US Army Corps
of Engineers
Waterways Experiment
Station

Zebra Mussel Research Technical Notes

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Louisville District Initiates a Zebra Mussel Monitoring Program

Background and purpose

The water quality team at the U.S. Army Engineer District, Louisville, will monitor zebra mussels at selected sites in the District. The purpose will be to obtain information on spatial and temporal variation in distribution, as well as environmental effects of infestations. Information will be used to help protect U.S. Army Corps of Engineers (USACE) facilities, the quality of impounded water and the quality of shallow water habitats and to develop zebra mussel control strategies.

Additional information

Contact the author of this technical note, Ms. Lisa Barnese, (502) 582-5878, U.S. Army Engineer District, Louisville, for additional information. Dr. Ed Theriot, U.S. Army Engineer Waterways Experiment Station (WES), (601) 634-2678, is Manager of the Zebra Mussel Research Program.

Methods and materials

Water quality will be monitored before and after zebra mussel infestations. Zebra mussels will be sampled using standard techniques to facilitate data comparison with other USACE Districts and agencies. Samplers will be constructed of two polyvinyl chloride (PVC) plates (6 in. by 6 in. by 1/4 in.) attached in sandwich-like fashion 1 in. apart. The plates will be positioned horizontally to the sediments, approximately 3 ft below the water surface, by cables attached to anchored surface buoys.

PVC substrates were selected for ease of zebra mussel detection and quantification. Attached zebra mussels, including those in early phases of development, can be detected against the smooth PVC surface through touch or examination under low magnification. Consistency of PVC plate dimensions and surface characteristics will control variations in zebra mussel veliger settlement rate, which are related to texture and substrate surface area.

Two replicated samplers will be used at a minimum of 33 sampling sites. These include: one site for each of 20 reservoirs, one site for each of three operated locks and dams on the Green River, and one site for each of eight locks and dams on the Ohio River. Additional samplers can be supplied upon request for use in other areas, for example, fish hatchery facilities. The distribution of samplers at all major points of operation along riverways and in reservoirs for extended periods of time will allow District personnel to determine variations in zebra mussel growth rates, colonization rates, and distribution over a wide range of environmental conditions.

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Samplers will be deployed in March and retrieved in October. Plates will be preserved immediately after collection. The bottom plate will be removed and placed in a small container with buffered formalin every two weeks. A new plate will be placed on the sampler, and the sampler resuspended in the water column. Before use, each new plate will be pretreated by soaking in tap water for two weeks. The top plate will be allowed to colonize for the summer.

Sampler plates will be delivered to a designated collection center for each major basin within one day of collection. Plates will be transported to the District to be examined for signs of attached zebra mussels. Positive indications of zebra mussel presence will be verified through consultation with WES.

Success of this proposed plan depends on the participation of operations personnel at each project. Personnel will be responsible for plate retrieval and replacement, and sample delivery to the designated collection office. Everything the operator needs will be prepared and delivered in advance. Personnel from the water quality team will initiate the study by establishing sampling sites and setting up support buoys. Project managers will be provided instruction as to proper methods for handling samplers and safe use of formalin. The preservative will be delivered in the plastic storage containers used to hold the plates. All containers will be supplied with labels for recording date of sample placement, date of sampler retrieval, sample site, and other information. Sample containers will also be labeled with a warning of formaldehyde content and reference to the Material Safety Data Sheet (MSDS) provided. Eye goggles and gloves will be provided to project operators to help protect them against accidental chemical content.

Data analysis

Data will be analyzed to determine whether zebra mussel density and growth rate differ between sample sites and time of year. Results of these tests will be compared to changes in environmental conditions over space and time to identify factors most closely related to zebra mussel distribution. Synthesis and interpretation of these data will assist with assessing environmental impacts to native biota and developing environmentally sound control strategies.