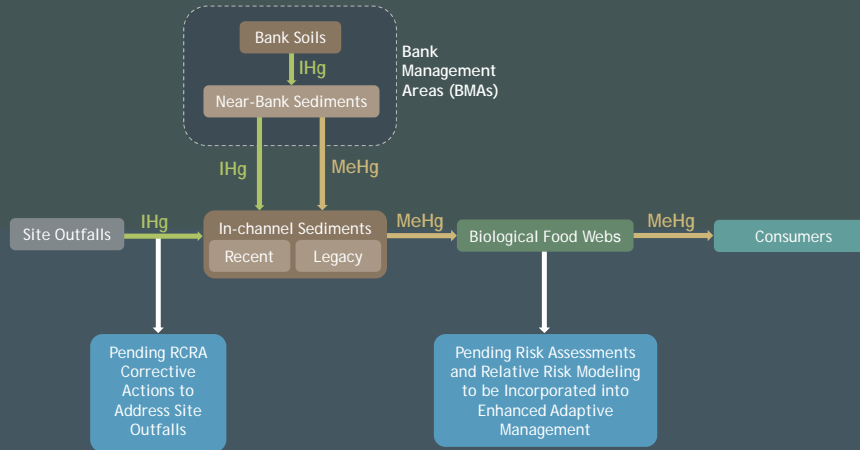
- Interim measure design
- Further evaluation of bank erosion rates
- Refinement of bank management areas
- Engineering options
- Next steps



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Basis for Remediation Conceptual Site Model



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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

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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

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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

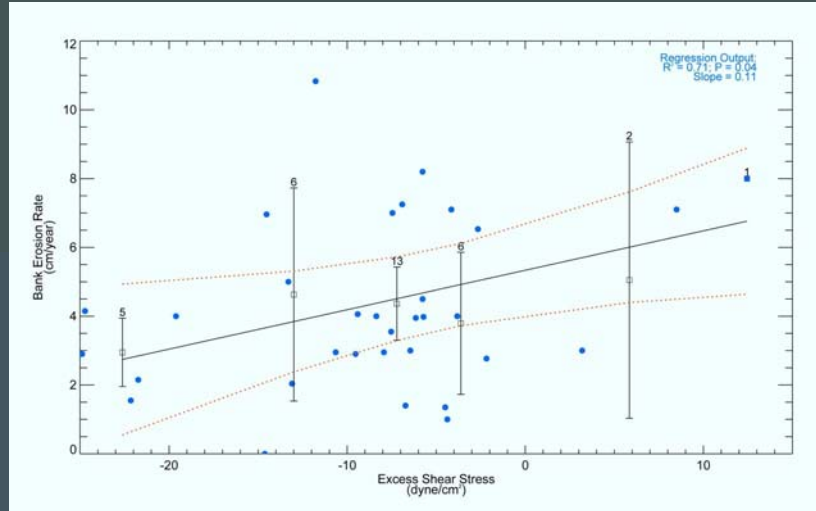
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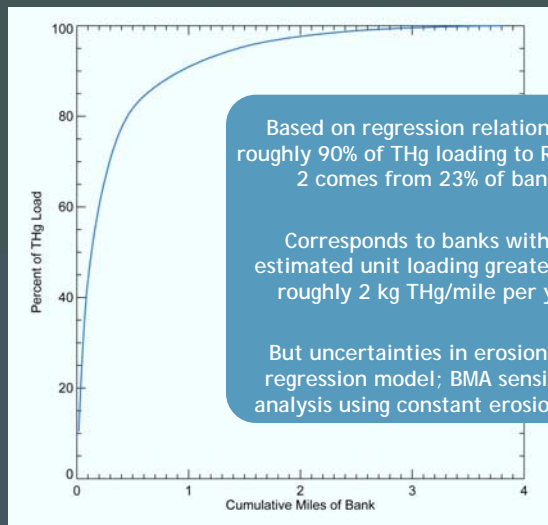
Bank Erosion Rate Regression: RRM 2 to 10



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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

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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



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Wastewater Treatment Plant Reach BMAs



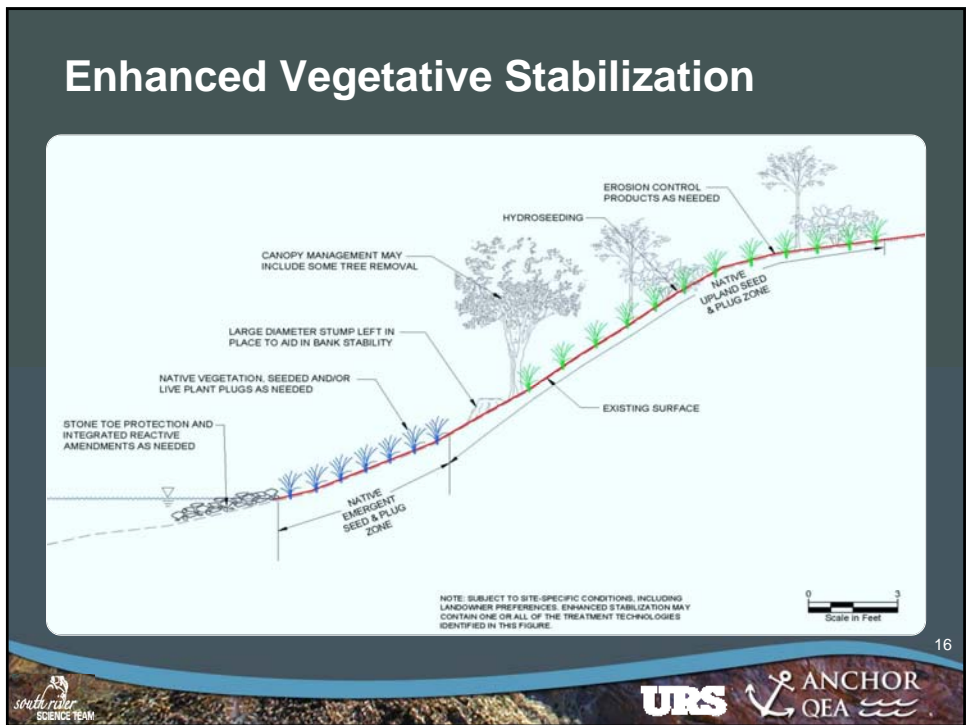
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Interim Measures Objectives	BMA Alternatives	Technologies/Design Features/Components
Reduce Mercury Loading to the South River from Bank Erosion	Institutional Controls and Monitoring	<ul style="list-style-type: none"> • Conservation easements • Long-term bank monitoring
	Enhanced Vegetative Stabilization	<ul style="list-style-type: none"> • Enhance root penetration • At-risk tree management • Toe protection (live stakes, tree stumps, etc.) • Live stakes
	Structural Stabilization	<ul style="list-style-type: none"> • Minor bank reshaping • Slope stabilization <ul style="list-style-type: none"> - Enhance vegetative stabilization options - Structural options • Toe protection (rock/stone toe)
	Removal and Disposal	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Infiltration controls <ul style="list-style-type: none"> - Soil conditioning - Enhance vegetative evapotranspiration • Reactive amendments
	Structural Stabilization	<ul style="list-style-type: none"> • Infiltration controls <ul style="list-style-type: none"> - Soil conditioning - Minor bank reshaping • Reactive amendments
	Removal and Disposal	<ul style="list-style-type: none"> • Removal of historical release age deposits
Decrease Shear Stress on Banks with High Erosion Potential	Enhanced Vegetative Stabilization	<ul style="list-style-type: none"> • Canopy management
	Structural Stabilization	<ul style="list-style-type: none"> • Toe protection (rock/stone toe)
	Removal and Disposal	<ul style="list-style-type: none"> • Slope and channel reconstruction
Improve Habitat Functions	Institutional Controls and Monitoring	<ul style="list-style-type: none"> • Conservation easements
	Enhanced Vegetative Stabilization	<ul style="list-style-type: none"> • Enhance native vegetation (on top of banks and on slope)
	Structural Stabilization	<ul style="list-style-type: none"> • Toe protection (rock/stone toe)

Summary of Interim Measures Objectives, Alternatives & Components

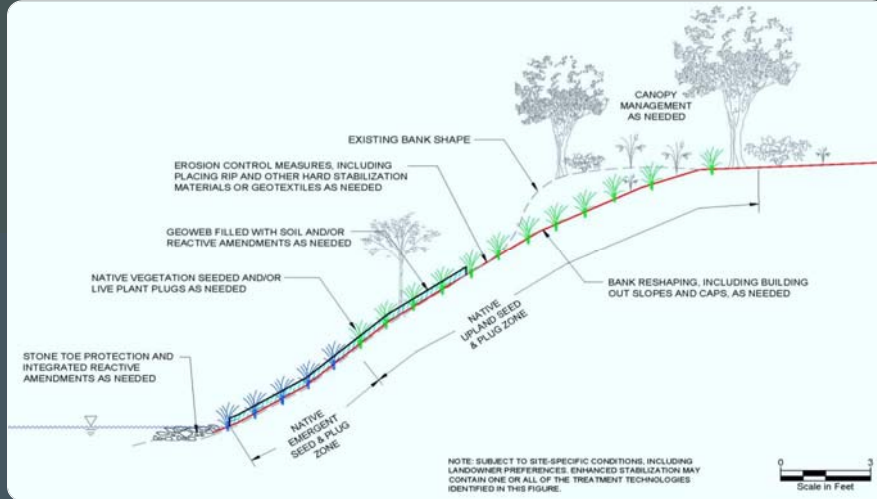
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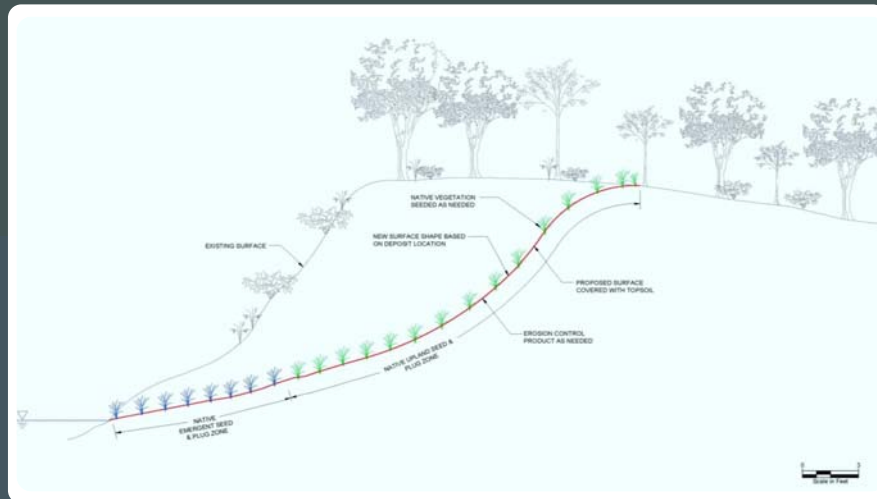
Structural Stabilization



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Removal and Disposal



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Pilot Bank Stabilization Project, RRM 0.1



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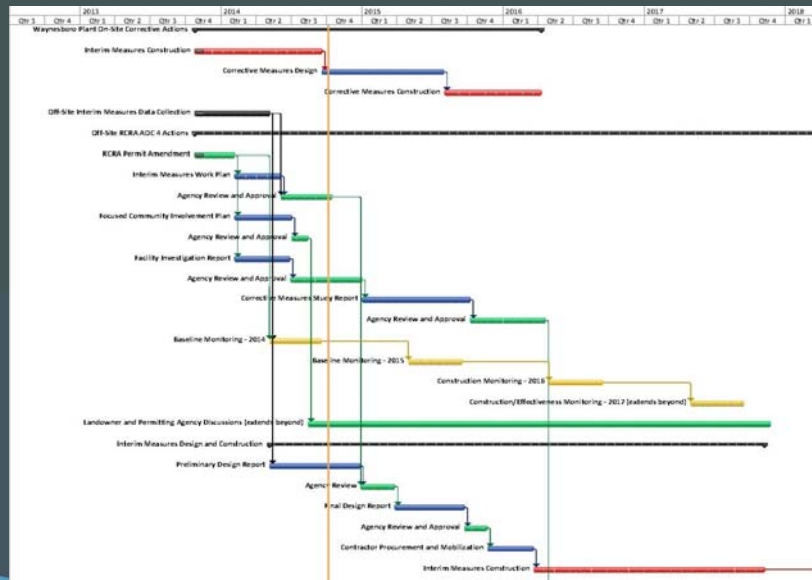
Enhanced Vegetative Stabilization (Tittabawassee River, Michigan; lower energy)



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Current Project Schedule



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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

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