

**Mussel Survey Report for the SCI-823-0.00/6.81 (PID 19415)
Preferred Alternative for the Portsmouth Bypass over the
Little Scioto River, Scioto County, Ohio**

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A report on a mussel survey of the Little Scioto River at the SCI-823-0.00/6.81
(Portsmouth Bypass) site

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Ligumia recta (black sandshell)
Ohio Threatened Species
New record for the Little Scioto River

For

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2 September 2011

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Summary

Nine species of mussels were found in the Little Scioto River in the vicinity of the proposed SCI 823 Bridge. Only four of these species were found alive in the reach, but one of these is an Ohio Threatened Species, *Ligumia recta* (black sandshell). The other species collected alive from the study area were *Quadrula quadrula* (mapleleaf), also a new record for the river, *Potamilus alatus* (pink heelsplitter) and *Lampsilis cardium* (plain pocketbook). One live specimen (*Q. quadrula*, mapleleaf) was found in the primary impact area for the proposed bridge, 0.5 mussels/m² were found in the best areas downstream of the area where the bridge is proposed and 0.0 mussels/m² were found in the best areas upstream of the primary impact area for the proposed bridge. No Ohio or Federally endangered species were found alive or as dead shells. The reach supports a few mussels with one rare species for Ohio and so therefore represents a locally significant mussel community within the reach. This community appeared to be relatively similar far upstream of the proposed bridge site and for a similar distance downstream.

Introduction

The Little Scioto River is known to have supported a mussel fauna of 20 species (Watters *et al.*, 2009) including four species listed by Ohio as Species of Concern (Table 1). Watters (1988) stated, “This relatively clean stream has enormous numbers of naiads in some regions...It has a wide variety of substrates, from mud to bare bedrock.” In addition, the Little Scioto River is listed by the USFWS as a stream with potential habitat for *Villosa fabalis*. It is apparent that the stream within the reach identified in Figure 1 may support a large number of mussels including state, and possibly, federal significant species. The objective of the current study was to determine if mussels are present in a reach extending 100 feet upstream to 600 feet downstream of the proposed construction limits for the project (Figure 1) and to determine species composition of the mussel community in this reach if mussels are found. No mussel records for this reach occur, and so an additional objective of this study was to determine if rare species of mussels occur here and if so how abundant they are in this reach.

Materials and Methods

Mussels were collected by using general collecting techniques employing visual and tactile methods and quadrat sampling (where appropriate) from an area 600 feet downstream to 100 feet upstream of the potential impact area shown in Figure 1. The stream was low (Figures 2 and 3 show the stream at the time of this survey, how low the water was, and the very good water clarity) and water clarity was excellent (11.8 NTU – Turbidity). General collecting techniques were used to identify where live mussels occurred in the stream and to locate the best habitats for quadrat sampling. During the general collecting activities, timed searches were employed to determine the distribution and abundance of mussels in the project area. Three people searched the downstream reach for two hours using viewers to scan the bottom of the river and tactile methods (including sieving substrate through a hand sieve) to locate buried or small mussels.

These same people searched the primary impact area and upstream reach for one hour each. In addition, shells of dead mussels were collected wherever found within the entire reach sampled during this study. Live mussels found were mostly kept *in situ* for later quadrat sampling of the area. Quadrat sampling occurred wherever there were large numbers of mussels (within the downstream and upstream reaches). For this study, a line 10 meters long was placed in the river parallel to the flow of the river and 20 ¼ m² quadrats were excavated along each side of this transect. All mussels found in a quadrat were measured (length, width, height) and aged (annular ring method). Appendix 1 contains these data. Once these data had been collected the live mussels were returned to suitable habitat within the project area (not relocated). All live mussels and dead shells were identified and counted. Both live mussels and dead shells also were photographed.

Results

A total of nine species of mussels was found in the study area during this survey. Four of these species were found alive and the remaining five were found as freshly dead shells. Both live individuals and freshly dead shells would indicate a population of the species is present in the reach. Four of the species found during this survey are new records for the Little Scioto River: *Amblema plicata* (threeridge), *Q. quadrula* (mapleleaf), *Quadrula pustulosa* (pimpleback) and *L. recta* (black sandshell). *Ligumia recta* (black sandshell) is an Ohio Threatened Species.

The mussel community within the study area was dominated by *P. alatus* (pink heelsplitter), which accounted for 44% of the live mussels found, and *L. cardium* (plain pocketbook), which accounted for 31% of the live mussels found. The community in this reach was fairly small, which was clearly demonstrated by the quadrat sampling portion of the study. The community downstream of the primary impact area had a density of 0.5 mussels/m² in the best areas sampled and no mussels were found when we sampled within the upstream 100 feet of the primary impact zone. Only one live mussel (*Q. quadrula*, mapleleaf) was found in the primary impact zone, and so no quadrat sampling was performed there. Figure 4 shows some of the mussels collected from the reach downstream of the primary impact area.

Endangered Species

No specimens of *V. fabalis* (rayed bean) were found during the current survey. This mussel was not collected as a live specimen or as a dead shell. Furthermore, it was not found during the general collecting portion of the study (when it might be overlooked), or during the quadrat sampling portion of the survey, when it would more likely be collected if present. Given the low water conditions at the time of this survey, many of the mussels seen upstream of the primary impact area were up in the substrate and moving to find deeper water. It would seem that if *V. fabalis* was present in the reach, it too would have been moving and relatively easy to find if present. The only rare Ohio species found during this survey were the two specimens of *L. recta* (black sandshell), which is an Ohio Threatened Species, and a new record for the Little Scioto River. That species appears to be increasing its range and abundance in the state, apparently including its distribution in

the Little Scioto River. None of the other species listed by Ohio as Species of Concern previously recorded for the river were found during this survey alive or as freshly dead shells. No endangered mussels occur in the potential impact area for this bridge project.

Literature Cited

Watters, G.T. 1988. The Naiad Fauna of Selected Streams in Ohio: I. Stillwater River of Miami River, II. Stream systems of south central Ohio from the Little Miami River to the Hocking River, excluding the Scioto River proper. Final Report to The Ohio Department of Natural Resources, Division of Wildlife, Columbus, Ohio. 440 pages.

Watters, G.T., M.A. Hoggarth, and D.H. Stansbery. 2009. The Freshwater Mussels of Ohio. The Ohio State University Press, Columbus, Ohio. 421 pages.

Table 1. Mussel reported from the Little Scioto River system by Watters *et al.*, (2009).

Species	Common name
1. <i>Utterbackia imbecillis</i>	paper pondshell
2. <i>Pyganodon grandis</i>	giant floater
3. <i>Anodontoides ferussacianus</i>	cylindrical papershell
4. <i>Strophitus undulatus</i>	creeper
5. <i>Lasmigona costata</i>	fluted shell
6. <i>Lasmigona compressa</i> ^a	creek heelsplitter
7. <i>Lasmigona complanata</i>	white heelsplitter
8. <i>Simpsonaias ambigua</i> ^a	salamander mussel
9. <i>Tritogonia verrucosa</i>	pistolgrip
10. <i>Quadrula quadrula</i>	mapleleaf
11. <i>Fusconaia flava</i>	Wabash pigtoe
12. <i>Pleurobema sintoxia</i> ^a	round pigtoe
13. <i>Elliptio dilatata</i>	spike
14. <i>Actinonaias ligamentina carinata</i>	mucket
15. <i>Leptodea fragilis</i>	fragile papershell
16. <i>Potamilus alatus</i>	pink heelsplitter
17. <i>Obovaria subrotunda</i>	round hickorynut
18. <i>Truncilla truncata</i> ^a	deertoe
19. <i>Lampsilis radiata luteola</i>	fatmucket
20. <i>Lampsilis cardium</i>	plain pocketbook

a — Ohio species of concern

Table 2. Mussels collected from the vicinity of the proposed SCI 823-0.00/6.81 bridge.

Species	Common name	Downstream	Impact	Upstream
1. <i>Strophitus undulatus</i>	creeper	0	0	1 d
2. <i>Amblema plicata</i>	threeridge	0	0	1 d
3. <i>Quadrula quadrula</i>	mapleleaf	0	1 L	1 L, 3 d
4. <i>Quadrula pustulosa</i>	pimpleback	0	0	1 d
5. <i>Leptodea fragilis</i>	fragile papershell	0	0	1 d
6. <i>Potamilus alatus</i>	pink heelsplitter	6 L	0	1 L, 5 d
7. <i>Ligumia recta</i> ^a	black sandshell	1 L	0	1 L, 1 d
8. <i>Lampsilis radiata luteola</i>	fatmucket	0	0	1 d
9. <i>Lampsilis cardium</i>	plain pocketbook	2 L	0	3 L, 3 d
Total # of species (live + dead)		3	1	9
Total # of live species		3	1	4
Total # of live individuals		9	1	6

a – Ohio threatened species

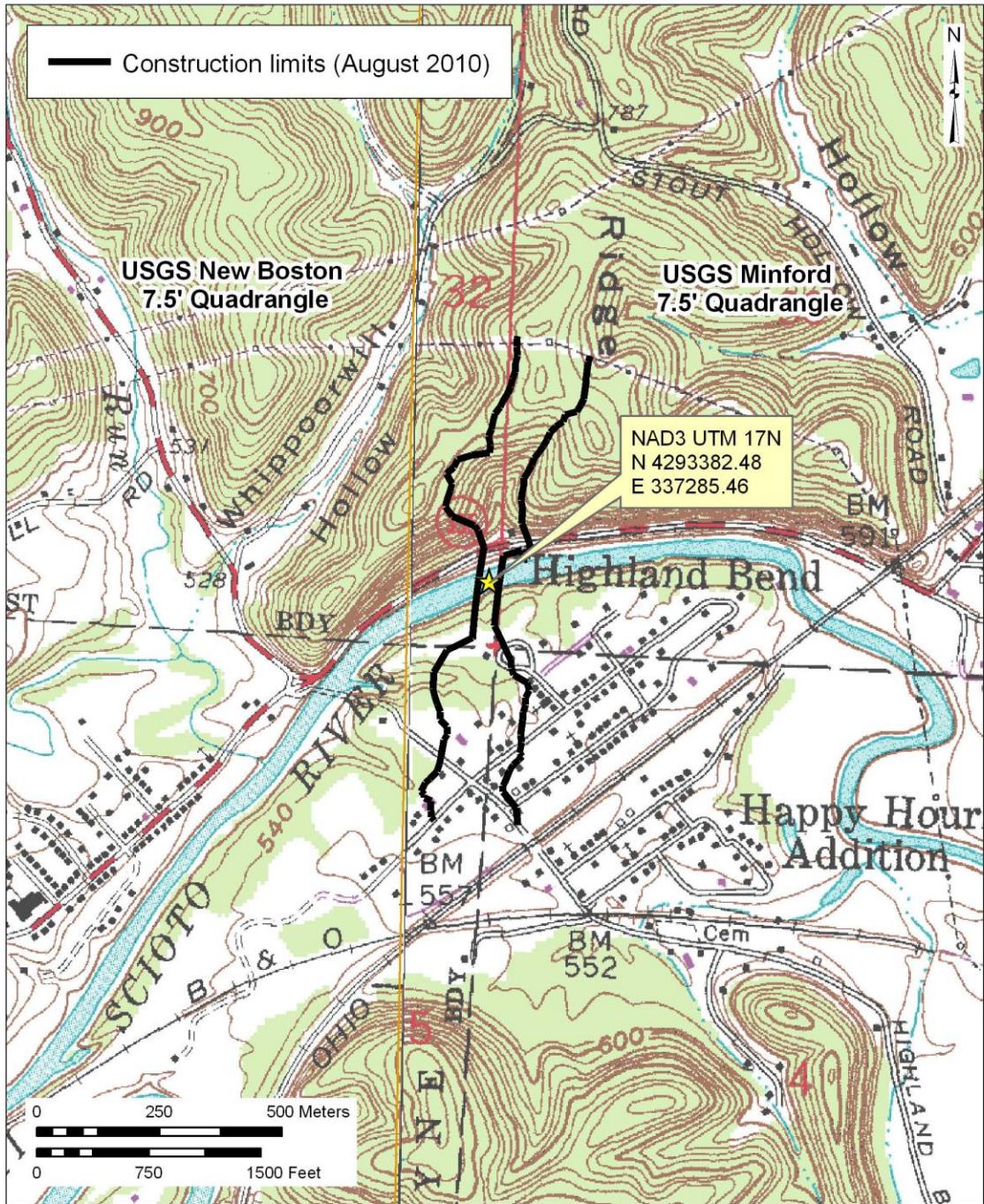


Figure 1. Topographic map of the study area showing the location of the construction limits for the SCI-823-0.00/6.81 project.



Figure 2. Photograph of the survey area for SCI 823-0.00/6.81 in the vicinity of the proposed bridge.



Figure 3. Photograph of the survey area for SCI 823-0.00/6.81 in the vicinity of the proposed bridge.



Figure 4. Photograph of some of the mussels collected from the vicinity of the proposed SCI 823-0.00/6.81 Bridge; from left to right – *Potamilus alatus* (pink heelsplitter), *Ligumia recta* (black sandshell) and *Lampsilis cardium* (plain pocketbook).

Appendix 1. Morphometric data for the mussels collected in the vicinity of the proposed SCI 823-0.00/6.81 Bridge.

Specie	Length	Height	Width	Age
Downstream Quadrats (10 meters ² total area sampled)				
1. <i>Potamilus alatus</i>	83	63	25	6
2. <i>Potamilus alatus</i>	85	65	22	6
3. <i>Potamilus alatus</i>	99	78	26	9
4. <i>Ligumia recta</i>	136	50	40	12
5. <i>Lampsilis cardium</i> ♀	98	73	62	14

$5 \text{ mussels}/10\text{m}^2 = 0.5 \text{ mussels}/\text{m}^2$

Upstream Quadrats (10 meters² total area sampled)

No mussels found