

# Update on Biota Studies

South River Science Team Meeting  
January 12, 2010

E. E. Mack, DuPont

# BioSummit V

- Held December 9, 2009 at Virginia Inst. Marine Sciences
- Review and discussion of results from 2009 projects
- Introduction and discussion of proposed work for 2010

# Projects for 2010

- **Avians**
  - Cristol – Laboratory dosing study (Ongoing)
  - Folsom, Evers, Schmerfeld, Condon – Wren reproductive study (Proposed)
- **Bats and Furbearers**
  - Yates, Evers, Kunz, Moore, Basu - Bats (Proposed)
  - Yates, Evers - Mink and Otter (Proposed)
- **Amphibians and Reptiles**
  - Hopkins – Snapping turtle reproductive study (Ongoing)
  - Hopkins - Wind up of Toad study (Ongoing)
- **Trophic Modeling**
  - Newman (Proposed)
    - Floodplain Biomagnification and Probabilistic Exposure Modeling
    - Support of URS Phase II Studies: Modeling Bioaccumulation by Aquatic Invertebrates and Assessing Prediction Accuracy for Bass Bioaccumulation

# Laboratory Dosing Study

*Dan Cristol, College of William and Mary*

- **Objective:** Determine physiological effects in song birds of dietary mercury exposure at levels found in the South River.
- **Progress:**
  - Aviary renovations complete
  - Initial dosing in progress for zebra finches and starlings
  - Selection of final target blood levels in progress

# **Wren Reproductive Success Study (Proposed)**

*David Evers and Sarah Folsom, Biodiversity Research Institute*

*John Schmerfeld and Anne Condon, U.S. Fish and Wildlife Service*

- **Objective:** Determine reproductive success of wild wrens in the South River floodplain relative to mercury exposure.
- **Proposed for 2010**
  - Increase sample sizes and quality of data by monitoring territories
  - Use radio telemetry to delineate territories and to find nests
  - Use cameras near nests to document causes of nest failure
  - Add and/or move nest boxes to promising wren territories

# Bats (Proposed)

*David Yates and David Evers, Biodiversity Research Institute*

*Thomas Kunz and Marianne Moore, Boston University*

*Nil Basu, University of Michigan*

- **Objective:** Determine effects (physiological, behavioral, reproductive) of mercury exposure in South River bats
- **Proposed for 2010:**
  - Juveniles
    - Flight behavior
    - Echolocation
  - Juvenile, lactating and post-lactating females
    - Flight maneuverability through obstacle path
  - Immune response
    - Innate and adaptive responses
  - Neurochemical biomarkers
    - Quantify 8 biochemical markers in brains

# Mink and Otter

*David Yates and David Evers, Biodiversity Research Institute*

- **Objective:** Determine exposure and effects of mercury in South River fur bearers.
- **Proposed for 2010**
  - Mink and otter home range study:
    - On South River trap mink and otter, sample for mercury, and equip with radio transmitter
    - Release and monitor to determine home range
    - Retrap for additional mercury testing
  - Mink and otter relocation and mercury exposure
    - On other Virginia rivers, trap mink and otter, sample for mercury and equip with radio transmitter
    - Release and monitor
    - Retrap for additional mercury testing

# Trophic Modeling Studies

*Mike Newman, Virginia Institute Marine Studies*

- **Objective:** Develop trophic transfer models for mercury in South River aquatic and terrestrial environments and apply to predict effects of remedial strategies
- **Proposed for 2010**
  - Expand coverage of floodplain trophic transfer modeling (add sites)
  - Prepare Probabilistic exposure assessment for floodplain avians
    - Will require expert elicitation for information on bird diet and consumption rates
  - Synthesis report to integrate south River biota data (many sources) into framework of trophic transfer models
  - Support Phase II Ecostudy Activities:
    - Invertebrate bioaccumulation modeling
    - Integrate 2010 Bass study results into trophic model by comparing bass results with model predictions