

## South River Science Team

July 17, 2013

### Minutes

As with the past several meetings, this science team meeting was a half day meeting featuring mostly updates from SRST Task Teams.

#### SRST Task Team Updates

##### **Remedial Options: Robert Brent, JMU**

- Task Team Meeting Agenda
  - Reviews of Ongoing Work
    - Carol Ptacek – Characterization of Hg in SR sediments and assessment of treatment options
    - Danny Reible – Voltammetry and DGT probe work
    - Progress Updates on New Work
    - Robert Brent and Kip Mumaw – Mesocosm study of water column treatment techniques
    - Mike Newman – Biological assessment of potential amendments
    - J.R. Flanders – Floodplain bioavailability and treatment study
    - Olesya Lazareva – Biogeochemical dynamics of Hg in floodplain banks and alluvial groundwater
    - Remediation Proposal – Clay Patmont
  - Robert showed conceptual model and which pathways researchers were investigating.
  - Ptacek –Take Home Messages
    - Large amounts of Hg can be leached from SR soils/sediments
      - Important for conceptual model assumptions about loadings from banks
    - Leaching decreased over time, but could be restimulated by introduction of acid rain water
      - Important because rainwater leaching through the banks may be of much lower pH than river water
    - Different adsorptive media varied in treatment effectiveness and introduction of byproducts (nutrients, etc.)
      - Cowboy Charcoal (hardwood biochar) performed among the best
      - This has led to its use in other SRST studies
    - Biochar is very effective at removing leached Hg under saturated conditions
      - Important as a possible treatment technology
    - Removed Hg is tightly bound
      - Important to ensure that treatment technologies using biochar won't easily exchange Hg with water column

- Hg is bound in first several cm of column
    - Indicates high absorptive capacity or possibly thinner treatment layers needed in treatment applications
  - Biochar treatment was good under saturated and unsaturated conditions
    - Indicates flexibility in eventual applications
  - Leaching from low Hg soils/sediments is ~linear and still a potential Hg source to river
    - 10 ug/g soils produce ~ 200 ng/L aqueous concentration, more than an order of magnitude higher than water column concentrations
- Reible – Take Home Messages
  - In Wertman Pond amendment study, there were substantial reductions in pore water and biota Hg
    - Confounding factor of control reduction over time
    - Monitoring continues
  - Voltammetry indicates reduced conditions at shallow depths
    - Reduced Mn and Fe identified, but S below detection
  - Pore water Hg at base of bank was ~ 10x higher than previous measurements
    - Measurements were taken after large rain and flooding event
    - Flushing from banks?
    - MeHg was not elevated above previous measurements
    - Rich Landis stated this sample was actually taken in what would normally have been the river bank because of high water.
- Brent – Study Design
  - Experiment designed to test the effectiveness of treating the water column with biochar to remove Hg
  - Brent's group has designed 4 different raceway/mesocosm structures. The first uses river water that is directed through an absorptive filter while the other 3 contain structures similar (but on a smaller scale) to those used in instream restoration practices in which they have incorporated absorptive media. You can see pictures of structures on presentation.
- Newman – Study Design
  - Evaluated detrital processing (*H. azteca* feeding) and bioaccumulation in sediments amended with biochar and Sedimite.
  - Evaluated at 1 wk, 1.5, 3 and 6 mo.
  - 30 *H. azteca* per treatment
- Newman – Take Home Message
  - Detrital processing seems to be decreased in Sedimite amended treatments (not in biochar amendments)
- Flanders – Study Design
  - Three biochar concentrations: 0% (control), 5% and 10%
    - Cowboy charcoal

- Sieved to < 2 mm
    - Two THg concentrations (0.3 and 40 mg/kg)
    - Endpoints
      - Earthworms:
        - 4 weeks: weight change, mortality, [THg]adult and [MeHg]adult
        - 8 weeks: reproduction, [THg]offspring and [MeHg]offspring
      - Plants:
        - Shoot emergence
        - Shoot weight and height
        - Three species (minimum)
    - THg and MeHg in soil at beginning and end of experiment
    - Sequential extractions on soil
  - Lazareva – Study Design
    - Piezometers are to be constructed in pairs of shallow (flood bank deposits) and deep (coarse substrate), at distances from the stream of +2', +6' and +25', and at lateral distances of ~ 8-10' and 19' from a position +13' from the stream bank. This will enable monitoring of hydraulic response in both types of deposits and assessment of formation permeability from a) dampening in exposure with distance and b) delay in response with distance. Flow fields will be assessed by multiple pairs of triangulations.
    - There will be sampling of soil cores and groundwater
    - Continuous monitoring will record redox, soil moisture, temperature, level and conductivity
    - Results to date
      - Oxidic conditions at top 15 inches changing to anoxic with depth
      - Significant redox change from anoxic to oxidic conditions on Feb 27, March 12 and May 8 and June 10 corresponding to increased stream gauge height due to heavy rainfall
      - Potentially during storm, bank soils are under oxidic conditions due to stream and surface water influence and anoxic during the base flow due to groundwater dominated flow
  - Remediation Proposal (for submittal to NRDC)
    - Draft available
    - Contact Clay Patmont for access to draft
    - Comments due to Clay by August 9, 2013
- **Human Exposure: *Annette Guiseppi-Elie, DuPont***
  - Beef sampling results are in.
    - Results are well below level of concern, but are elevated compared to control samples.
    - Heart concentrations similar to muscle, but liver and kidney concentrations were higher in THg than muscle tissue.

- Controls were collected from supermarket and Polyface Farm and were mostly below detection limits.
  - Actual results will be shared at next meeting (after being QA'd).
  - Technical write up and fact sheets will be produced in near future as will fact sheet on wildlife work.
- We have path forward for milk sampling.
- Remediation Proposal for NRDC includes monitoring human health aspects. This may include the following:
  - More (frequency, miles surveyed, questions asked, etc) creel surveys.
  - Evaluating other organisms for sampling
  - Is there anything else that needs to be monitored?
  - Need to communicate risk to affect behavior.
    - How do we measure effectiveness?
      - Promotores record "health contacts".
      - Creel survey asks fishermen questions about consumption advisory (Do you know about the advisory? If yes, what does it say?).
      - VDH survey at local health departments.
      - Outreach to local physicians.
- Letters went out right after April meeting to landowners whose property and ponds were sampled in second round of floodplain sampling to communicate findings.

**Monitoring Task Team: *Ralph Stahl, DuPont***

- Remediation Proposal for NRDC includes both short and long term monitoring plans. DuPont is looking at other programs such as DEQ's 100 year monitoring plan and possibly other monitoring programs (state, feds, etc.) to see where data is already being collected that can be used in their monitoring so as not to duplicate efforts.
- Team is working on trying to create a "central repository" of all the data. Team needs to figure out what system is best to use. The following are a few options:
  - CEDs – This is the oracle-based system DEQ uses. It is not user friendly and will not communicate with other databases.
  - Equis – This is the system that EPA uses and is required for superfund sites.
  - Locus – similar to Equis and is what DuPont prefers using. It can communicate with Equis.
  - Also need to figure out who will "own" this central repository and where it will be located.
- Emails about Protocols
  - Pre-remedy- before actions
  - Talk to other folks/programs
- Goals – are the remedies working?
  - Information needs to be collected so that it can easily feed into the following:

- Enhanced Environmental Adaptive Management
  - Relative Risk Model
- Goals (slides)
  - 2<sup>nd</sup> slide – not just remediation proposal
- Objectives slide
  - Added terrestrial and human exposure
- Team will be having calls between now and October

**Program Integration Task Team – regulatory and legal drivers: *Mike Liberati, DuPont***

- SRST activities/research are being driven by many drivers that are all working independently but share a similar outcome which is remediation of the river. DuPont was looking for ways to bring all of this work together under one regulatory umbrella.
  - There are two administrative/regulatory options that can be sued for remediation of the plant site and river ((including banks and floodplain):
    - RCRA – already existing RCRA permit for plant site and RCRA has ability to follow pollution off site.
    - Superfund Alternative – Site is necessarily listed as “Superfund site”, however would basically follow same regulatory process.
  - The decision on which direction to follow has been made/agreed upon between Virginia DEQ, EPA and DuPont:
    - The remediation for the river will be handled under the existing RCRA Corrective Action permit (needs to be modified to include river).
    - EPA will continue to be lead agency on onsite work until remedy selection has been completed then will be handed over to DEQ for implementation.
    - DEQ will be lead agency for off-site RCRA CA program.
  - Next steps:
    - Assemble and integrate DEQ resources
    - RCRA CA permit needs to be modified to add off-site component
      - Completion of these tasks set for September.
    - Develop tasks, schedules, deliverables, required approvals to progress towards implementation of the river remediation program

**Outreach: *Mike Liberati, DuPont***

- Newsletter
  - Issue due in the next few weeks
  - Next issue to come out before Christmas. Looking for articles.
- SRST Office
  - Currently collaborating with WDDI (Waynesboro Downtown Development Inc) and Center for Coldwater Restoration by providing space in from of SRST office for demonstration trout hatchery/natural history museum.
- Website – [southriverscienceteam.org](http://southriverscienceteam.org)

- The site has been updated and improved. Give it a test drive.
- There is a link on site with Scott Gregory phone number. Make sure to call him if you are planning on visiting the office.
- The website is much easier to search now. All materials including publications, meeting presentations, minutes, etc are available on the site to anyone and you no longer need a login or password.
- Fact sheets
  - The fact sheets have become an important tool in communicating findings of the science team to the general public. We continue to develop new fact sheets when there is enough information on a subject to justify its creation. Fact sheets in development currently include beef and wildlife consumption.
- Promotores Program
  - The Promotores program has trained over 30 Hispanic/Spanish speaking people to be health advocates in their respective communities with additional training about the risk of mercury and the consumption advisories on fish in the South River and South Fork Shenandoah Rivers. Training has occurred in Harrisonburg and Waynesboro. Elkton will be the next area targeted.
  - Besides Spanish, Russian and Arabic are the two most spoken native languages of immigrants in the area. DuPont would like to take the Promotores model and use this to train Arabic-speaking people.
  - There have been major changes in personnel at the James Madison University Blue Ridge Area Health Education Center Promotores de Salud program. The Program Director, Susannah Lepley, has resigned and the Program Coordinator, Joanna Jenson, has also resigned. Both will be replaced and DuPont wants to keep working with the center.
- Terry Gooding is the new DuPont Resource Public Affairs person.
- DuPont has never formally developed a communications/outreach team and wants/needs to get this up and running. This team will be instrumental in outreach efforts to landowners whose property may/will be affected by remedial activities.
- Meetings/publications/etc. SRST members will be participating in the November SETAC meeting in Nashville. Ralph Stahl mentioned the desire to have a special South River session at the 2014 SETAC meeting in Edinburgh, Scotland.

**Status of Plant Site Investigation/Remediation: *Mike Liberati, DuPont***

- Railroad Avenue Interim Remedial Actions
  - Install Filtration Sumps
    - Bench testing of filtration media
    - Design
  - Abandon, Repair, Re-route Sewers
    - Smoke Testing
    - Utility, Topo Survey

- Cleaning, Slip-lining
  - Clean downstream PHS Sump
  - Removed large amount of debris from sewers
- Sewers are in bad shape, some are not needed anymore
- There was a delayed impact to the river after cleaning which included increase in Hg concentrations in both water column and clam tissue samples
  - Same has been seen at Oak Ridge Lab during their sewer clean outs
  - There will be more sewer cleaning at plant site and efforts will be made to capture any Hg before getting to the river.
  - DuPont was researching a filtration device, but company went out of business. In process of finding or engineering new device.
- Pump House Sump is very large and full of sediment.
- Schedule
  - Interim Measures
    - Filtration Sump Design, Installation July-Nov 2013
    - PHS cleanout IQ14
    - Sewer Work 1-2Q14
  - CMS Report 4Q13
  - Remedial Design 2014
  - Final Remediation 2015
- It was stated that cleanup work would take place during the winter to reduce exposure to Hg fumes.
- Outfall 011 not part of investigation due to demolishing work at old Nylon building and surrounding area. Hg concentration has been decreasing and Invista has had no toxicity issues and it was stated as to being a “mystery” why.

### **October Expert Panel Meeting**

- Dates for the meeting:
  - Oct 8: Task Team meetings
  - Oct 9: Full day Expert Panel Meeting
  - Oct 10: Half day Expert Panel Meeting
- Ralph Stahl took suggestions on ways to improve meeting and what kind of meeting members wanted.
  - If you want to make suggestions contact Ralph Stahl.
- For future events including meetings, seminars, events, etc relating to the SRST, mercury, South River, etc, please check the SRST website at [southriverscienceteam.org](http://southriverscienceteam.org). The website will be regularly updated with information about these events plus information on any new publications, technical memos, etc. Please contact Mike Liberati if you have any information you would like posted to the website.