

Advisory Panel & Group Discussion Questions

Will Clements

Colorado State University



Are the key elements (**monitoring, modeling & experimental**) in place to measure success and inform the adaptive management process?



Be ready to adapt to
changing conditions!

FINAL INTERIM MEASURES DESIGN, IMPLEMENTATION, AND MONITORING WORK PLAN PHASE 1 – SOUTH RIVER AREA OF CONCERN 4

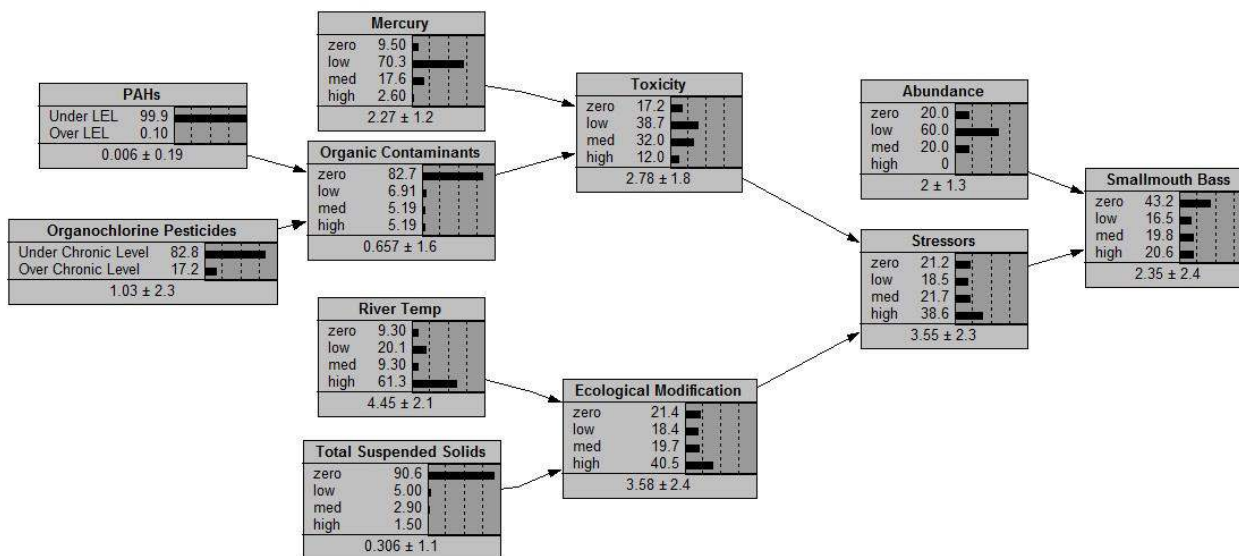
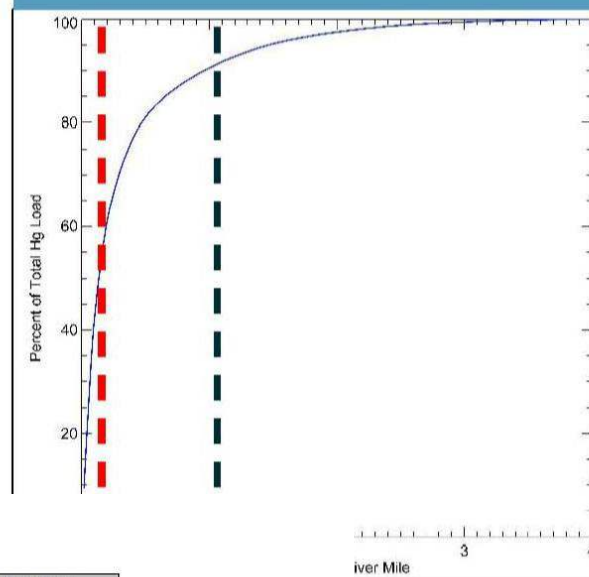
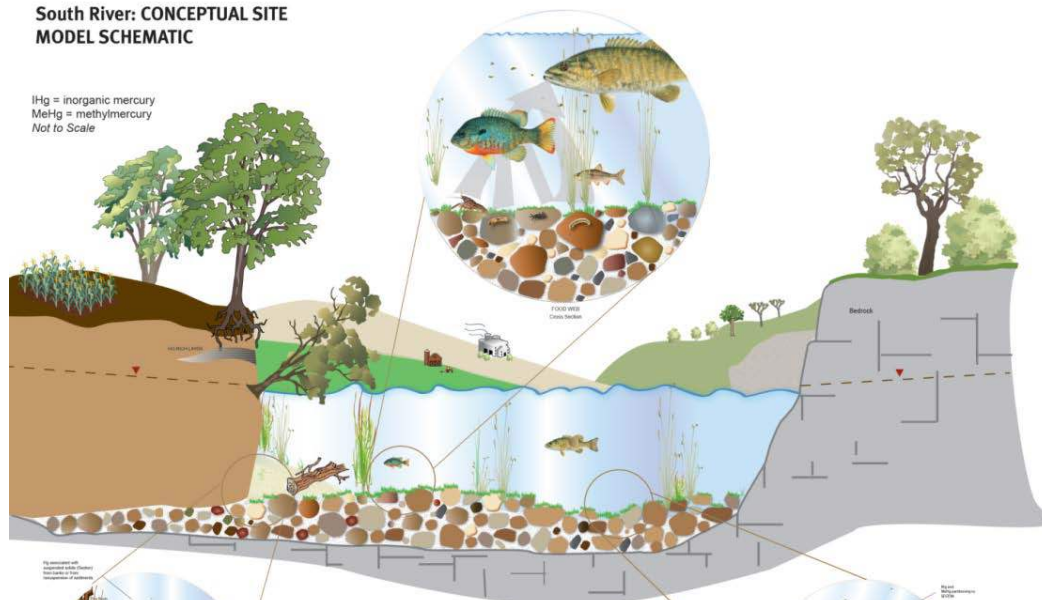
VIRGINIA DEQ
100-YEAR MERCURY MONITORING PLAN
SOUTH RIVER / SOUTH FORK SHENANDOAH RIVER

	1990	92	93	96	97	99	2002	05	07	12	17	22	27	32	37	42	47	52	57	62	67	72	77	82	87	92
FISH	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
SEDIMENTS					X				X		X		X		X		X		X		X		X		X	
WATER		X			X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
FLOOD PLAIN									X				X				X				X				X	
CONSULTANT*					X				X		X		X		X		X		X		X		X		X	

Prepared by
Anchor QEA, LLC
URS Corporation
E. I. du Pont de Nemours and Company
February 2015

983 pages!

IHg = inorganic mercury
MeHg = methylmercury
Not to Scale



How can we reduce the potential for unintended adverse effects to the ecosystem?



Animas River
August 10, 2015

What is unacceptable risk?



Ecotoxicological Effects of Activated Carbon Amendments on Macroinvertebrates in Nonpolluted and Polluted Sediments

D. Kupryianchyk,^{*,†} E. P. Reichman,[†] M. I. Rakowska,[‡] E. T. H. M. Peeters,[†] J. T. C. Grotenhuis,[‡] and A. A. Koelmans^{†,§}

Consistent finding: Negative effects of Biochar should be evaluated within the context of benefits associated with reduced contaminant bioavailability

Zürich, Switzerland

[†]Center for Applied Geoscience, University of Tübingen, Hölderlinstrasse 12

Biochar properties regarding to contaminants content and ecotoxicological assessment
Patryk Oleszczuk^{*}, Izabela Joško, Marcin Kuśmierz
Department of Environmental Chemistry, Faculty of Chemistry, 3 Maria Curie-Skłodowska Square, 20-031 Lublin, Poland

Biochar effects on soil biota – A review
Johannes Lehmann^{a,*}, Matthias C. Rillig^b, Janice Thies^a, Caroline A. Masiello^c,
William C. Hockaday^d, David Crowley^e

Ecotoxicological Effects of Activated Carbon Addition to Sediments
MICHEL T. O. JONKER^{*}, MARTIN P. W. SUIJKERBUIJK,
HEIKE SCHMITT, AND THEO L. SINNIGE
Institute for Risk Assessment Sciences, Utrecht University,
P.O. Box 80177, 3508 TD Utrecht, The Netherlands

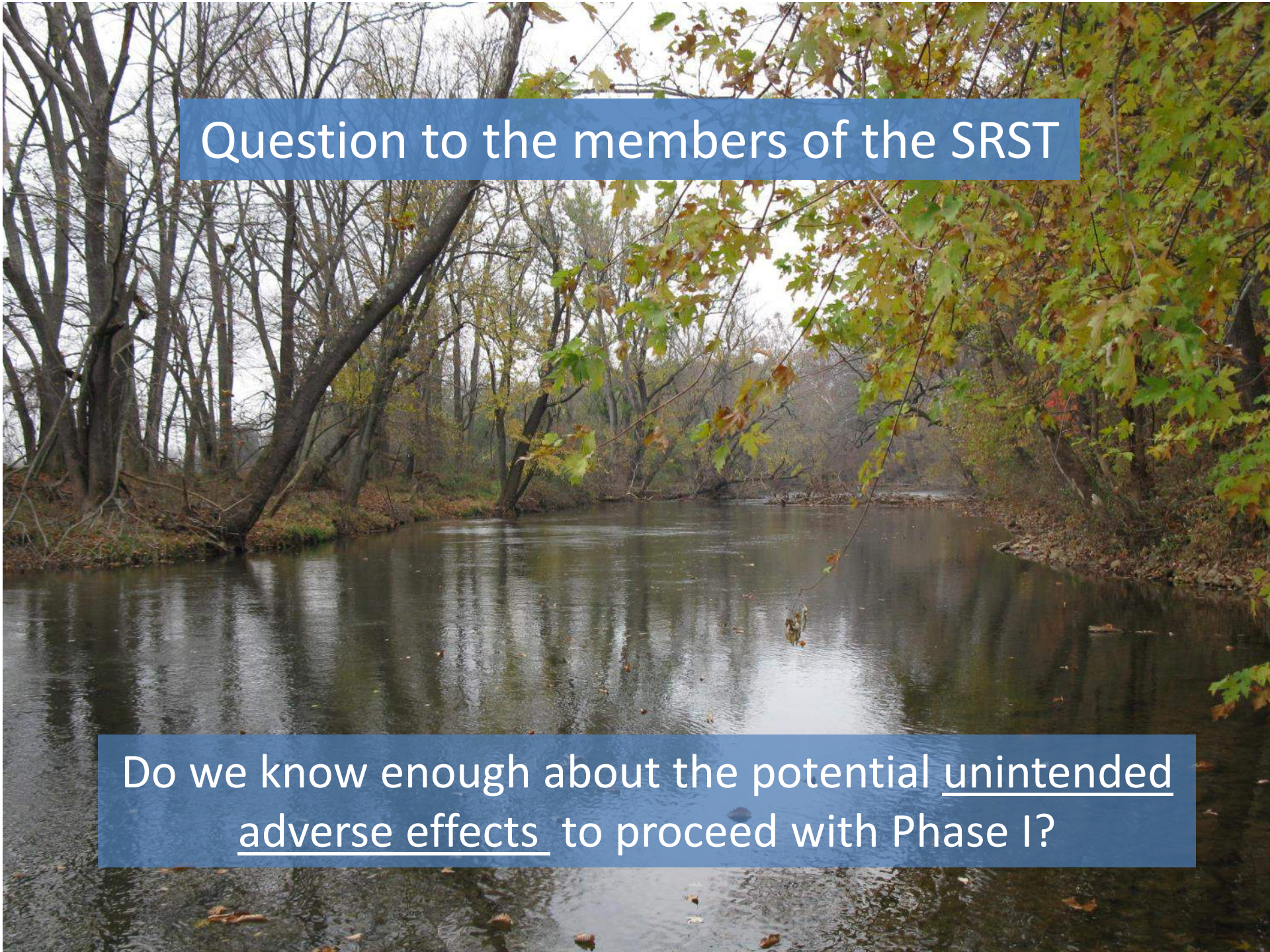
Environ. Sci. Technol. 2009, 43, 5969–5988

supported the remediation potential of AC addition, showing strongly reduced aqueous and bioaccumulation concentrations of PCBs, PAHs, and DDT upon the addition (5–13). Very recently, AC addition was applied *in situ*, and preliminary results indicated decreased bioaccumulation under field conditions as well (14). From a chemical point of view, AC addition therefore seems promising. Nevertheless, *in situ* application may have some cons. and several physical/chemical objections have been forwarded (15), including mobilization of highly contaminated light AC particles and their uptake into the aquatic food chain.



- Continue to integrate monitoring with experiments
Ex) Bank stabilization study; Bank leaching study
- Evaluate unintended adverse consequences with EAM





Question to the members of the SRST

Do we know enough about the potential unintended adverse effects to proceed with Phase I?