

**Report on 2005 Monitoring of *Lampsilis higginsii* Released into the Wisconsin
River near Orion and Prairie du Sac, Wisconsin.**

Wisconsin Department of Natural Resources.

31 December 2005

ACKNOWLEDGEMENTS

The St. Paul District of the U. S. Army Corps of Engineers supported this work. Various staff from the Wisconsin Department of Natural Resources contributed significant in-kind work.

INTRODUCTION

This is a report on the 2005 monitoring of *Lampsilis higginsii* placed on caged fish and free-released fish in the Wisconsin River, Wisconsin during 2001-2005. This effort was part of mussel propagation related to the continued operation and maintenance of the Mississippi River System Navigation project by the U. S. Army Corps of Engineers in cooperation with associated, multi-agency Mussel Coordination Team. Persons involved in this 2005 monitoring were staff from the Wisconsin Department of Natural Resources and the U. S. Fish and Wildlife Service, Genoa National Fish Hatchery.

From 2001-2005, 79 mesh-bottomed and 13 solid-bottomed cages containing various fishes artificially inoculated with at least 451,351 glochidia of the federally endangered *Lampsilis higginsii* (mollusca: bivalvia: unionidae) were placed at several locations near Orion and Woodman Lake on the lower Wisconsin River. In addition to cages, 2089 unconfined, inoculated fish containing at least 160,205 glochidia were released in the vicinity of Prairie du Sac on the lower Wisconsin River. Details of these releases are summarized in Table 1. Fish and mussel propagation, rearing, inoculation methods and cage design are described in Gordon, 2001 and Gordon and Brady, 2003.

During 2005, we sampled mussels in the vicinity of these introduction sites to determine if juvenile *L. higginsii* were present as a result of these propagation efforts.

METHODS

Orion

At the Orion site, we collected mussels by hand-excavating 10 0.25m² quadrates at the upstream mesh-bottomed cage site and 20 0.25m² quadrates at the downstream mesh-bottomed cage site. This quadrate sampling was done during 1 September 2005 and was intended to supplement more spatially extensive transects done in 2004. Five quadrates were taken along each of 6 stratified transects placed perpendicular to the current direction. quadrates were taken every 3m along each transect starting at 1m from shore. Transects were placed every 7.6m starting at each of the two cage sites (Figures 1 & 2). Transects were done from 0 to 8.7m downstream of the upper cage site and 0 to 22.9m downstream of the lower cage site.

All mussels, both living and dead, were identified, counted and measured for total length and height. To obtain a larger sample of mussels than was found in the quadrates additional "random searches" were conducted at locations immediately downstream of the cage sites.

Prairie du Sac

Near the Prairie du Sac fish free-release site, we conducted two different sampling schemes. During 2 September 2005, we randomly searched from 0-50m and 50-100m downstream of the Hwy 12 bridge free-release site.

On 19 July 2005, several people searched locations with relatively high adult or high juvenile population densities. These locations (Figure 3) were as far as 2.7 river miles upstream of free-release sites.

RESULTS AND DISCUSSION

Orion

Total mussel population density was 1.60/m² downstream of the Orion mesh-bottomed cage sites. This compares to 1.34/m² for the entire 8km long Orion mussel bed sampled randomly in 2002. Densities by species are given in Table 2.

Three specimens of juvenile *L. higginsii* were found downstream or at the lower cage site. One was found in 0.25m² quadrat immediately at the cage site. Another was found at the cage site while placing cages in May. The third was found 39m downstream of the cages in random searches. Measurements for these are given in Table 3. This brings the total number of *L. higginsii* juveniles found near these cage sites to 4, with the addition of one found during 2004.

There is no way at present to know if these three 2005 individuals and one previously found resulted from our artificial propagation efforts. It is probable that all these individuals came from introductions and were not naturally propagated. Considering locations where these were found, and the extreme rarity of juvenile *L. higginsii* in the lower Wisconsin River, it seems unlikely that these were natural recruits. Prior to 2004, the smallest *L. higginsii* specimen of 41 found in the lower Wisconsin River was 55mm in total length. A total of 90% of the specimens found were over 70mm. It seems that small, natural recruits are rare to the Wisconsin River.

In addition to these juveniles, two adults *L. higginsii* specimens were found at Orion in 2005.

Prairie du Sac

In random searches at Prairie du Sac, no juvenile *L. higginsii* were found. We did find 3 adult *L. higginsii*, two males and one female. These were added to the Prairie du Sac stockpile for future brood stock in propagation.

Juvenile *L. higginsii* are probably so rare and scattered at Prairie du Sac, they are unlikely to show up in our samples. A total of at least 160,205 estimated transformers have been released here on free-ranging fish since 2001. If 1% of these survived, there would be about 1600 *L. higginsii* present at a density of 0.0035/m² - which is undetectable with just about any reasonable sampling effort. Future monitoring at this location should concentrate on free diving where large numbers of juveniles could be found.

REFERENCES USED

Gordon, Roger. 2001. *Lampsilis higginsii* recovery project Genoa National Fish Hatchery. 2001. Genoa National Fish Hatchery, Genoa, Wisconsin. 8 pp.

Gordon, Roger and Tony Brady. 2003. *Lampsilis higginsii* recovery project Genoa National Fish Hatchery 2003. 10 pp.

Table 1. 2001-2005 Location, Date of Release, Release Method, Number of Each Fish Species & Population Strain for Propagated *L. higginsii* Released into the Wisconsin River, Wisconsin.

LOCATION	STATION	RIVER MILE	DATE OF RELEASE	LATITUDE LONGITUDE	METHOD (# OF CAGES)	FISH SPECIES	# OF FISH	EST. # OF L. HIGGINSII TRANS- FORMERS	MUSSEL "STRAIN"
Woodman Lake	2	22.7	24 May 2005	43°06'20.0" 90°46'52.9"	Solid-bottomed cages (7)	M. salmoides	234	83983	Cassville
Orion	89	48.42	13 June 2001	43°12'28.6" 90°21'59.8"	Mesh-bottomed cages (9)	M. dolomieu S. vitreum	445 150	34042	Hudson
Orion	89	48.42	23 June 2003	43°12'28.6" 90°21'59.8"	Mesh-bottomed cages (9)	M. salmoides	225	20700	Cassville
Orion	89	48.42	12 May 2004	43°12'28.6" 90°21'59.8"	Mesh-bottomed cages (11)	M. dolomieu	451	29789	Cassville
Orion	89	48.42	24 May 2005	43°12'28.6" 90°21'59.8"	Mesh-bottomed cages (9)	M. salmoides	225	80753	Cassville
Orion	6	49.5	23 May 2003	43°12'37.3" 90°20'43.2"	Mesh-bottomed cages (17)	M. salmoides	425	39100	Cassville
Orion	6	49.5	12 May 2004	43°12'37.3" 90°20'43.2"	Mesh-bottomed cages (10)	M. dolomieu	410	27089	Cassville
Orion	6	49.5	24 May 2005	43°12'37.3" 90°20'43.2"	Mesh-bottomed cages (14)	M. salmoides	350	125615	Cassville
Orion	3	48.66	12 May 2004	43°12'19.5" 90°21'38.6"	Solid-bottomed cages (6)	M. dolomieu	156	10307	Wisconsin R.
Prairie du Sac	68	89.16	13 June 2001	43°16'10.6" 89°43'17.9"	Free-release	M. dolomieu	450	25020	Hudson
Prairie du Sac	68	89.16	11 May 2004	43°16'10.6" 89°43'17.9"	Free-release	M. dolomieu	395	26101	Cassville
Prairie du Sac	68	89.16	18 May 2005	43°16'10.6" 89°43'17.9"	Free-release	M. dolomieu	410	41205	Cassville
Prairie du Sac	127	91.44	29 April 2002	43°17'51.6" 89°43'34.2"	Free-release	M. dolomieu	300	16500	Wisconsin R.
Prairie du Sac	127	91.44	7 May 2003	43°17'51.6" 89°43'34.2"	Free-release	M. dolomieu	534	51748	Cassville (Wisconsin R. supplement)

Figure 1. 2005 Location of 20 0.25m² quadrates and Random Search Area Sampled Downstream and at the Lower Cage Site (Station 89) near Orion, Wisconsin River, Richland Co., Wisconsin.

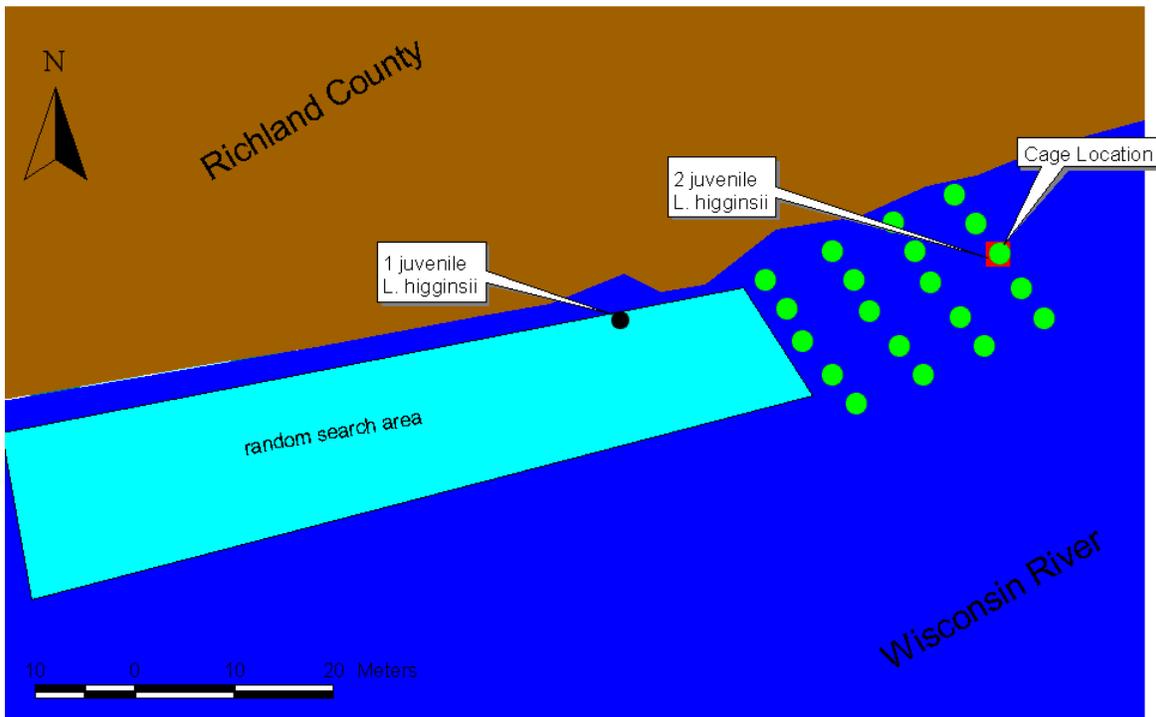


Figure 2. 2005 Location of 10 0.25m² quadrates and Random Search Area Sampled Downstream of the Upper Cage Site (Station 6) near Orion.

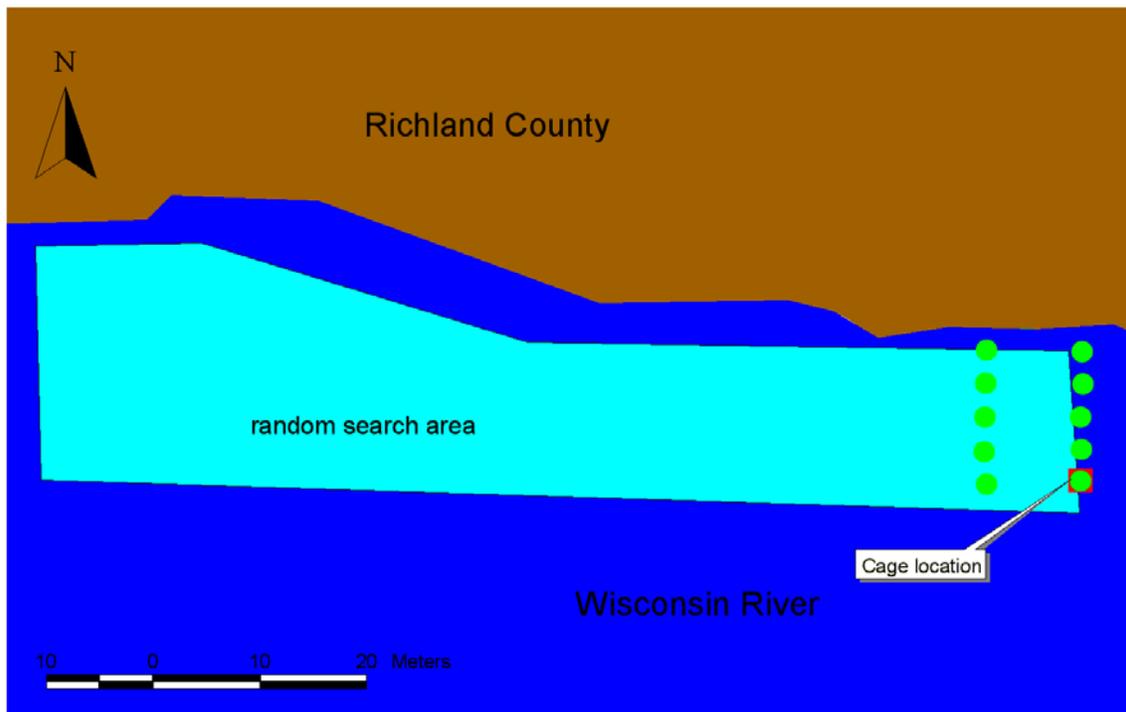


Figure 3. 2005 Prairie du Sac, Wisconsin River Free-Release Locations and Random Search Areas.

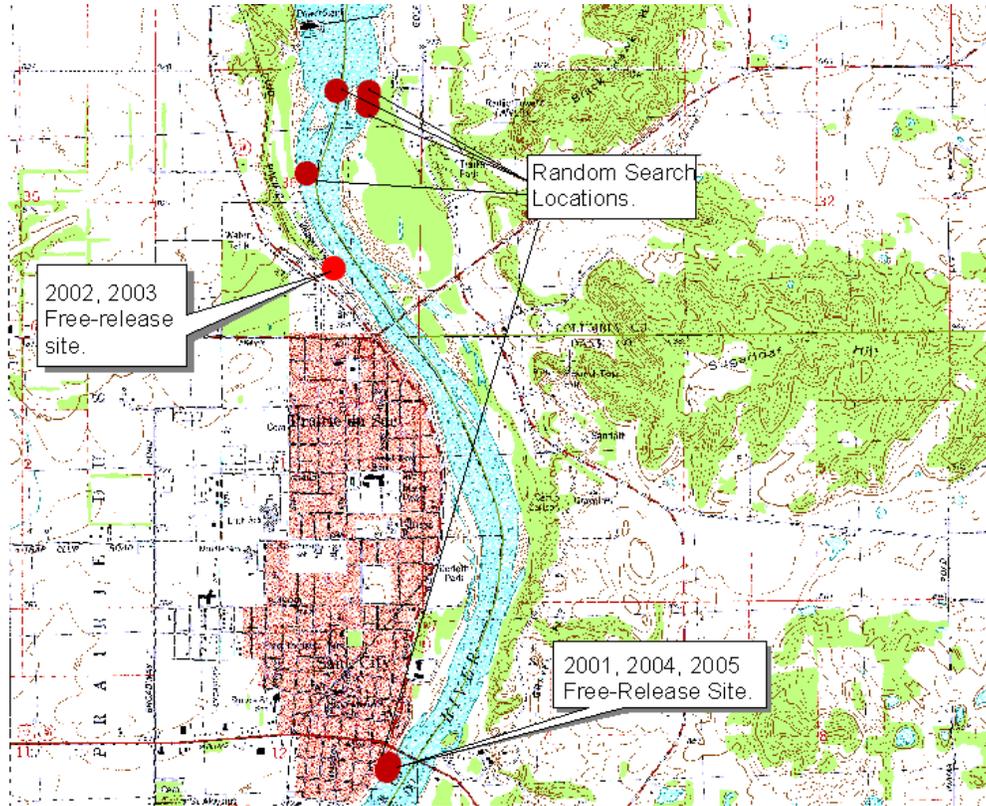


Table 2. 2005 Mussel Population Densities from 30 0.25m² quadrates done Downstream of two *L. higginsii* Release Sites on the Wisconsin R., near Orion.

TAXON	#/m ²	STD DEV
<i>A. p. plicata</i>	0.13	0.73
<i>E. dilatata</i>	0.27	1.46
<i>L. t. form anodontoides</i>	0.13	0.73
<i>L. higginsii</i>	0.13	0.73
<i>L. cardium</i>	0.27	1.01
<i>P. alatus</i>	0.27	1.01
<i>Q. p. pustulosa</i>	0.13	0.73
<i>T. verrucosa</i>	0.13	0.73
<i>T. truncata</i>	0.13	0.73
ALL TAXA	1.60	4.53

Table 3. 2005 *L. higginsii* measurements from lower Cage Site, Orion, Wisconsin River.

Station	Length	Height	External age
89	32	20	3
342	38	25	4
355	50	30	4

Figure 4. Two of the three *Lampsilis higginsii* Collected near the Lower Cage Site near Orion, Wisconsin, 2005.

