

Transplanted Clam Studies

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Background: Recent studies of *Corbicula*, a non-native freshwater clam, have shown that this organism acts as a reliable biomonitor for mercury concentrations in the South River (Graber-Neufeld, 2001; Bowles and Benzing, 2003; Benzing and Graber-Neufeld, 2004.) Taken together, these studies indicate that source areas continue to exist in a 5-mile reach of the river beginning at the plant site in Waynesboro. In particular, clam tissue concentrations increased at Constitution Park, at a point just upstream from Bridge Street, and at a point just upstream from the Dooms mill pond. So far, all studies have relied on wild (i.e. stream-bred) clams that were sampled directly from the river channel.

Summary of Results: Pilot Study & Monthly Sampling

A preliminary study was initiated in November 2003 to establish both the methodology for transplanting clams in the river, and the minimum time needed for clams to accumulate tissue mercury. Two groups of *Corbicula* were moved into mesh cages: 1) “Transplant” clams were taken from a clean (North River) site and moved to the South River at the Augusta Forestry Center (AFC), and 2) “Control” clams from AFC were caged and placed adjacent to the cages containing transplanted clams. Monthly sampling from cages continued through August 2004. Major conclusions from this section of the study include:

- Clams appeared to be unaffected by caging. Survival of clams was excellent until mid-summer (June-July), when both caged and uncaged clams showed increased mortality. There was no difference in mercury levels of control clams that were caged vs uncaged.
- Mercury turnover in clams is relatively rapid. “Clean” clams moved to a contaminated site accumulated the majority of their mercury within one month, and major seasonal changes in clam mercury levels occurred within a matter of several weeks.
- Despite nine months exposure to contaminated conditions, clams from the “clean” site never reached levels of mercury as high as those of clams taken from the contaminated site.
- Clams from the August collection had a higher percentage of methylmercury (50-60%) than those from the March collection (25-30%).

Summary of Results: Transplant Study on Plant Reaches

During Summer 2004, 20 groups of *Corbicula* were transplanted from North River to cages along the Dupont plant boundary in both South River and Jones Hollow. These cages were placed at 100-meter intervals in the river channel, collected after 3 months of exposure, and analyzed for total mercury and methylmercury in tissue. The caged clams showed good survival and growth during the exposure period, and the cages themselves had not moved significantly from the locations in which they were placed.

In South River, tissue concentrations increased significantly within a reach located 400-600 meters below the Wayne Avenue bridge. These increases occurred primarily in the non-methyl fraction and suggest the presence of a mercury source in the river channel at this point.

In Jones Hollow, tissue concentrations were higher than background levels and increased near the confluence with South River. The Jones Hollow clams also showed higher methylmercury concentrations that suggest a difference in methylation rates in the two river systems.