

Progress Update on 2009 South River Biota Projects

SRST Meeting July 21, 2009

A. Condon, USFWS

E. E. Mack, DuPont

Projects for 2009

- Avians (3)
 - Cristol, Folsom/Evers (BRI), FWS
- Fur-bearing mammals (1)
 - Yates/Evers (BRI)
- Amphibians & Reptiles (2)
 - Hopkins
- Trophic Modeling (1)
 - Newman

Avians

Dan Cristol, College of William & Mary

Mercury Dosing Study

- Proposed:
 - Determine sublethal effects level for songbirds fed a constant low-dose of mercury (realistic conditions)
 - Mortality, reproductive impairments, immune suppression, endocrine disruption, neurological damage, behavioral abnormalities



Mercury Dosing Study Progress

- Aviaries built (except drainage, more wren cages)
- Working with engineers to deal with waste disposal
- Aviaries under construction now
- Starlings (88) and Zebra Finches (40) are in aviary
- Wrens will be captured after breeding season, acquiring Federal permits
- Post-doc began July 6
- Dietary doses to begin once drainage is approved

Avians

Dave Evers/Sarah Folsom, Biodiversity Research Inst.

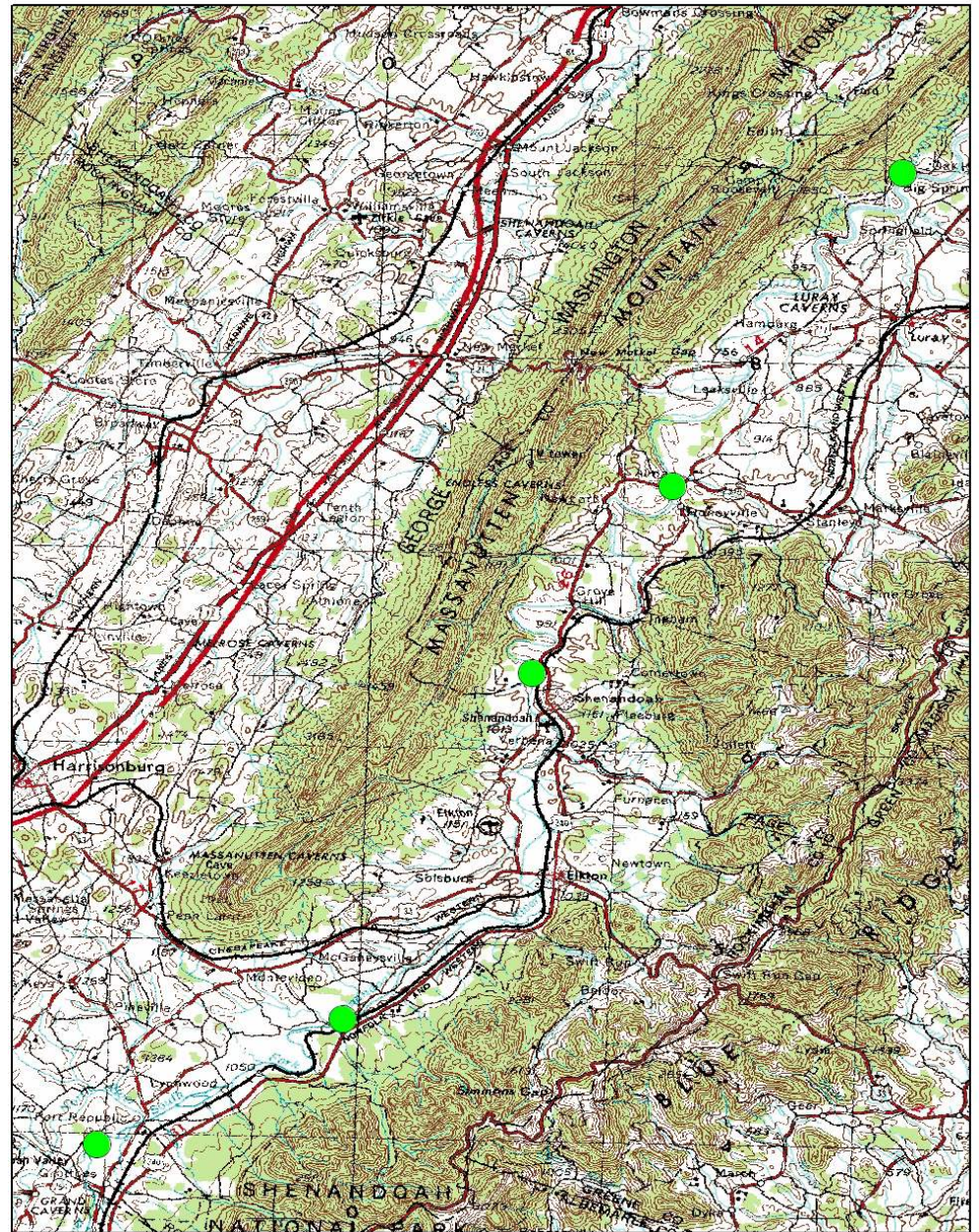
Spatial trends of Mercury in Songbirds

- Proposed:
 - Determine geographic extent of mercury contamination downstream in South Fork Shenandoah River (in Songbirds)



Spatial Trend Study Progress

- 1 reference site (Waynesboro Nursery), 5 downstream sites
- May 18 – July 10
- Mercury is being analyzed at WM in July/August



COMMON SPECIES SAMPLED:

- Carolina Wren (80)
- Song Sparrow (72)
- Red-eyed Vireo (51)
- Carolina Chickadee (24)
- Indigo Bunting (54)
- Eastern Tufted Titmouse (18)
- Northern Cardinal (53)
- Gray Catbird (59)
- American Goldfinch (24)



Results

<i>Site Name- Approx. River Mile*</i>	<i>Tier 1</i>	<i>Tier 2</i>	<i>Tier 3</i>	<i>Other</i>	<i>Total</i>
Bealers Ferry (SFSR)- RM63	32	12	6	16	66
Shuller Island (SFSR)- RM20	30	10	10	11	61
Longs Bend Farm (SFSR)- RM30	31	18	17	40	106
Power Dam (SFSR)- RM7	37	15	6	26	84
Grottoes City Park (SR)	32	29	4	27	92
Ridgeview Park (SR-Reference)	11	6	6	4	27
Waynesboro Nursery (SR-Reference)	29	13	46	25	113
Grand Total	202	103	95	149	549

***Approximate river mile (RM) from the confluence of the South River (SR) and the South Fork of the Shenandoah River (SFSR)**

Avians

USFWS

Carolina Wren Reproductive Success

- Proposed:
 - Monitor Carolina Wren nests
 - Collect data on clutch initiation date, number of eggs, number of nestlings hatched, number of fledglings, mercury levels of adult(s), nestlings
 - Nest box cameras (supplement dosing study)



Carolina Wren Nest Success Study Progress

- Nest boxes monitored
 - 210 reference, 175 contaminated
 - Began box checks April 7, will continue to mid-August

	# nests	# failed (eggs or nestlings)	# fledged (all or some)	# still active
Reference	10	5	3	2
Contaminated	15	10	5	0

- 19+ Adult blood/feather samples collected
- Analyzed July-August



BIRDCAM 01

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BIRDCAM 01

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Bats

Dave Evers/Dave Yates, BRI

Spatial trends of Mercury in Bats

- Proposed:
 - Use radio telemetry to establish distance bats are travelling from South River (RM 10-20)
 - Determine geographic extent of mercury contamination downstream in South Fork Shenandoah River (in bats; 5 subreaches)



Spatial trends of Mercury in Bats

- Progress:
 - Started June 1
 - Tracking June 1-mid July
 - Started mist-netting downriver July 15
 - 5 sites
 - Will continue to August 15

Spatial trends of Mercury in Bats

- Results
 - 5 new maternity roosts
 - 25 bats with transmitters (table next slide)
 - 1st site downstream complete ~40 bats captured

Spatial trends of Mercury in Bats

Capture Location/Species	Little Brown	Eastern Pipistrelle
AFC	2	2
Craige Barn	4	0
Freeds	2	3
Grottoes Park	2	3
Port Republic	5	0
Renkin	3	0

Amphibians & Reptiles

Bill Hopkins, Virginia Tech

Mercury Effects in Snapping Turtles and American Toads

- Proposed:
 - Turtles (pilot study):
 - Effects of mercury on reproduction
 - Samples for trophic models
 - Determine mercury levels in edible tissues
 - Toads:
 - Determine relative importance of trophically derived vs. maternally derived mercury on toad success
 - Larval → metamorphosis
 - Survival and growth of post-metamorphic Juveniles



Amphibians & Reptiles

- Progress -1:
 - Reptiles:
 - Snapping Turtles
 - Tissue collections completed in June, samples will be analyzed in August
 - New graduate student on board in August



Amphibians & Reptiles

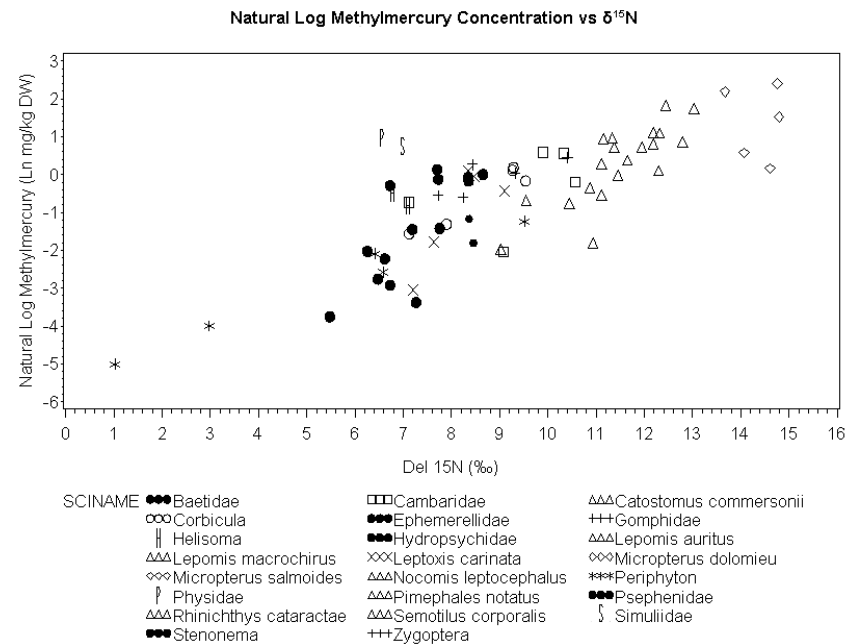


- Progress-2:
 - Amphibian Studies (American Toad)
 - Mesocosms (3,200 tadpoles)
 - Hatchlings +/- maternal Hg X +/- predators (dragonfly larvae).
 - Currently wrapping up expt, looking at survival, time to metamorphosis and size at metamorphosis
 - Diet I (150 tadpoles held individually)
 - Hatchlings +/- maternal Hg X control, low, or high Hg diet
 - Tadpole locomotory performance data (speed and responsiveness) has been collected
 - Currently in middle of metamorphosis, once complete toadlet locomotory performance (hopping distance, speed, and responsiveness will be evaluated.
 - Diet II (1,800 tadpoles held communally)
 - Hatchlings +/- maternal Hg X control, low, or high Hg diet
 - Currently wrapping up and analyzing data on metamorphosis and survival.
 - Individuals are either entered into terrestrial enclosure expt, performance studies (hopping distance and prey capture efficiency) or euthanized for Hg analysis
 - Terrestrial Enclosures (288 toadlets)
 - Toadlets +/- Maternal Hg X control or High Hg diet
 - Toads have been marked and placed in pens. Will conduct a census shortly and at regular intervals through next year to track growth and survival

Trophic Modeling

Mike Newman (VIMS)

- Proposed:
 - Develop preliminary floodplain trophic models
 - Apply existing aquatic models to remediation scenarios
 - Explore effects of phase II manipulations on mercury in periphyton, settling fine solids, and 1^o consumers



Trophic Modeling

- Progress:
 - Completed collections for initial terrestrial food-web analysis
 - Great help from BRI & USFW
 - Detritivores → rodents & song-birds → Screech Owls
 - Will explore current BRI samples for additional avian samples
 - Completed collections for additional aquatic insects at different life stages
 - Great help from URS
 - Additional collections planned for August
 - Samples are in prep for stable isotope and Hg analyses