

SOUTH RIVER SCIENCE TEAM
DEQ, Harrisonburg, VA
December 11, 2001

AGENDA ITEMS:

- Results of Spring 2001 Fish Sampling – Bill Van Wart
- 2002 Fish Sampling Plan – Bill Van Wart, Don Kain
- DEQ Ongoing Clean Metals Monitoring – Ted Turner
- 2002 Water Sampling Plan – Don, Ted
- Va Tech Study update – Ralph Stahl
- DuPont Site RFI Results - Mike Liberati / Mike Sherrier (lead geologist from URS Corp)
- Sediment Statistical Analysis - John Green
- Mud Map – Dick Jensen and Ted Turner
- Mercury in the Floodplain Soils / Vegetation, Previous Studies – Annette G-E
- Newsletter/Fact Sheets – Mike Liberati
- **Conference Call w/ Expert Panelists 1:00 pm - ???**
- Open Discussion, Action Items, Next Meeting

Meeting Summary

Welcome & Introductions. Don Kain opened the meeting. Self introductions of all attendees were made. An attendance list is included as Attachment 1.

Results of Spring 2001 Fish Sampling. Bill Van Wart presented the results of DEQ's fish monitoring from spring 2000. Slides are included in the Presentations folder. Stations of particular interest included South River near Hopeman Parkway in Waynesboro and 2 sites on the mainstem Shenandoah (below Warren Power Dam and at the Route 50/17 bridge). Mercury levels in harvestable smallmouth bass at Hopeman Parkway approached 2 ppm. Levels in the mainstem Shenandoah appear to be fairly consistent (between 0.5 and 1.0 ppm) from Front Royal to the VA/WV state line. All recent data have been posted on the DEQ web site at <http://www.deq.state.va.us/rivers/mercury.html>.

2002 Fish Sampling Plan. Don Kain informed the group that DEQ will be preparing a draft sampling plan for 2002 fish sampling prior to the next meeting of the Science Team. As a beginning framework, DEQ plans to sample at the "traditional" 14 stations (same as 1999 sites, identified on web site above) for the 3 "traditional" trophic groups. Suggestions for additional species or locations will be considered. Comments can be sent to Don before the next meeting or after the draft plan is shared with the Science Team at the February meeting.

DEQ Clean Metals Monitoring. Ted Turner provided an overview of DEQ's clean metals monitoring in the Shenandoah River basin. Under this program, total and dissolved mercury at levels as low as 1.5 parts per trillion are measured every other month at 10 stations. Data from the November 2001 South River sampling run are included in Ted's presentation located in the Presentations folder. The November sampling was notable, since it reflected river conditions at near record low flows. This sampling supports DEQ's ongoing mercury monitoring and provides useful data collection for TMDL efforts in the Shenandoah basin. DEQ plans to continue this sampling for at least a full year.

2002 Water Sampling Plan. As part of the long-term mercury monitoring program, and for comparison with historic data, DEQ will be developing a plan for water sampling during 2002. In the past the sampling has consisted of a single event at the 14 "traditional" stations. Don suggested that an expanded program might be appropriate, since the single-event sampling provides only a "snapshot" of mercury levels every few years, and does not provide enough information to determine whether factors such as flow, turbidity, and other environmental conditions affect mercury concentrations. Comments to address these concerns are encouraged.

Va Tech Study update. Ralph Stahl provided an update on the Virginia Tech fish food organism study. DuPont has accepted Dr. Tammy Newcomb's proposal and agreed to fund the work. Copies of the study plan are available electronically (see Ralph). Deliverables from this project will be to the Science Team. Dr. Newcomb will have a student coming on board in January. We hope to have Dr. Newcomb and her student join the Science Team for our February meeting to discuss details of the project. Phase I of the project will begin with field collections of fish in spring 2002, followed by identifications of food organisms. Phase II will occur in the second year and will involve collection of prey organisms and associated mercury analyses.

DuPont Site RFI Results. Mike Sherrier (lead geologist from URS Corp), presented the results of a recent environmental site assessment of the DuPont Waynesboro property. This work was conducted during the summer of 2000. This evaluation addressed geology, hydrogeology, and potential ground water pathways for the site. Details of Mike's slides are included in the Presentations folder. The objectives of the project were to confirm the nature and extent of soil and groundwater impacts, further characterize groundwater flow and quality, particularly in the portion of the site with karst geology, conduct surface water runoff sampling, and begin an annual groundwater monitoring program. Results indicated that the shallow "overburden" aquifer flows toward and discharges directly to the South River along the western boundary of the DuPont property, and to the karst aquifer in the NE portion of the property. A mercury flux model based on shallow aquifer mercury data and ground water movement did not appear to support the theory that large amounts of mercury are currently entering the river via this route. Recent South River water column mercury data indicate the possibility of a more diffuse source, which is resulting in substantial increases 1-2 miles downstream of the DuPont plant site. It is unclear whether the karst area underlying portions of the DuPont site may be a reservoir or transport mechanism for undefined mercury "pocket(s)" or off-site disposal areas. The team suggested that more work may be needed in this area, including further investigation into the karst aquifer and its quality and movement, along with the possibility of intensely surveying the river and working "backwards" from areas where sharp increases in mercury levels are found. Questions regarding a former landfill site were also raised, and DuPont staff agreed to look into this issue.

South River Mud Map. Dick Jensen presented information on the ongoing “mud mapping” effort in South River. The project has successfully located, mapped, and cataloged a number of different sediment and riparian areas for use by those who are interested in the river. This project has resulted in the development of a “virtual river tour,” allowing the user of the final report to view maps, photographs, and narrative descriptions of the entire river length from Waynesboro to Port Republic. The final report will function much like a web site, with links and thumbnails to detailed information. Dick presented a very impressive prototype of the interactive report at the meeting. Slides from Dick’s presentation are included in Attachment 2.

Sediment Statistical Analysis. John Green presented a statistical summary of historic sediment data for the South River study area (see Presentations folder). There appeared to be good correlation between mercury levels in fish and those found in sediment samples. The areas of the river most highly contaminated with mercury (Dooms, Crimora, and Grottoes) were reflected in both the fish tissue and sediment data. John recommended that the more highly contaminated areas be the primary focus of future sediment sampling. There is still some question whether we have located and provided all available sediment data to John. DEQ will see if any additional results can be found.

Mercury in the Floodplain Soils / Vegetation, Previous Studies. – Annette Guiseppi-Elie presented an overview summary of previous studies and information related to mercury in the floodplain soils (Presentations folder). Her presentation recapped the findings of studies by the State Water Control Board, Lawler Matusky & Skelly, and James Madison University and included conclusions by the Virginia Departments of Agriculture and Health that direct risks from contaminated soils were negligible. Annette also shared conclusions from the USEPA biosolids “503” rule, indicating that uptake and transfer of mercury from soil to plants was not expected to be a problem. Ralph Stahl suggested development of a map outlining floodplain Hg levels, old landfill sites, previously sampled locations, mud areas, wetlands, etc. Annette suggested that we revisit issues such as mercury transferred through grazing animals to meat and milk and to consumers of crops grown on the floodplain.

Conference Call w/ Expert Panelists. During the afternoon, a conference call between meeting attendees and our expert panelists took place. Panelists included Betsy Henry (for Gary Bigham), Ralph Turner, Rob Mason, and Mike Newman. Several topics were discussed.

- Sediment Collection Issues. Concern was expressed by team members over how to effectively collect fine sediment particles in a riverbed consisting largely of bedrock, cobble, and sand, with few fine-grained depositional areas. Ralph Turner suggested the use of a bilge pump and screen, then letting fines settle in a container. It was noted that it would be useful to compare “muds” from gravel-bottom areas to those found in depositional areas.
- Water Sampling Issues. DEQ is planning to conduct “routine” water sampling for mercury in 2002, as outlined in the 100-year sampling plan developed in the 1980s. The panel members were asked for input, using the previous single-sample snapshots for total mercury at the 14 traditional sites as a starting point. Panel members suggested the sampling plan address gradients across the river, along with the influence of springs and tributaries. Betsy Henry pointed out that seasonal variations in mercury levels can be expected. Sampling during a low-flow period was recommended, since storm flows may confuse data. Sampling within 72 hours of a storm was discouraged. The panel was asked if sampling for methyl mercury in the water column was necessary, since cost was high relative to total mercury. Ralph Turner suggested that methyl mercury data may be quite useful in modeling. In his work at Oak Ridge, methyl mercury was sampled at a subset of stations, and these were rotated to ensure adequate coverage. Dick Jensen asked about using water data to “tease out” an ongoing source, particularly from a spring or seep. The use of a thermal probe to identify these sites was mentioned. Ralph Turner noted that the karst area underlying DuPont and other local areas near DuPont should be further explored. He also noted that, depending on how the mercury was generated or if it was associated with specific chemical processes (example, acetic acid distillation), it may be possible to identify a chemical linked with mercury as a “marker,” which could be helpful in sampling and source identification. Sulfate, anions, and cations were also noted as constituents which may influence mercury and its response to different ambient waters.
- Hypotheses. Ralph Turner recommended that the Science Team develop hypotheses and put them to paper, then set up sampling, where necessary, to test these hypotheses. Ralph Stahl agreed to proceed with this.

Newsletter/Fact Sheets. Mike Liberati presented a proposal that the Science Team produce a periodic newsletter or series of fact sheets to document and communicate the work of the Science Team and other researchers. DuPont will be willing to provide technical writing staff to assist in development and production of these reports. There was consensus that this would be a good way to communicate with the citizens and officials in the community. Paul Bugas suggested we develop a distribution list of local organizations, officials, and other potentially interested parties. Mike agreed to head a task group for newsletter development and will set up a January conference call with the members of the group. Preliminary members include Mike Liberati, Paul Bugas, Bob Luce, Doug Larsen, Don Kain, and, if available, Mike Newman.

SOUTH RIVER SCIENCE TEAM
Dec 11, 2001, Page 4 of 9

Next Meeting. The next meeting of the Science Team was set for February 5, 2002 at the DEQ Harrisonburg office.

Action Items between now and Next Meeting.

- DEQ to develop final fish tissue sampling plan for 2002.
- DEQ to develop draft plan for 2002 “routine” water sampling for comparison to historic data.
- Ralph Stahl to invite Tammy Newcomb and student to next meeting for status/update/plan.
- DuPont to look into mercury “source” issues/questions (old landfill site, etc.).
- Dick Jensen to proceed with finalizing mud map report / virtual river tour.
- DEQ to scour files to see if there may be additional sediment data beyond that already shared with John Green.
- Ralph Stahl to develop list of hypotheses, as recommended by Ralph Turner during conference call.
- Mike Liberati to set up January conference call for newsletter task group.

Attachment 1
Meeting Attendees

<u>Name</u>	<u>Organization</u>	<u>Phone No.</u>	<u>E-Mail Address</u>
Bill Van Wart	DEQ	540-574-7861	Bvwart@deq.state.va.us
Don Kain	DEQ	540-574-7815	dgkain@deq.state.va.us
Sandra Mueller	DEQ	540-574-7848	stmueller@deq.state.va.us
Bob Luce	Friends of Shenandoah	703-860-3795	Lucerw@erols.com
Mike Liberati	DuPont	302-892-7421	michael.r.liberati@usa.dupont.com
Larry Mohn	VDGIF	540-234-9360	lmohn@dgif.state.va.us
Paul Bugas	VDGIF	540-248-9360	pbugas@dgif.state.va.us
Stephen Reeser	VDGIF	540-248-9360	sreeser@dgif.state.va.us
Doug Larsen	VDH	540-332-7712	dlarsen@vdh.va.us
Bill VanWart	DEQ	540-574-7861	Wjvanwart@deq.state.va.us
Ralph Stahl	DuPont	302-892-1369	ralph.g.stahl-jr@usa.dupont.com
Kelly Vanover	VDH	540-722-3480	kvanover@vdh.state.va.us
John W. Green	DuPont	302-366-5310	john.w.green@usa.dupont.com
Allex Barron	DEQ	804-698-4119	ambarron@deq.state.va.us
Robert Hoke	DuPont	302-451-4566	robert.a.hoke@usa.dupont.com
Khizar Wasti	VDH	804-786-1763	kwasti@vdh.state.va.us
Allen Gutshall	VDH	540-332-7830 ext. 38	agutshall@vdh.state.va.us
Dick Jensen	DuPont	302-547-6286	richard.h.jensen@usa.dupont.com
Annette Guiseppi-Elie	DuPont	804-383-4584	annette.guiseppi-elie@usa.dupont.com
Ted Turner	DEQ	540-574-7858	rturner@deq.state.va.us
Brenda Kennell	DuPont	540-946-1320	brenda.l.kennell@usa.dupont.com

Attachment 2: Mud Map – Dick Jensen

South River Mud Mapping

Participants

August Order of the Shenandoah Paddle

- Annette Guiseppi-Elie, DuPont
- Don Kain, VA-DEQ
- Ted Turner, VA-DEQ
- Larry Carpenter, VA-DEQ
- Dick Jensen

MeHg areas/causes??

- External, ongoing source/water column
- **Muddy accumulation areas**
 - Mud mapping in anticipation this could be significant accumulation/methylation - and limited in area/volume
- **Wetlands (dry/wet cycling areas)**
- River banks
- Sand/gravel/moss on/between cobbles
- Loose fluff on all surfaces
- Floodplains - slow return/cycling to/from main channel

Purposes of Mud/Wetland Mapping

- Verify general nature of river and bottom
- Then by difference...
- Map locations of heavy mud deposits
- Map locations of wetlands (wet/dry cycling)
- **Identify candidate locations for sampling, testing, other investigations**
- More thorough photo survey

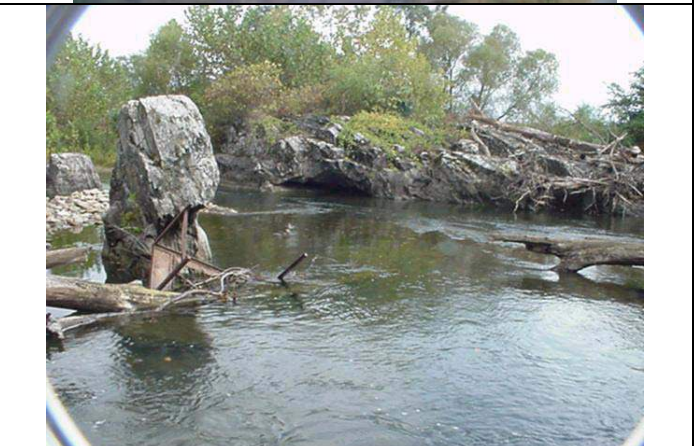
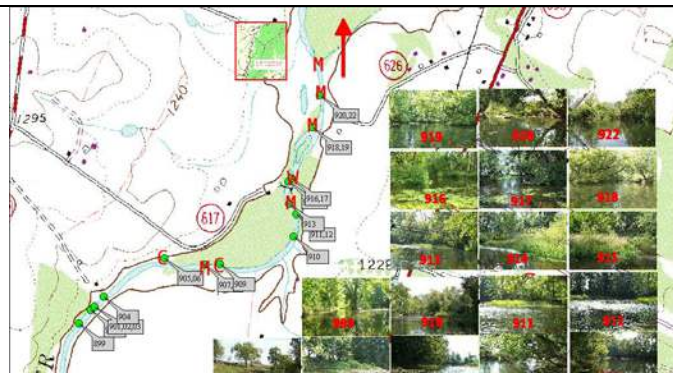
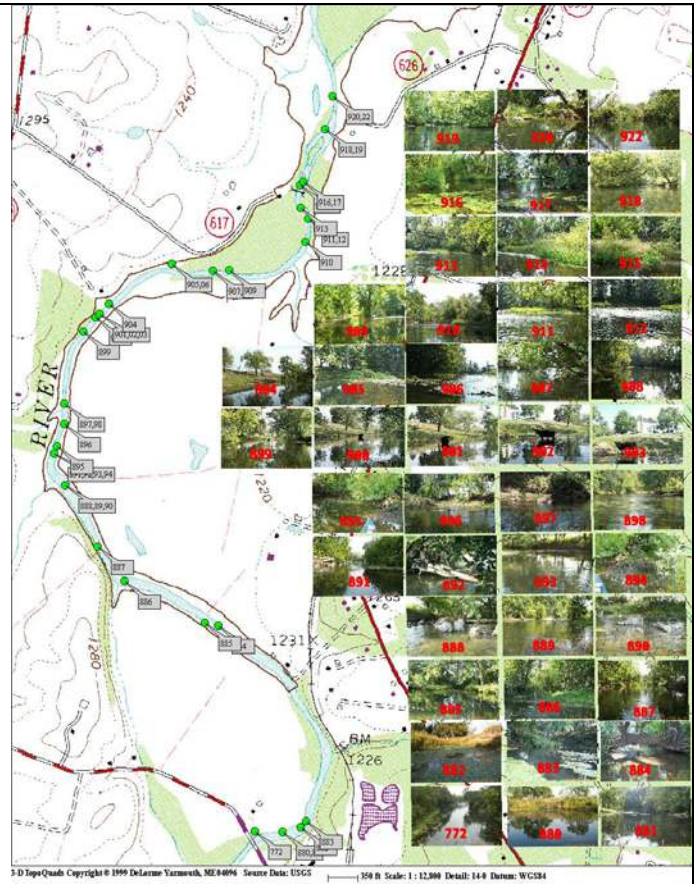
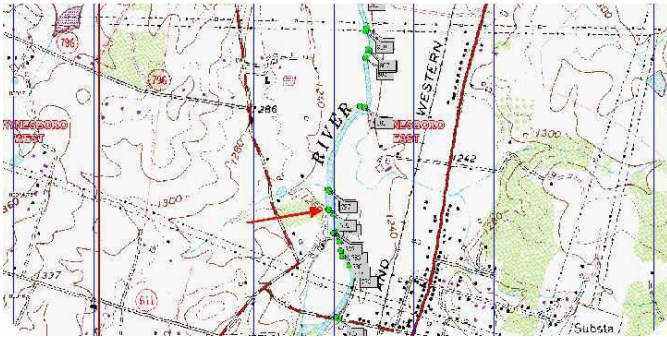
Methodology

- GPS - Lat/Long and time stamp
- Digital camera with Date/Time stamp
- Bottom Probing - time stamped results
- Micro-cassette recorder - waypoint/time stamp
- Report: Narrative, maps, photos

South River Mud Map



Return of Mill Race Near Dooms







Preliminary Findings

South River

- 95+% of river bottom cobble or bedrock
 - Ample/varying amounts of sand/gravel
 - Leaf accumulations - seasonal
 - Muddy “fluff” over all surfaces (low water)
 - Well oxygenated
- Rock/soil banks
- Some tribs/mill races/cutbacks have muddy, organic, sulfury sediments (mapped)
- Mud accumulations behind islands, in wetlands (mapped)
- Deep areas have hard bottoms

Additional Findings

- Don’t bet on the topo quads!
- Heavy construction areas
- Agricultural areas/damage
- Island/tributary documentation
- Other...

Recommended Locations

very tentative!!

- Heavy, sulfurous mud accumulations
 - River right, 500-750 ft above Dooms Dam
 - N38 10.5741 W078 51.1660, pocket by old footbridge below Crimora
 - N38 17.1942 W078 49.7562, pocket behind island below Grottoes, above Port Republic
- Wetlands
 - River right, 500-750 ft above Dooms Dam, beside major mud accumulation

Mud Map Report

- Written Report - ~10-12 copies
- CD-ROM
 - Written report in .pdf format
 - Interactive topo map with all photos and observations
 - Tables of data/observations, etc.
 - Tables of earlier LMS study