

Mussel Relocation Study Under Way

In late July, St. Croix National Scenic Riverway, WI, began relocating freshwater mussels to similar habitat in the same watershed as part of a study to determine the long-term effectiveness of translocation as a conservation measure for endangered mussels and to refine existing translocation protocols. Native bivalves throughout the Midwest, South, and Northeast are threatened by an infestation of the nonnative zebra mussel (*Dreissena polymorpha*). Funded by the National Park Service and directed by the National Biological Service (Dr. Greg Cope and Dr. Diane Waller), the project resulted in the relocation of 450 native mussels into a refugium in the NPS managed zone of the St. Croix River.

Two federally-endangered species, the Higgins' eye pearly mussel (*Lampsilis higginsi*) and the winged mapleleaf mussel (*Quadrula fragosa*) and 15 state-listed species reside in the St. Croix, which supports one of the most diverse communities of native mussels in the Upper Mississippi drainage. The information derived from this study will also be used nationally to establish appropriate methods for conducting mussel relocation projects based upon long-term monitoring results (Cope and Waller, 1995).

Two species of unionid mussels representing the subfamily Ambleminae (pimpleback, *Quadrula pustulosa* and spike, *Elliptio dilitata*) and one representing the subfamily Lampsilinae (Higgins' eye pearly mussel) were collected from the St. Croix River by divers under federal endangered species permits. The 450 mussels were re-

located to three underwater 5x5 meter (16.4 x 16.4 ft) study grids, two of which are located in the experimental refugium, upstream, and one that served as a source-site control grid located in the collecting zone. The upstream location supports an existing diverse population of mussels, including the only known world population of the winged mapleleaf. Surrogates to the winged mapleleaf were used in the initial phases of this study rather than risk handling the species itself. The refugium is located upstream of a navigation control site established to regulate boat traffic to vessels that have not been operating in zebra mussel infested waters.

River substrate characteristics, mussel density, species richness, and live:dead ratio data were collected at each grid site. Mussels were measured, weighed, aged, sexed (for the federally-listed species) and uniquely marked prior to transport. Research staff placed the mussels in flow-through tanks that were temperature monitored prior to processing and transported in ice-cooled chests. A quantitative assessment of mussel survival, growth, and substrate characteristics will be made annually for a minimum of 2 years.

Native mussels are the most rapidly declining faunal group in the United States, and freshwater mussels constitute the largest group of federally listed endangered or threatened invertebrates. The St. Croix River supports 38 species of unionid mussels, including the only reproducing population of two federally listed species that are not impacted by the zebra mussel. This project is important in protecting the mussels of the St. Croix and in providing criteria for relocating mussels.