**HRES BIVALVE METADATA**

**Explanation of “Hudson River bivalve densities”**

The data in this file are population densities of native pearly mussels (three species of Unionidae) and alien dreissenid mussels (two species: the zebra mussel *Dreissena polymorpha* and the quagga mussel *Dreissena rostriformis bugensis*) in the freshwater tidal Hudson River, New York. Population densities are areally weighted, so they give the average density over the entire study area.

The study area is the freshwater tidal Hudson River, extending from river kilometer 99 near Newburgh to river kilometer 247 at the Troy dam (river kilometers are measured from The Battery at the southern tip of Manhattan in New York City).

Methods for sampling and analysis are described in detail in the following papers, which also present and discuss many of the results.

Strayer, D.L. Hunter, D.C., Smith, L.C., and C. Borg. 1994. Distribution, abundance, and role of freshwater clams (Bivalvia: Unionidae) in the freshwater tidal Hudson River. Freshwater Biology 31: 239-248.

Strayer, D.L., J. Powell, P. Ambrose, L.C. Smith, M.L. Pace, and D.T. Fischer. 1996. Arrival, spread, and early dynamics of a zebra mussel (*Dreissena polymorpha*) population in the Hudson River estuary. Canadian Journal of Fisheries and Aquatic Sciences 53: 1143-1149.

Strayer, D.L., and L.C. Smith. 1996. Relationships between zebra mussels (*Dreissena polymorpha*) and unionid clams during the early stages of the zebra mussel invasion of the Hudson River. Freshwater Biology 36: 771-779.

Strayer, D.L., and H.M. Malcom. 2006. Long-term demography of a zebra mussel (*Dreissena polymorpha*) population. Freshwater Biology 51: 117-130.

Strayer, D.L., and H.M. Malcom. 2007. Effects of zebra mussels (*Dreissena polymorpha*) on native bivalves: the beginning of the end or the end of the beginning? Journal of the North American Benthological Society 26: 111-122.

Strayer, D.L., N. Cid, and H.M. Malcom. 2011. Long-term changes in a population of an invasive bivalve and its effects. Oecologia. DOI 10.1007/s00442-010-1792-0. In press.

We used separate programs to sample bivalves living on soft and hard sediments. Bivalves living on soft sediments were sampled in late June-early August along 11 cross-channel transects. Each transect contained 4 sampling sites, whose location was selected randomly in 1991-92, then relocated each year thereafter using loran or GPS. The transects were set up in a stratified random design (spaced more closely in reaches thought to contain dense bivalve populations). We anchored the boat at each sampling site, then used a standard PONAR grab (23 x 23 cm) to take 5 samples. If the bottom was so hard that we could not take 5 samples in 15 attempts, we repositioned the boat slightly and took more samples until we retrieved 5 samples. Samples were sieved in the boat through a 2.8-mm mesh brass sieve. All visible (i.e., adult) unionid mussels were placed into individual Whirl-Pak bags, and they and the remaining sieve residue were placed on ice in a cooler. All of this material that we collected was then frozen upon return to the lab. Later (usually by the end of the summer), we thawed the samples and sorted them carefully, removing all unionid and dreissenid mussels. We used calipers to measure the shell length, width, and weight of all unionids, shucked out the unionid bodies, dried them to constant weight at 60oC, then weighed them. We also counted all dreissenids attached to each unionid. We counted and measured the shell length of dreissenids, whether they were attached to a unionid or were unattached in the sample.

We used divers to sample dreissenid bivalve populations living on rocky substrates too coarse to be sampled with a PONAR grab. In most years, we sampled 6-7 sites in June and August (in 1993-1995 and in 2000, we took samples only in August). At each site, the divers picked up 10 rocks between 15 and 40 cm in maximum dimension and brought them to the surface. We placed these rocks onto ice in coolers and returned them to a laboratory cold room. Within 3 days, we removed and counted all of the dreissenid mussels > 2mm long on the rocks, and traced the outline of each rock onto a sheet of paper to estimate its area. If possible, we put ~300 mussels from each rock into 70% alcohol and ~300 mussels into the freezer for long-term storage. We also used 30-50 mussels from each site to estimate length-weight relationships. We measured the shell length of these animals, removed their bodies, dried them at 60oC, and weighed the dried bodies. Beginning in 2007, we examined the animals preserved in alcohol to determine whether they were zebra or quagga mussels. Special methods used in 1991-1992 were described by Strayer et al. (1996). Densities reported for dreissenid mussels are means of June and August samples.