

South River Science Team

February 24, 2015

Minutes

This meeting was held as a webmeeting. All presentations can be found on the SRST web site <http://southriverscienceteam.org/>

Results of 2014 Poultry Study: Annette Guiseppi-Elie and Tim Bingman, DuPont

Due to DuPont restructuring, Annette will be leaving the SRST and is being replaced by Tim Bingman.

- Poultry study was completed in December. Analysis of all the samples is completed. All results are available except for blood and feather samples taken in December. Still processing results.
- Preliminary results to date:
 - Samples from floodplain had higher mercury concentrations than samples from outside floodplain and control samples.
 - Risk calculations indicate that egg and muscle consumption are acceptable.
 - Concentrations in eggs and muscle do not indicate a need to restrict consumption.
 - Risk calculations for gizzard and liver suggest need for further evaluation, however consumption of gizzard and liver acceptable to some degree.
 - See presentation for graphs and figures.

Pat McMurray (DEQ Risk Assessor) stated that results from this study need to be communicated properly.

Alex Barron (DEQ) stated that even though gizzards had higher concentrations of mercury, possibly suggesting a consumption limit, each chicken only has one gizzard and one would have to kill a lot of chickens in order to consume enough gizzards to cause concern. This scenario would be highly unlikely because most people would not have enough chickens to kill or would want to kill that many chickens in their family flock.

Floodplain Pilot Study: JR Flanders, AECOM

To test the effectiveness of carbon amendments on limiting mercury uptake by soil-dwelling ecological receptors and safety on terrestrial environment, several laboratory projects have been completed and more planned for the field. JR went over projects completed to date with results and plans for future.

Laboratory projects (Phase 1 Pilot) were completed in 2014 to assess the effects of biochar on:

- Mortality, growth, and reproduction of earthworms
- Seed germination and shoot production in plants
- And to evaluate the potential to reduce mercury uptake from floodplain soil by worms and plants.

Earthworm Results:

- No apparent biochar related adverse effects on adult mortality, growth or reproduction.
- Adult mortality in RRM 11.8 soils reduced to levels observed in background soil controls.
- Apparent biochar-related increases in growth of worms in RRM 11.8 soils.
- MeHg concentrations in juveniles are lower in biochar treatments.
- MeHg concentrations in soil appear to be lowered by biochar treatment.

Plant Results:

- No differences in emergence between the seedlings grown in the two controls.
- No biochar related adverse effects on emergence and growth of seedlings.
- Apparent biochar related increases in growth for wheat and radish.
- MeHg concentrations higher in RRM 11.8, but not different from controls.

Phase 2 study will take place in field using caged worms. This will test effects of flooding and precipitation. Focus will be on juvenile earthworms. See presentation for study design. Plan to deploy Spring 2015.

So far, studies indicate biochar was effective at limiting MeHg uptake by juvenile earthworms, and no negative effects were observed in either worms or plants.

Remedial Options Program Update: Nancy Grosso, DuPont

Nancy summarized ROPs activities for 2015:

- Design and Implement Phase 1 Interim Measures for SR AOC4 (Anchor QEA/AECOM): Preparing preliminary and final design for RRM 0 – 2.
- Enhanced Adaptive Management Model (Christy Foran, USACE): Complete spreadsheet model and training to help define and facilitate the ST adaptive management process.
- Dynamic Mercury Cycling Model (Reed Harris): Further refine the conceptual model and mass balance for Hg and MeHg in the aquatic environment under baseline flow and storm conditions.
- Reactive Capping Simulations (Danny Reible, Texas Tech U): Identify capping design element parameters through laboratory mesocosms and modeling.
- Characterization/Treatment of Sediment/Soil (Carol Ptacek, Waterloo): Characterize the leaching behavior of SR soil and sediment and test treatments that can be utilized in the South River.
- Aquanty HydroGeoSphere Modeling (Steve Berg, Aquanty): Estimate the post-storm volume of bank face seepage and GW flow to assist in bank stabilization design.
- Pore Water Measurements (Danny Reible, Texas Tech): Further explore use of the DGT probes and voltammetry to increase understanding of the bioavailable pool of mercury (methylmercury production) and geochemical processes in the South River.
- Floodplain Soil Amendment Pilot (JR Flanders, AECOM): Test the efficacy of biochar application in floodplain soils to reduce uptake of Hg or MeHg by biota.

- Biochar – impact on aquatic organisms through direct contact (Mike Newman, VIMS; Will Clements CSU): Laboratory and field mesocosm studies.
- Stable Isotope Analysis (Joe Blum, U Michigan): Explore stable Hg isotopes as a tool for forensics and Hg fate and transport.

Highlights from last ROPs meeting held Feb 18, 2015 include:

- Robert Brent - Can Biochar-containing structures effectively treat the SR water column?
 - Experiments indicate that biochar is an appropriate material for adsorbing mercury and remedial options that include biochar should continue to be investigated.
 - Improved design of biochar filled logs increased porosity and resulted in increased Hg sorption.
 - Water column treatment is possible if physical contact time can be balanced with the necessarily high flow volumes.
 - Treatment using in-stream adsorptive structures is possible, but the engineering feasibility would need to be examined more closely.
- Clay Patmont – Phase 1 interim measures Preliminary Design
 - Working on location specific bank designs tailored to specific bank characteristics such as Hg concentrations, erosion potential and existing habitat.
 - Trying to balance remedial objectives and landowner/stakeholder needs.
 - Ongoing discussions with the City and DGIF particularly about areas with mature stands of trees.
 - Considering how significant the loading is from a BMA, anticipated longevity of given tree and what vegetative enhancements will yield similar reductions in loading?
- Aquant's GW-SW HydroGeoSphere Model
 - Fully coupled GW flow and SW flow model
 - Use to characterize the importance of bank leaching and post storm GW
 - Model will estimate Seepage and GW flux for four storm recurrences.
 - Results will be used to refine Hg loading contribution associated with storms.
 - Initial results anticipated in April.
 - Could be used to design field program as indicated.
- Joel Blum - Naturally Occurring Stable Hg Isotopes
 - Relative abundance of mass dependent and mass independent fractionation can reveal Hg sources and transport and fate processes such as sorption/desorption and MeHg photochemical demethylation.
 - Isotopic analysis of solids in SR samples at numerous stations indicate mixing with regional background below RRM 10.
 - There is evidence that photochemical reduction and loss of Hg(0) is occurring within the suspended fraction.
 - Hg isotopes in the SW TSS, from the streambed sediments, bank soils and solids filtered from GW are all similar.
 - Next step is to analyze filtered SW and filtered GW.

Data Simulation/Monitoring: Ralph Stahl, DuPont

Ralph discussed the various models being used and how they will all interact with the Enhanced Adaptive Management Framework. Objects include the following:

- Describe how the various models in use for AOC 4 can be integrated in the Enhanced Adaptive Management Framework.
- Identify data inputs for various models to identify missing/inadequate data.
- Define goals, scope and construction of a simulated data set to test models.

See presentation to view diagrams of how different models will interact, pro's and con's, data inputs, etc.

RCRA Permit Status: Vince Maiden, VADEQ

Vince gave overview of RCRA and progress to date.

- RCRA Facility Investigation (RFI) submitted. Initial regulatory reviews have been completed and revisions have been received or are forthcoming.
- Interim Measures Work Plan (IMWP) for first two miles of river has been submitted. Initial DEQ review completed. Revised final version expected soon.
- Preliminary design work for Bank Management Areas (BMAs) has started.
- Community Involvement Plan was submitted to DEQ and has been approved. The Remediation Advisory Panel (RAP) call for in this plan meets for the first time this week.
- All approved final RCRA documents will be posted on the SRST webpage.

Communications and Outreach: Mike Liberati, DuPont

Mike went over activities since last meeting. DuPont held public meeting to present RCRA report review. Meeting was not well attended by public and they are looking for ways to increase participation. DuPont has held several meetings with the City and DGIF to discuss bank stabilization projects. The RCRA Community Involvement plan is posted on the SRST website. It includes maintaining SRST office in Waynesboro, keeping website up to date, posting of river advisories, meetings with landowners, holding public meetings, etc. Considering holding public information session in conjunction with Riverfest to increase public participation. Wednesday night will be first meeting of the Remediation Advisory Panel (RAP).

Wrap up, Future Meetings

SRST Meetings (at DEQ, Harrisonburg):

- May 12-13, 2015
- August 18-19, 2015
- October 21-22, 2015