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Zebra Mussel Research Technical Notes

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Inadvertent Transport of Live Zebra Mussels on Barges — Experiences in the St. Louis District, Spring 1992

Purpose This technical note discusses the potential for long-distance transport of zebra mussels on commercial barge hulls.

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Description Immature zebra mussels, or veligers, colonize new areas by being carried passively on water currents. After the veliger settles, it usually remains attached to hard substratum. If conditions become unsuitable because of physical disturbance or poor water quality, zebra mussels can release from their byssal threads. Once detached from the substratum, individuals will be carried by water currents to new structures where they can settle and secrete new byssal threads. Natural dispersal is always passive and in a downstream direction. However, the ability of veligers to settle and grow to maturity on the hulls of commercial vessels provides a mechanism for upstream dispersal in the inland waterway system (Hebert, Muncaster, and Mackie 1989, Mackie and others 1989, and Stanczykowska 1977).*

The potential for long-distance dispersal of zebra mussels attached to the hull of a commercial hopper barge is presented as an example. In April 1992 a barge (EMT-211B), owned by Eagle Marine Transport Co., was put in dry-dock at National Maintenance and Repair, Inc., in Hartfield, Illinois. The St. Louis District was contacted when live mussels were seen on the hull.

* R. F. McMahon and J. L. Tsou. 1990 (April 23-25). "Impact of European Zebra Mussel Infestation to the Electric Power Industry," presentation at the American Power Conference, Chicago, IL.

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District personnel examined the barge on April 15, 1992. Approximately one-quarter of the forward hull had been exposed for repairs. Clumps of zebra mussels were attached along the lower seam of the bumper plate on the sides of the hull and along weld seams on the bottom of the hull (Figure 1). Clumps appeared to be randomly distributed but always on weld seams. Numbers of individuals in clumps along the bumper plate ranged from 8 to 34 in the six clumps counted. Two clumps examined on the underside of the hull contained 66 and 96 individuals. Each clump occupied an area of approximately 1/2 square foot. Estimates of total number of zebra mussels on the hull was impossible due to the extensive structural repairs being made. However, on the section of the exposed barge, well over 1,000 mussels were observed.

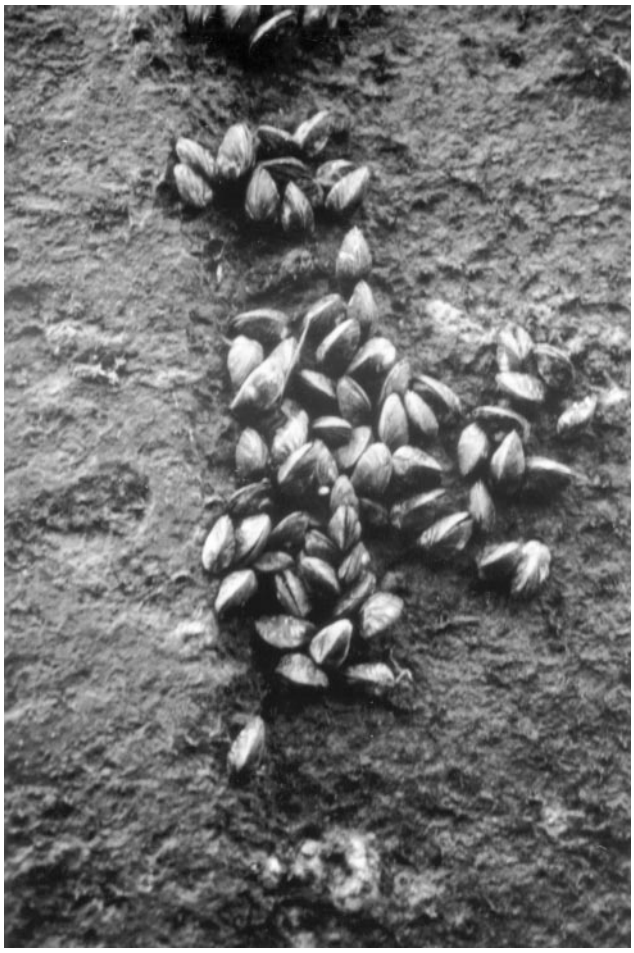

Figure 1. Clumps of zebra mussels

Total shell length of 100 randomly chosen zebra mussels from several clumps were measured to the nearest 0.1 millimeter (mm) with a dial caliper. The mean shell length was 17.3 mm (standard deviation = 1.6); minimum and maximum were 11.6 and 21.1 mm, respectively. Zebra mussels are reported to grow at a rate of 1.0 to 1.6 centimeters per year in slow and fast growing populations, respectively. Based on the size of the zebra mussels found on the hull of barge EMT-211B, it would appear that they were approximately one year old.

Information on barge movement provided by Eagle Marine Transport Co. (Table 1) provides an indication of a probable veliger attachment site. Barge EMT-211B was in the Illinois River at Hennepin, Illinois, on January 26, 1991; however, the water would have been too cold for spawning. In waters of the United States veligers can be found from May to October. On April 24, 1991 the barge was again in the Illinois River at Spring Valley, Illinois. Veliger attachment probably took place at Spring Valley during the spring of 1991.

Table 1
Movement of Barge EMT-211B on the Inland Waterway System

Date	Condition	Movement	Miles Traveled
2/26/91	Loaded	Hennepin, IL, to Louisiana	1,220
	Loaded	Louisiana to Spring Valley, IL	1,212
5/3/91	Loaded	Spring Valley, IL, to Louisiana	1,225
	Unloaded	Louisiana to St. Louis, MO	930
7/3/91	Loaded	St. Louis to Chicago, IL	380
	Unloaded	Chicago to LaSalle, IL	75
8/1/91	Loaded	LaSalle to Louisiana	1,275
	Unloaded	Louisiana to Winona, MN	1,555
10/1/91	Loaded	Winona to Louisiana	1,500
	Unloaded	Louisiana to Mound City, IL	775
11/14/91	Loaded	Mound City to Louisiana	790
	Unloaded	Louisiana to Mississippi	200
1/7/92	Loaded	Mississippi to St. Louis, MO	1,140
April 1992		Dry-dock in Hartford, IL (zebra mussels found)	**Total miles 12,277**

Table 1 illustrates the potential for long-distance dispersal of zebra mussels on barge hulls. During the period of attachment to the time of dry-docking, these zebra mussels were transported a distance of 11,045 miles on the inland waterway system. During barge transit, locking, and fleeting there was a potential for dislodgment and spawning of the attached mussels. During the period of available transit data barge EMT-211B traveled 12,277 miles on the inland waterway system. This included the upper Mississippi, lower Mississippi, and Illinois Rivers. The potential for long-distance transport and dispersal of zebra mussels on the hulls of barges is great.

References

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