

FRESHWATER MUSSELS (PELECYPODA: UNIONIDAE) OF THE MAJOR TRIBUTARIES OF THE ST. CLAIR RIVER, MICHIGAN. - Western Lake Erie, Lake St. Clair, and the associated tributary streams harbor the richest freshwater mussel fauna in the St. Lawrence River drainage (Goodrich & van der Schalie, 1932). Although some recent surveys have contributed to our knowledge of the current fauna (e.g., Clarke, 1973; Clark, 1977; Strayer, 1979, 1980), there is a paucity of published data available for several major drainages in the region. Furthermore, since many of the freshwater mussels listed as rare, threatened or endangered by the Michigan Department of Natural Resources (1983) are known from this area, further survey work is necessary to determine the present status of these faunal elements.

Study area and methods. To ameliorate our understanding of current freshwater mussel distributional patterns, the Black (including Elk and Mill creeks), Pine and Belle rivers (which are tributary to the St. Clair River) were surveyed during the summer and fall of 1982 and 1983. The drainage basin is predominantly level glacial lake plain underlain by silty loam and sandy loam soils. Land use in this region is primarily agricultural (Hull, 1978). At the sampled localities, these hardwater rivers rarely reached widths of 15 m with low-level water depths of less than 2 m.

Twenty-seven sites harbored live freshwater mussels (Fig. 1). Collections were made by handpicking the shallows with the aid of waterscopes. Identifications were made according to Burch (1975) and representative specimens placed in the Museum of Zoology, The University of Michigan.

Collecting stations. 1) Black R. at Deckerville Rd. (S25, R14E, T13N; Sanilac Co.); 2) Black R. at Forester Rd. (S12, R14E, T12N; Sanilac Co.); 3) Black R. at Custer Rd. (S19, R15E, T12N; Sanilac Co.); 4) Black R. at Church Rd. (S4, R15E, T11N; Sanilac Co.); 5) Black R. at Washington Rd. (S15, R15E, T11N; Sanilac Co.); 6) Black R. at French Line Rd. (S23, R15E, T11N; Sanilac Co.); 7) Black R. at Aitken Rd. (S7, R16E, T10N; Sanilac Co.); 8) Black R. at Galbraith Line Rd. (S29, R16E, T9N; Sanilac Co.); 9) Black R. at Comstock Rd. (S17, R16E, T8N; St. Clair Co.); 10) Black R. at Norman Rd. (S29, R16E, T8N; St. Clair Co.); 11) Black R. below 'Ford' Dam (S8, R16E, T7N; St. Clair Co.); 12) Black R. at Wadhams Rd. (S2, R16E, T6N; St. Clair Co.); 13) Elk Cr. at Stilson Rd. (S16, R14E, T10N; Sanilac Co.); 14) Elk Cr. nr. Fitch Rd. (S31, R15E, T11N; Sanilac Co.); 15) Elk Cr. at Walker Rd. (S17, R15E, T11N; Sanilac Co.); 16) Mill Cr. at Brown City Rd. (S10, R12E, T8N; Lapeer Co.); 17) Mill Cr. at Hwy. M-19 (S36, R14E, T8N; St. Clair Co.); 18) Pine R. at Fargo Rd. (S23, R15E, T7N; St. Clair Co.); 19) Pine R. at Bryce Rd. (S24, R15E, T7N; St. Clair Co.); 20) Pine R. at Hwy. M-21 (S31, R16E, T7N; St. Clair Co.); 21) Pine R. at Dove Rd. (S21, R16E, T6N; St. Clair Co.); 22) Pine R. at Frith Rd. (S9, R16E, T5N; St. Clair Co.); 23) Pine R. at Mitchell Rd. (S15, R16E, T5N; St. Clair Co.); 24) Belle R. at Capac Rd. (S9, R13E, T6N; St. Clair Co.); 25) Belle R. at Hwy. M-19 (S35, R14E, T6N; St. Clair Co.); 26) Belle R. at Hwy. M-25 (S32, R15E, T5N; St. Clair Co.); 27) Belle R. at Indian Trail Rd. (S15, R16E, T4N; St. Clair Co.).

Results and Discussion. Twenty-five species of freshwater mussels were collected live from the Black, Pine and Belle river drainages (Table 1). Nine mussels, *Actinonaias carinata*, *Dysnomia torulosa*, *D. triquetra*, *Lampsilis fasciola*, *Obovaria subrotunda*, *Proptera alata*, *Ptychobranhus fasciolaris*, *Truncilla truncata* and *Villosa fabalis* were found to be rare. Conversely, mussels found to be abundant included *Amblyma plicata*, *Anodonta grandis*, *Lampsilis radiata siliquoidea* and *Lasmigona complanata*.

From this investigation it is apparent that the Black, Pine and Belle rivers of southeastern Michigan harbor a diverse array of freshwater mussels. The sites with high diversity (Stations 7, 15 and 22) had very similar substrates, i.e., deep,

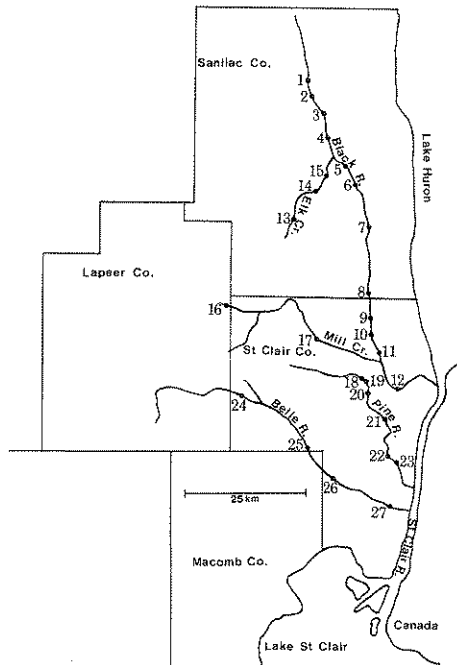


FIG. 1. Map of collecting stations on the St. Clair River drainage, southeastern Michigan.

TABLE 1. List of mussel species found live at each station in the St. Clair River drainage, southeastern Michigan.

Species	Station number																											
	Black River												Elk Creek			Mill Creek		Pine River						Belle River				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
<i>Actinonaias carinata</i> (Barnes)							R																					
<i>Alasmidonta catceolus</i> (Lea)													C	R	R						R							
<i>Alasmidonta marginata</i> Say				C			R		R	C																		R
<i>Ambiema plicata</i> Say			R	R		A	A	A	R		R		A	A	A						R	C	C					R
<i>Anodonta grandis</i> Say	A	A	A	C	R	R	R						A	C			R		R		C	C	C		C	R	R	
<i>Anodontoides ferussacianus</i> (Lea)	R		R	R		R							A			R	R		R								R	
<i>Dysnomia torulosa</i> (Rafinesque)***							R								R													R
<i>Dysnomia triquetra</i> (Rafinesque)**																						R						
<i>Elliptio dilatata</i> Rafinesque						C	C													A								R
<i>Fusconota flava</i> (Rafinesque)				R		A	A	C					C	C	A													R
<i>Lampsilis fasciola</i> Rafinesque*															R													
<i>Lampsilis ovata</i> (Say)							R						R	R	R							R	R	R		R		R
<i>Lampsilis radiata siliquoides</i> (Barnes)				A	A	R	C	C	C	R	R	R	C									C	A	A		R	C	C
<i>Lasmigona complanata</i> (Barnes)	C	A	A	A	A	A	C	A	C	C		R		A	C	C		R				A	C	R		R	R	C
<i>Lasmigona compressa</i> (Lea)	R			R					R						R							R	R	R				R
<i>Lasmigona costata</i> (Rafinesque)				R	R	R	C	A				R			C							R	C					C
<i>Leptodea fragilis</i> (Rafinesque)												C	C										R	R				
<i>Obovaria subrotunda</i> (Rafinesque)**																							R					
<i>Pleurobema cordatum</i> (Rafinesque)						R	A	C							R							R						
<i>Proptera alata</i> (Say)																							R					
<i>Prychobranthus fasciolaris</i> (Rafinesque)							R								R								R					
<i>Strophitus undulatus</i> (Say)				R		R	R								R								R				R	C
<i>Truncella truncata</i> Rafinesque												C																C
<i>Villosa fabalis</i> (Lea)***																							R	R	R			
<i>Villosa iris</i> (Lea)													R									C		A			R	R

*Rare, **threatened, or ***endangered, as listed by the Michigan Department of Natural Resources (1983).
 Abbreviations: A (abundant) = >5 mussels/man hr.; C (common) = 1-5 mussels/man hr.; R (rare) = <1 mussel/man hr.

coarse sand and gravel. Many of the Michigan-listed unionids (Michigan Dept. Nat. Resources, 1983) are known to inhabit gravel bars, where they are often found deeply buried (van der Schalie, 1938; Parmalee, 1967; Johnson, 1978). Throughout lotic ecosystems, this particular type of substrate is fast disappearing due to increased siltation from modern agricultural practices, channelization and dam construction for flood control and power generation (Stansbery, 1970). If the present fauna is to be preserved, a concerted effort must be initiated to preserve this type of habitat.

The proximity of the study sites to Lake St. Clair and Lake Erie undoubtedly contributes to the high diversity of freshwater mussels. Of the species encountered in this study that are considered rare, threatened or endangered (Table 1), all five have been found in Lake Erie or Lake St. Clair (Goodrich & van der Schalie, 1932). It is obvious that the closer a particular site is to a source of colonizing individuals, the greater the likelihood that larval mussels will reach that site by way of fish potentiated phoresis. However, this colonizing ability is severely hampered by dam construction. In the upper Black River drainage, mussel populations are virtually isolated from populations in the lower drainage and Lake St. Clair by 'Ford' Dam (St. Clair Co.). If the upper drainage populations were decimated by either a natural or an anthropogenic perturbation, it would be impossible for recolonization to occur from downstream populations. Given this possibility, it is important to note that *Dysnomia torulosa*, considered rare and endangered throughout its range (Stansbery, 1970), was found exclusively in the upper Black River drainage above 'Ford' Dam.

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