Status Assessment of Unionid Mussel Species in the Huron-Manistee National Forest

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Inset-right cover figure: Map of recent survey sites (1998-2015) in the vicinity of Huron-Manistee Nation Forest lands.

Inset-left cover photo: Wabash pigtoe (*Fusconaia flava*) and spike (*Elliptio dilatata*) at Site 8 in Triple Lakes Creek, Big South Branch Pere Marquette River, where a high abundance of native unionid mussels was found and no zebra mussels were present.

Background cover photo: 2011 survey site 14 in the Manistee River where shells of the state threatened slippershell (*Alasmidonta viridis*) and special concern elktoe (*Alasmidonta marginata*) were found.

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Introduction

The goal of this project was to provide an assessment of the status and distribution of native mussels (Unionidae) in waters across Huron-Manistee National Forest (HMNF) lands. The main objectives were to 1) gather available historical occurrence data on unionid mussels in the HMNF and intersecting watersheds, 2) gather available recent occurrence data, 3) filter these data to only include occurrences meeting requirements of this assessment, 4) create GIS data layers to facilitate analysis, and 5) utilize GIS data layers and associated data sets to a) determine and illustrate historical and recent species ranges, b) identify long term trends in species status, c) identify mussel species with potential to occur on HMNF lands that have not previously been recorded, and d) identify watersheds with relatively little or no known past surveys to prioritize future survey efforts.

This assessment allows a number of management related questions to be addressed. For example, which watersheds are in most need of survey (based on past survey effort)? Which watersheds have apparent declines or increases in mussel species richness? Which have the highest species richness and number of listed species? Which species may have declined, and which may have increased between historical and recent times?

Historical Unionid Mussel Occurrence Records

Unionid mussel occurrences recorded in Michigan were acquired from the University of Michigan, Museum of Zoology Mollusk Division (UMMZ) and The Ohio State University Museum of Biological Diversity (OSUMBD). Staff from each museum were contacted to identify policies for use of occurrence data. A total of 6123 records within the state of Michigan were acquired from UMMZ, and 767 records were acquired from OSUMBD. Museum occurrence data were reviewed to identify and remove records not meeting requirements for the project. These requirements were locational precision, valid collection date, and geographic location.

Occurrence records not meeting a minimum level of locational precision were omitted. For UMMZ records, locational precision was assessed based on "localityID" and "county". Seven UMMZ records did not have valid values for the "county" field. Counties for five of these were determined and added based on the description in the "localityID" field. The two remaining records were omitted. For OSUMBD records, this precision was assessed based on "waterbody", "county", and "locality" data fields. The "locality" data field is a more detailed description of location. Records with null values for "waterbody" or "county" were omitted. 727 out of 767 records met requirements for the OSUMBD data set. Latitude and longitude coordinates for both OSU and UMMZ data sets were assigned by museum staff based on the other existing locational data fields, so this data field was not used to assess locational precision.

Records were also omitted if they lacked a collection date. Although in cases where a well-known collector is identified for a historical record with no collection date, a maximum collection year was inferred based on the year of death of the collector. For example, specimens collected by Bryant Walker that do not have a collection date listed were assumed to have a collection date of pre-1936 based on the year of his death. 96% of UMMZ records have a collection date of 1960 or earlier. Fourteen UMMZ records were omitted due to a lack of collection date. A total of 584 records were included in the historical mussel occurrence data layer for occurrences within HUC10 watersheds intersecting or contained within the HMNF boundary. 551 of these records were from UMMZ and 53 were from OSUMBD. The collection dates of these records ranged from ca.1900 to 1973.

Recent Unionid Mussel Occurrence Records

For the purpose of this project, recent occurrence records were considered those between 1998 and 2015. The recent data set includes records from field surveys by Michigan Natural Features Inventory (MNFI) and Huron-Manistee National Forest (HMNF), and records from the Natural Heriage Database maintained by MNFI. Records from the Natural Heritage Database include endangered, threatened, and special concern species only. Records from MNFI and HMNF surveys include non-listed and listed species, and survey sites where no mussels were found. There were 325 recent records in HUC10 watersheds contained within or intersecting the forest boundary, including 93 sites where no unionid mussels were found.

Typical Methods for Recent Mussel Surveys

Survey taking place in wadable habitats (less than approx. 70cm depth) utilized visual and tactile methods of detection. The number of individuals, both live and shells, were determined for each unionid mussel species at each site. A measured search area was used to standardize sampling effort among sites and allow mussel density estimates to be made. Typically $128m^2$ provides a good compromise between the amount of search effort per site and the number of sites to be completed within the scope of the project. The size of this search area is also consistent with a number of past mussel surveys in Michigan that have used $128m^2$ as a standard search area. The search area was defined by dividing stream width into 128 to get a reach length that would give $128m^2$. In some cases more or less area is searched based on amount of available habitat. When possible, sites were searched from bank to bank so that the full

range of micro habitats was covered and the area equaled the stream width times the reach length.

Live unionids and shells were located with a combination of visual and tactile means. Glass bottom buckets were used to facilitate visual searches. At sites where visual detection was difficult (e.g. where mussels were found buried in the substrate) hands were passed through the substrate throughout the entire search area. Occasional tactile searches through the substrate were made at sites where primarily visual detection was used to help ensure that buried mussels were not overlooked. Live individuals were identified to species and planted back into the substrate anterior end down (siphon end up) in the immediate vicinity of where they were found. Shells were identified to species. The presence/absence of zebra mussels, and Asian clams (*Corbicula fluminea*) was recorded. In cases where zebra mussels were found attached to live native unionid mussels, the number attached to each was counted. Zebra mussels attached to live unionid mussels were removed by hand before the unionid was placed back in the substrate.

Habitat data were taken to describe and document conditions at the time of the surveys. The substrate within each transect was characterized by estimating percent composition of each of the following six particle size classes (diameter); boulder (>256mm), cobble (256-64mm), pebble (64-16mm), gravel (16-2mm), sand (2-0.0625mm), silt/clay (<0.0625mm) (Hynes 1970). Woody debris, aquatic vegetation, exposed solid clay substrate, and erosion were noted when observed. Conductivity and pH were recorded with an Oakton handheld meter. Alkalinity was measured with a LaMotte kit (model DR-A) and hardness was measured with a Hach kit. Latitude and longitude of sites were recorded with handheld GPS units.

SCUBA was used at some sites too deep to wade, e.g. sites in the main stem of the Manistee and Au Sable Rivers. A flat bottom aluminum boat with an outboard jet drive motor was use to access sites and made navigating shallow areas much easier. Mussel habitat and signs of mussel beds, such as shells in muskrat middens, were identified from the boat and were used as a basis for selecting survey sites. The field crew for SCUBA surveys typically consisted of two divers and a third person who recorded data, assisted divers with gear, and tended the boat while divers were in the water. Once signs of a mussel bed were identified, the boat was anchored and transects were set. In some cases, sites were surveyed without prior evidence of shell or live individuals other than apparently suitable habitat.

Transects were set side by side approximately 3 to 8m apart, parallel to river flow. This orientation of transects was used to assist divers in maintaining position in relative high currents. Transects were delineated using 10m lengths of 2.54cm nylon webbing with 4.5kg anchors fastened to each end. An arms-width (approx. 0.8m) on each side of each transect was searched by passing the hands over and through the substrate to a depth of approximately 5cm of substrate. A buoy was tied to one or both anchors to mark the endpoints of each transect. Divers started working each pair of transects at the same time, moving in an upstream direction. Searching in an upstream direction helped limit a decrease in visibility due to disturbance of fine sediments during surveys. Divers searched a total of eight transects at each site (four transects per diver). Subsequent pairs of transects were placed directly upstream from the previous pair. Transects in water shallow enough to wade (approx. <70cm) allowed surveyors to kneel on the bottom and perform tactile searches without the use of SCUBA. Glass bottom buckets were also used at these sites to help detect mussels visually.

Unionids buried up to approximately 5cm below the substrate surface and located within 0.8m on either side of transect lines were detectable. At sites with low underwater visibility, mussels were located primarily by feel as divers passed their hands through the substrate adjacent to the transect lines. Relatively clear water at a few of the sites made visual detection of mussels possible in addition to locating by hand. Live unionids were placed in mesh bags, brought to the surface, and identified after completing each transect. Empty unionid shell found during transect searches was either identified underwater or brought to the surface for identification. The boat and outboard motor were either dried overnight or washed with a bleach solution to prevent the transportation of live *D. polymorpha* and other exotics between different river reaches.

Long Term Mussel Species Trends

Of the 47 unionid mussel species recorded in Michigan, 28 are currently listed as threatened, endangered, extirpated, or are species of special concern (Table 1). The history of the listed status of these species in Table 1 reflects, in part, the actual conservation status of the species in Michigan, but also has been influenced by the lack of survey data in the decades between 1970 and 2000. The spread of zebra mussels and other factors has undoubtedly impacted native mussel populations, including those in and near the HMNF, and this is reflected in the sharp increase in number of mussel species listed between 1992 and 2009.

Data sets for three geographic scopes were created using both historical and recent occurrence records. The first geographic scope included only those records which were located within HMNF ownership (Appendix A.1-3.), the second included records located within the HMNF boundary (Appendix B.1-3.), and the third included records in

HUC10 watersheds within or intersecting the boundaries of the HMNF (Appendix C.1-3.).

Eighteen species have historical and/or recent occurrence records within the ownership of HMNF (Table 2). Five of these are currently threatened, endangered, or are species of special concern. Another three were proposed in 2014 to be considered species of special concern. An additional two mussel species have historical and/or recent occurrence records outside HMNF ownership but within the HMNF boundary. Both of these are species of special concern. A total of twenty-seven mussel species have historical and/or recent occurrence records within the HUC10 watersheds intersecting or contained within the HMNF boundary. Twelve are threatened, endangered, or are species of special concern.

One federally endangered mussel species, *Epioblasma triquetra*, has a recent occurrence record (2002) in the Muskegon River watershed outside of the HMNF boundary. It was not documented historically within any of the HUC10 watersheds of HMNF. Of the six federally listed mussel species that have been documented in Michigan, *E. triquetra*, has the most potential to be found with the HMNF boundary.

Two state endangered mussel species were documented in historical and recent surveys. *Ligumia nasuta* occurred within HMNF ownership both historically and recently. *Ligumia recta* was documented historically within the HMNF boundary and recently within HMNF ownership.

Four state threatened species have been recorded within HUC10 watersheds intersecting or contained within the HMNF boundary. *Alasmidonta viridis* occurred within HMNF ownership both historically and recently. *Lampsilis fasciola* was only recently documented within HMNF ownership. Historically it was not documented in any HUC10 watersheds intersecting or contained within the HMNF boundary. *Potamilus ohiensis* and *Truncilla donaciformis* have only been documented historically within the HUC10 watersheds of HMNF, and have not been documented within the HMNF boundary in either historical or recent surveys.

Five species of special concern have been documented in the HUC10 watersheds of HMNF. There are historical and recent records for *Alasmidonta marginata* within the HMNF boundary. *Pleurobema sintoxia* was documented in the HMNF boundary historically but not in recent surveys. *Truncilla truncata* is known from one of the HUC10 watersheds intersecting the HMNF boundary in recent surveys only. *Utterbackia imbecillis* was documented outside the HMNF boundary historically but within HMNF ownership in recent surveys. *Villosa iris* occurred within HUC10 watersheds of HMNF but outside of the HMNF boundary, both in historical and recent surveys. Three species proposed in 2014 to be species of special concern (*Lasmigona compressa*, *Lasmigona costata*, and *Potamils alatus*) were recorded in recent surveys within the ownership of HMNF.

Comparing the number of watersheds (HUC10) each species occurred in historically versus recently helps to identify long term trends of mussel species associated with the HMNF (Table 3). Although historical sampling effort and survey methods are not well documented, the increase or decrease in watersheds relative to other species allows for the identification of species ranges that have increased or decreased most dramatically. The species with the top three largest ranges historically (based on number of watersheds they occurred in) were *Lampsilis siliquoidea* (22), *P. grandis* (21), and *Strophitus undulatus* (18). The species with the top three largest ranges based on recent surveys were *L. siliquoidea* (13), *F. flava* (11), and *E. dilatata* (9).

Ten species were documented in more watersheds in recent surveys than historically. *Fusconaia flava*, *Elliptio dilatata*, *Actinonaias ligamentina*, and *Lasmigona complanata* had the highest increase in number of watersheds. All four of these are non-listed and fairly common in Michigan. The large increase in number of watersheds these four species were found relative to other species (up to 83% increase in *F. flava*) suggests an actually increase in range has occurred, not just an effect of a difference in sampling effort or methods between historical and recent surveys.

Four species were not known from the HUC10 watersheds of HMNF historically, but were found in recent surveys. These include one federally endangered (*E. triquetra*), one state threatened (*L. fasciola*), one species of special concern (*T. truncata*), and one non-listed species (*Quadrula quadrula*). All four were found in just one watershed in recent times. One species (*A. marginata*) was documented in same number of watersheds (2) recently as historically.

Four species documented historically within HUC10 watersheds of the HMNF were not found in recent surveys. Three of these four were known from only one watershed historically (*Amblema plicata*, *P. ohiensis*, and *T. donaciformis*), and one was known from two watersheds historically (*P. sintoxia*). An additional 12 species were found in fewer watersheds in recent surveys than historically. The five species with the greatest decrease in number of watersheds are all non-listed mussel species that are relatively common in Michigan. The large decrease in number of watersheds in which these five species were found (up to 60% decline in *Pyganodon grandis*) suggests an actually decrease in range has occurred, not just an effect of a differ-

ence in sampling effort or methods between historical and recent surveys.

Maps of Historical and Recent Species Occurrences

Figure 1 illustrates the geographic scope of this assessment including names of USGS ten digit hydrologic unit code watersheds (HUC10) and the HMNF boundary. Historical occurrence records in the vicinity of HMNF are illustrated in Figure 2. Recent occurrence records, including live individuals and/or shells, are illustrated in Figure 3, along with survey sites where no mussels (live or shell) were found. Maps illustrating historical (ca. 1900-1973) and recent (1998-2015) occurrence records were created for each mussel species with records in HUC10 watersheds intersecting or contained within the HMNF boundary. Maps for four species (*Cyclonaias tuberculata*, *Ptychobranchus faciolaris*, *Toxolasma parvum*, and *Venustaconcha ellipsiformis*) with records outside the target watersheds were also created due to their close proximity to these watersheds. Historical and recent occurrence maps were made for a total of 31 species (pgs. 18-79).

Mussel Species Richness by Watershed

Historically the HUC10 watersheds of HMNF with the three highest mussel species richness were the lower main stem of the Muskegon River (16), Brooks Creek-Muskegon River (14), and Hardy Dam Pond-Muskegon River (14) (Table 4). In recent surveys, there were just three species found in the lower main stem of the Muskegon River (Table 5). Zero mussels (live or shell) were found at four of the six recent survey sites. In the Brooks Creek-Muskegon River watershed ten species were found in recent surveys, and eight of ten survey sites had zero mussels. In the Hardy Dam Pond-Muskegon River watershed six species were found in recent surveys, and five of nine sites had zero mussels.

Watersheds with the highest mussel species richness in recent surveys are the lower main stem of the Au Sable River (14), lower main stem Manistee River (13), and a three way tie between the lower main stem of the White River (10), Clam River (10), and Brooks Creek-Muskegon River (10) (Table 5). All nine recent survey sites in the lower main stem of the Au Sable River had mussels present. On the opposite side of the spectrum, 15 of 34 recent survey sites in the lower main stem of the Manistee River had zero mussels present. Three of twelve sites surveyed recently in the lower main stem of the White River watershed had zero mussels. Two of eight recent survey sites in the Clam River watershed had zero mussels.

Species with Potential to Occur in HMNF Watersheds

Four species with no records historically or in recent surveys were included in this assessment because they occurred in close proximity to HMNF and have some potential to occur within the targeted HUC10 watersheds with increased survey effort. *Cyclonaias tuberculata*, a state threatened species, occurred historically and in recent surveys in the Grand River watershed adjacent to the Muskegon River watershed. *Ptychobranchus fasciolaris*, a species of special concern, occurs in the Tittabawassee River watershed adjacent to the South Branch of the Au Sable River, which intersects the boundary of HMNF. There is also an historical record for it north of the HMNF in the Black River watershed, Cheboygan County. *Toxolasma parvum*, a state endangered species, has recent occurrence records in the Grand River watershed and Tittabawassee River watershed, as well as an historical record in the Platte River watershed, Benzie County. *Venustaconcha ellipsiformis,* a species of special concern, has recent and historical records in the Tittabawassee, Grand, and Pine River watersheds.

Gaps in Survey Effort

Several watersheds in the HMNF boundary have no documented recent survey effort and could be prioritized for future survey efforts. Pentwater River watershed has zero recent surveys, though five species have been recorded in the watershed historically, including the state threatened *P. ohiensis*. The South Branch Au Sable River watershed has zero recent survey sites. Although there are no historical mussel records in the watershed, it might not have ever been surveyed. Big Creek watershed, also with zero recent survey sites, has one species recorded historically. The Pine River, Tawas River, and East Branch Au Gres River watersheds have no known recent survey effort. Historically they have four, zero, and zero species documented respectively.

Four watersheds have little recent survey effort documented and could also be prioritized for future survey efforts. Only two sites have been surveyed recently in the Little South Branch of Pere Marquette River watershed. No mussels have been documented in the watershed but the adjacent Big South Branch of the Pere Marquette River watershed has five species, suggesting the potential for occurrences. The South Branch White River watershed has four recently surveyed sites at the far west end of the watershed. The eastern two thirds of the watershed has no known recent survey effort and is within the HMNF boundary. The Little Manistee River watershed has no historical records but three species were documented recently. Only three sites have been surveyed recently.

Only the far upstream and far downstream reaches of the Au Sable River main stem have been surveyed in recent years. Fourteen species have been recorded recently, and six recorded historically, indicating a strong potential for additional occurrences in the un-surveyed middle reaches. These species include the state endangered *L. nasuta* and *L. recta*, and state threatened *A. viridis*.

Assessment of shorter term, recent trends in the status of HMNF mussel species is made difficult by the fact that most sites surveyed in recent years have not yet been resurveyed. One exception is a site in the Manistee River main stem about 1km upstream of the High Bridge boat launch where a decline in mussel population status was documented. This site was sampled four times over a twelve year period (Manistee M6a-d). These surveys documented a decline in species richness and abundance of native mussels over time. Unionid species richness in 2002, 2005, 2011, and 2015 declined from 8 to 3 to 2 and to 1 species respectively. The number of unionid mussels found per m^2 decreased from 0.20 to 0.07 to 0.02 to less than 0.01 respectively. There were three live individuals of the state endangered *L. recta* documented in 2002 and none in subsequent years. There was one live individual of a special concern species, *Utterbackia imbecillis*, found in 2002 and none in later years. The impact of zebra mussels on native mussels is a likely cause of the decline. A high rate and intensity of zebra mussel infestation was documented. The frequency of zebra mussel attachment to live unionid mussels was 88% in 2002. 100% of native mussels at the site had zebra mussels attached in 2005, 2011, and 2015. The average number of zebra mussels attached to each native mussel was 7.9 in 2002, 19.2 in 2005, 15.0 in 2011, and 68.5 in 2015 (Badra and Goforth 2003, Badra 2005, Badra 2012c, and Ania, Corner, and Riley unpublished data 2015). Future survey efforts could include revisits to selected sites, especially those with listed mussel species, in order to capture recent changes in the status of HMNF mussels.

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Table 1. Listed status of Michigan's unionid mussels from 1976 to 2016. Changes to the listed status of some species were proposed in 2014, and are being considered by the Michigan Department of Natural Resources and the state legislature. FE= federally endangered, E= state endangered, T= state threatened, SC= species of special concern, Extrp.= state extirpated

		1976	1980	1982	1987	1992	2009-Present	Proposed in 2014
Actinonaias ligamentina	Mucket							
Alasmidonta marginata	Elktoe						SC	SC
Alasmidonta viridis	Slippershell						T	T
Amblema plicata	Threeridge							
Anodontoides ferussacianus	Cylindrical papershell							
Cyclonaias tuberculata	Purple wartyback	T	T		SC	SC	T	T
Elliptio complanata	Eastern elliptio	T	T					SC
Elliptio crassidens	Elephant-ear							
Elliptio dilatata	Spike							
Epioblasma obliquata perobliqua	White catspaw			E	E	E/FE	E/FE	E/FE
Epioblasma torulosa rangiana	Northern riffleshell			E	E	E/FE	E/FE	E/FE
Epioblasma triquetra	Snuffbox	T			T	E	E/FE	E/FE
Fusconaia flava	Wabash pigtoe							
Lampsilis cardium	Pocketbook							
Lampsilis fasciola	Wavy-rayed lampmussel	E	E		SC	T	T	T
Lampsilis siliquoidea	Fatmucket							
Lasmigona complanata	White heelsplitter							
Lasmigona compressa	Creek heelsplitter							SC
Lasmigona costata	Fluted-shell							SC
Leptodea fragilis	Fragile papershell							
Leptodea leptodon	Scaleshell				T	SC	SC/FE	Extrp./FE
Ligumia nasuta	Eastern pondmussel						E	E
Ligumia recta	Black sandshell						E	T
Obliquaria reflexa	Three-horned wartyback						E	E
Obovaria olivaria	Hickorynut				T	SC	E	E
Obovaria subrotunda	Round hickorynut	E	E	E	T	E	E	E
Pleurobema clava	Clubshell	T	T	E	E	E/FE	E/FE	E/FE
Pleurobema cordatum	Ohio pigtoe							
Pleurobema sintoxia	Round pigtoe						SC	SC
Potamilus alatus	Pink heelsplitter							SC
Potamilus ohiensis	Pink papershell						T	E
Ptychobranchus fasciolaris	Kidney-shell						SC	SC
Pyganodon grandis	Giant floater							
Pyganodon lacustris	Lake floater						SC	SC
Pyganodon subgibbosa	Round lake floater	T	T	T	T	T	T	SC
Quadrula pustulosa	Pimpleback							
Quadrula quadrula	Mapleleaf							
Simpsonaias ambigua	Salamander mussel						E	E
Strophitus undulatus	Strange floater							
Toxolasma lividus	Purple lilliput			E	E	E/FC	E	E
Toxolasma parvum	Lilliput						E	E
Truncilla donaciformis	Fawnsfoot						T	E
Truncilla truncata	Deertoe						SC	SC
Utterbackia imbecillis	Paper pondshell						SC	SC
Venustaconcha ellipsiformis	Ellipse						SC	SC
Villosa fabalis	Rayed bean				E	E/FC	E/FE	E/FE
Villosa iris	Rainbow						SC	SC

Table 2. The distribution of occurrence records for each mussel species relative to the Huron-Manistee National Forest (HMNF) boundary and HMNF ownership. 1= Species documented within one or more HUC10 watersheds intersecting or contained within HMNF boundary; 2= Species documented within HMNF boundary; 3= Species documented within HMNF ownership. FE= federally endangered, E= state endangered, T= state threatened, SC= species of special concern

		Historical Records	Recent Records	Current listed status
Actinonaias ligamentina	Mucket	1, 2	1, 2, 3	
Alasmidonta marginata	Elktoe	1, 2	1, 2	SC
Alasmidonta viridis	Slippershell	1, 2, 3	1, 2, 3	T
Amblema plicata	Threeridge	1		
Anodontoides ferussacianus	Cylindrical papershell	1, 2, 3	1, 2, 3	
Cyclonaias tuberculata	Purple wartyback			T
Elliptio complanata	Eastern elliptio			
Elliptio crassidens	Elephant-ear			
Elliptio dilatata	Spike	1, 2	1, 2, 3	
Epioblasma obliquata perobliqua	White catspaw			E/FE
Epioblasma torulosa rangiana	Northern riffleshell			E/FE
Epioblasma triquetra	Snuffbox		1	E/FE
Fusconaia flava	Wabash pigtoe	1, 2	1, 2, 3	
Lampsilis cardium	Pocketbook	1, 2, 3	1, 2, 3	
Lampsilis fasciola	Wavy-rayed lampmussel		1, 2, 3	T
Lampsilis siliquoidea	Fatmucket	1, 2, 3	1, 2, 3	
Lasmigona complanata	White heelsplitter	1	1, 2, 3	
Lasmigona compressa	Creek heelsplitter	1, 2, 3	1, 2, 3	
Lasmigona costata	Fluted-shell	1, 2, 3	1, 2, 3	
Leptodea fragilis	Fragile papershell	1	1, 2, 3	
Leptodea leptodon	Scaleshell			SC/FE
Ligumia nasuta	Eastern pondmussel	1, 2, 3	1, 2, 3	E
Ligumia recta	Black sandshell	1, 2	1, 2, 3	E
Obliquaria reflexa	Three-horned wartyback			E
Obovaria olivaria	Hickorynut			E
Obovaria subrotunda	Round hickorynut			E
Pleurobema clava	Clubshell			E/FE
Pleurobema cordatum	Ohio pigtoe			
Pleurobema sintoxia	Round pigtoe	1, 2		SC
Potamilus alatus	Pink heelsplitter	1	1, 2, 3	
Potamilus ohiensis	Pink papershell	1		T
Ptychobranchus fasciolaris	Kidney-shell			SC
Pyganodon grandis	Giant floater	1, 2, 3	1, 2, 3	
Pyganodon lacustris	Lake floater			SC
Pyganodon subgibbosa	Round lake floater			T
Quadrula pustulosa	Pimpleback			
Quadrula quadrula	Mapleleaf		1	
Simpsonaias ambigua	Salamander mussel			E
Strophitus undulatus	Strange floater	1, 2, 3	1, 2, 3	
Toxolasma lividus	Purple lilliput			E
Toxolasma parvum	Lilliput			E
Truncilla donaciformis	Fawnsfoot	1		T
Truncilla truncata	Deertoe		1	SC
Utterbackia imbecillis	Paper pondshell	1	1, 2, 3	SC
Venustaconcha ellipsiformis	Ellipse			SC
Villosa fabalis	Rayed bean			E/FE
Villosa iris	Rainbow	1	1	SC

Table 3. The number of watersheds with historical and recent occurrence records for each mussel species, for HUC10 watersheds intersecting or contained within the Huron-Manistee Nation Forest Boundary.

Species	# Historical Watersheds	# Recent Watersheds	Difference
Fusconaia flava	6	11	+5
Elliptio dilatata	6	9	+3
Actinonaias ligamentina	3	5	+2
Lasmigona complanata	4	6	+2
Epioblasma triquetra	0	1	+1
Lampsilis fasciola	0	1	+1
Ligumia recta	3	4	+1
Quadrula quadrula	0	1	+1
Truncilla truncata	0	1	+1
Utterbackia imbecillis	1	2	+1
Alasmidonta marginata	2	2	0
Cyclonaias tuberculata	0	0	0
Ptychobranchus fasciolaris	0	0	0
Toxolasma parvum	0	0	0
Venustaconcha ellipsiformis	0	0	0
Amblema plicata	1	0	-1
Potamilus ohiensis	1	0	-1
Truncilla donaciformis	1	0	-1
Leptodea fragilis	4	2	-2
Ligumia nasuta	3	1	-2
Pleurobema sintoxia	2	0	-2
Potamilus alatus	3	1	-2
Villosa iris	3	1	-2
Lasmigona costata	6	3	-3
Alasmidonta viridis	11	7	-4
Lampsilis cardium	10	6	-4
Lasmigona compressa	8	2	-6
Lampsilis siliquoidea	22	13	-9
Anodontoides ferussacianus	17	7	-10
Strophitus undulatus	18	8	-10
Pyganodon grandis	21	7	-14

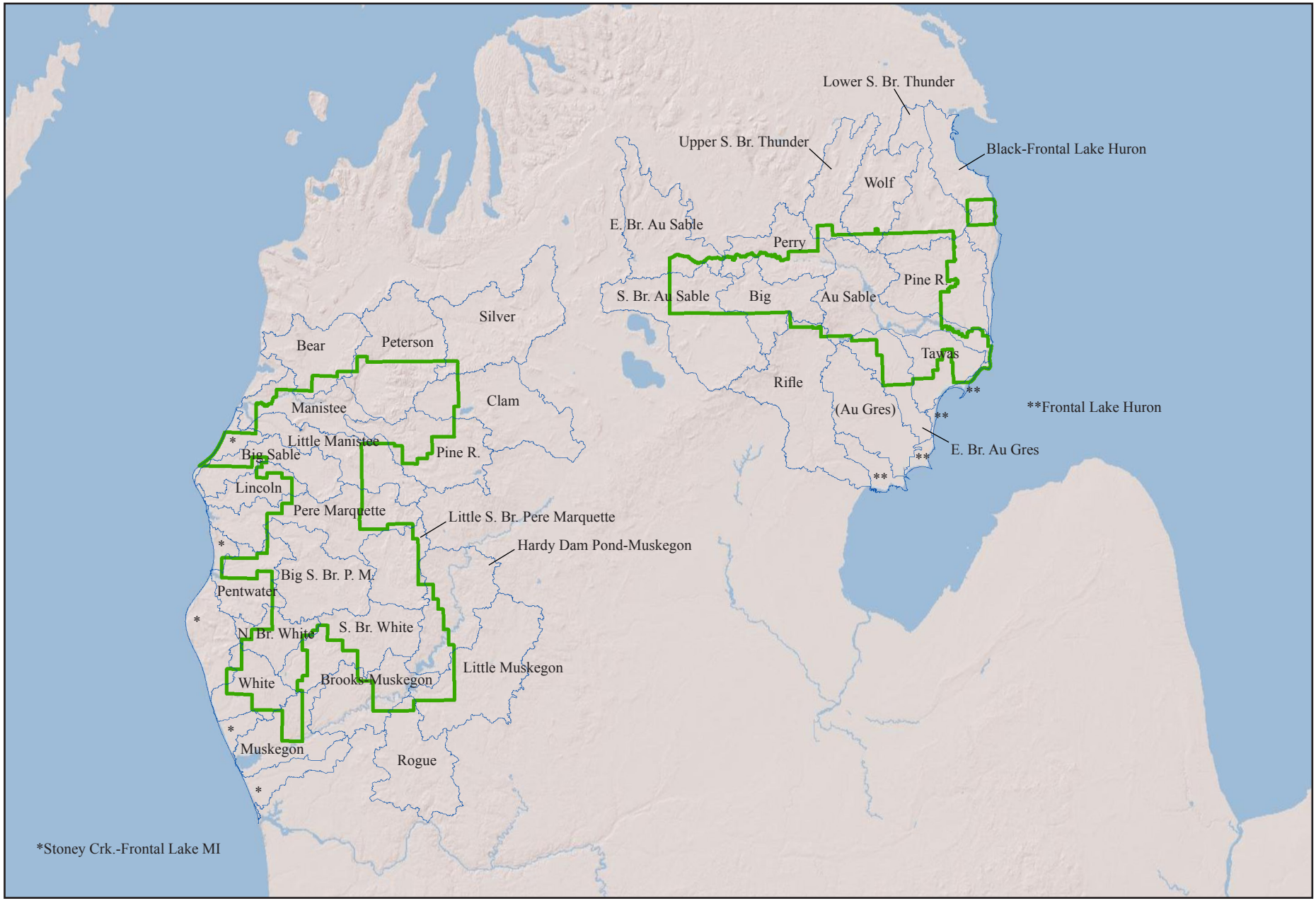


Figure 1. Names of watersheds contained within, or intersecting, the Huron-Manistee National Forest (HMNF) boundary. Blue polygons delineate USGS ten digit hydrologic unit code watersheds (HUC10). Green polygons delineate the HMNF boundary. The Au Gres River watershed is labeled for reference but not counted as a watershed within or intersecting the HMNF boundary.

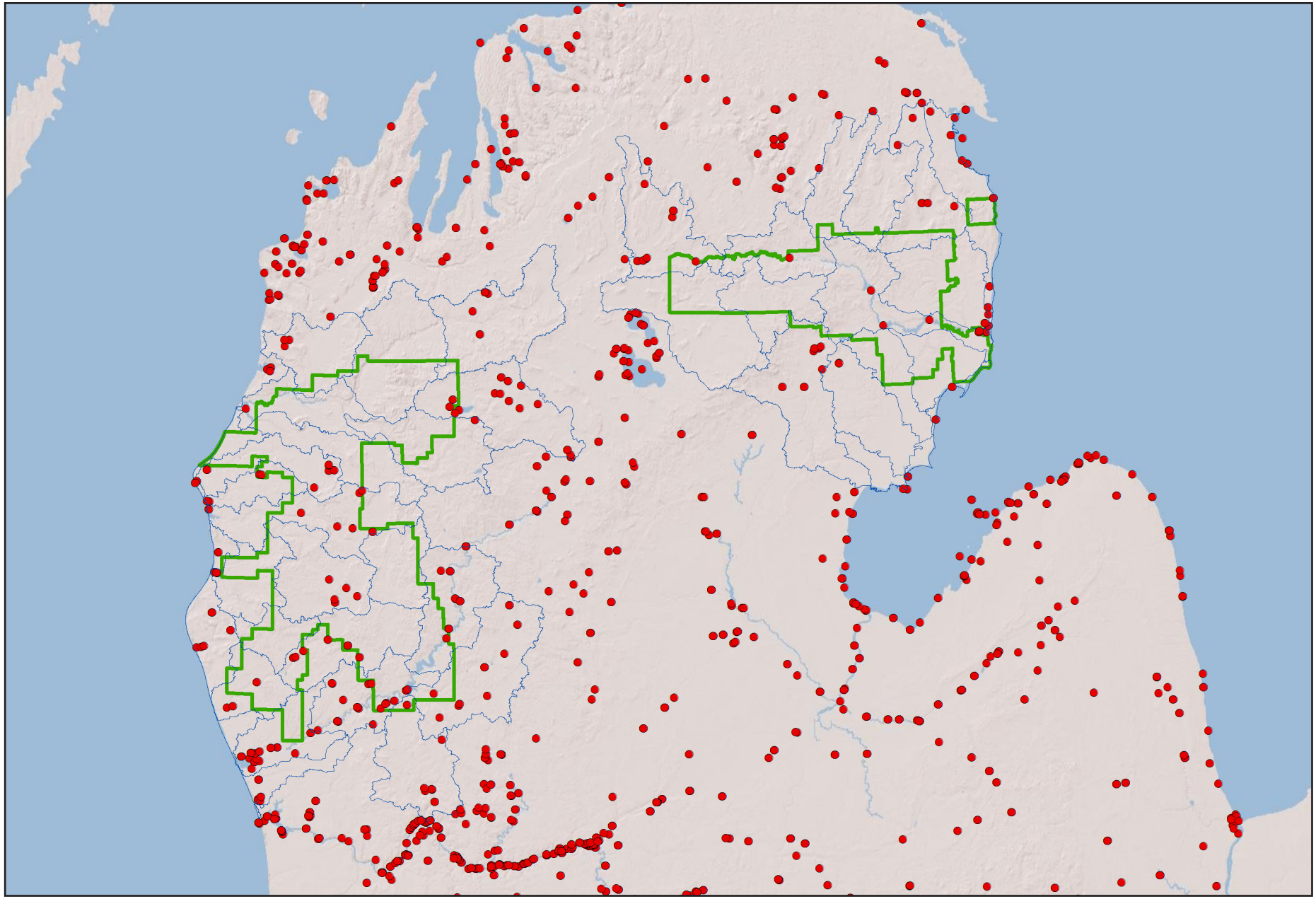


Figure 2. Historical mussel records (ca. 1900-1973) in the vicinity of Huron-Manistee National Forest (HMNF). Red dots represent sites where mussels were collected. Blue polygons delineate USGS ten digit hydrologic unit code watersheds (HUC10). Green polygons delineate the HMNF boundary. Historical records were provided by the University of Michigan, Museum of Zoology Mollusk Division and The Ohio State University Museum of Biological Diversity.

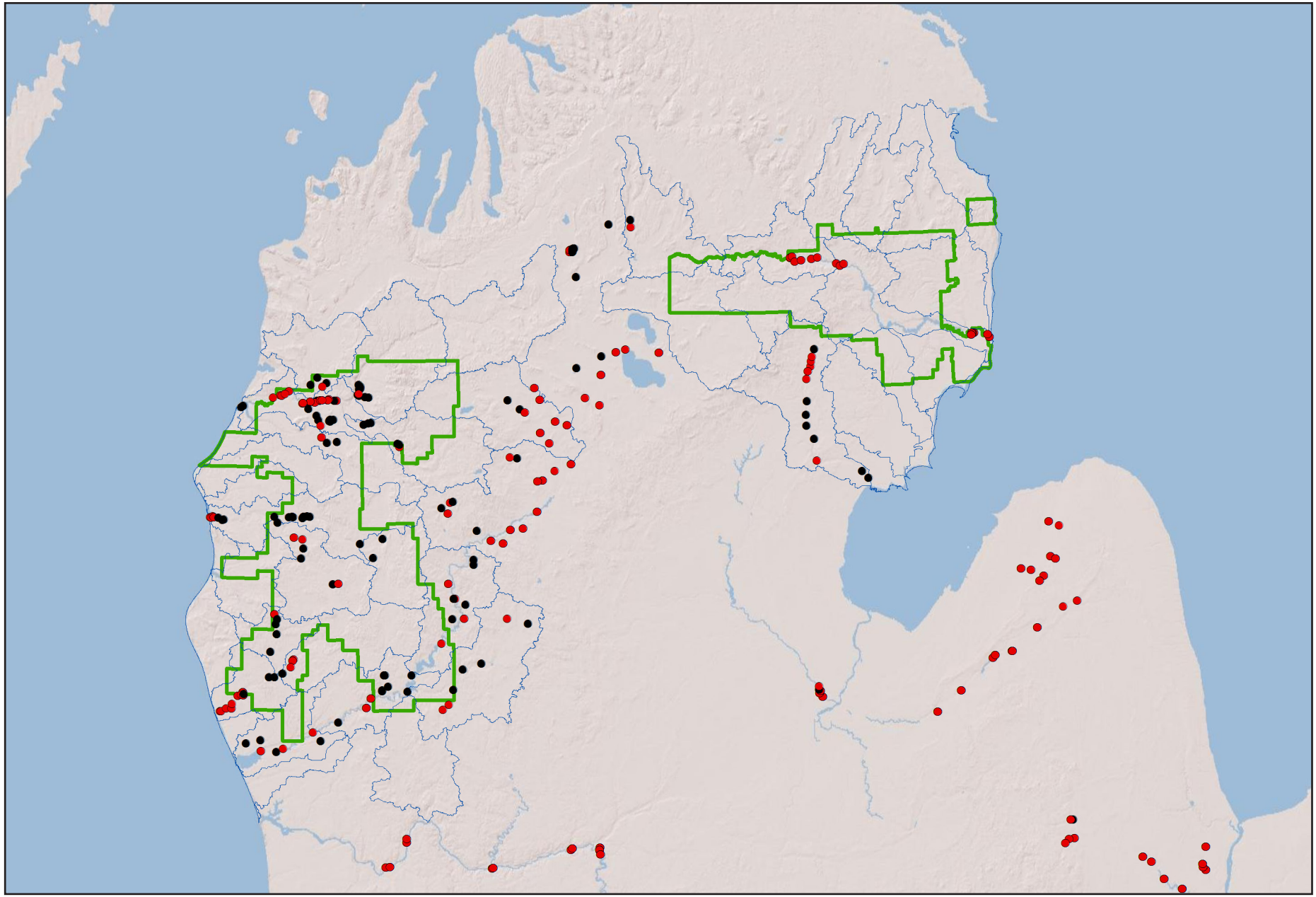


Figure 3. Sites surveyed for mussels in the vicinity of Huron-Manistee National Forest (HMNF) from 1998 to 2015. Red dots represent sites where mussels (live or shell) were present. Black dots represent sites where no mussels (live or shell) were found. Blue polygons delineate USGS ten digit hydrologic unit code watersheds (HUC10). Green polygons delineate the HMNF boundary. Recent occurrence data were compiled from results of Michigan Natural Features Inventory surveys, surveys by HMNF staff, and records from the Natural Heritage Database.

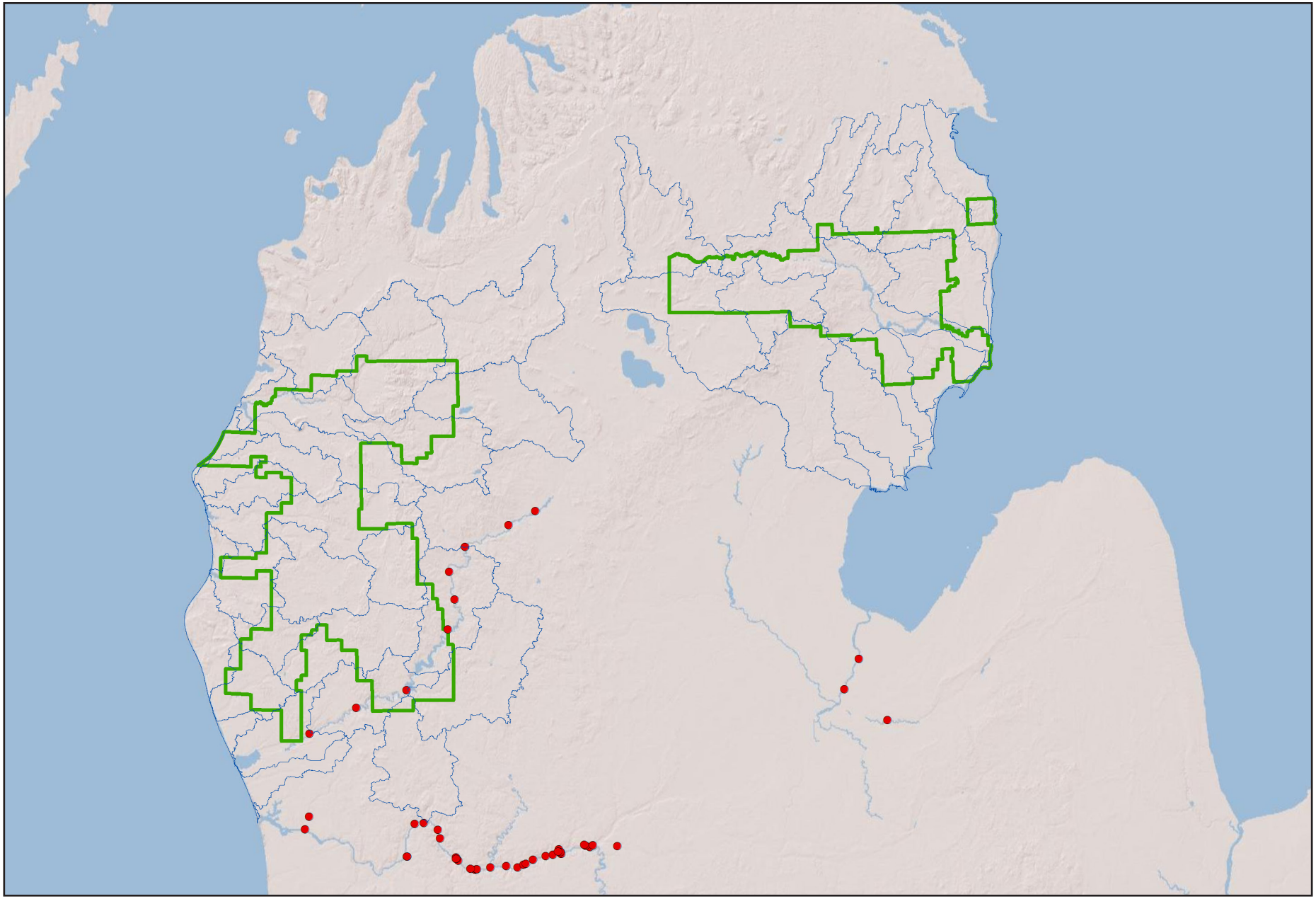
Table 4. Unionid mussel species documented in each watershed historically (ca. 1900-1973). An "x" denotes one or more historical records exist for that species in the watershed.

HUC8	HUC10	*Actinonaias ligamentina*	*Alasmidonta marginata*	*Alasmidonta viridis*	*Amblema plicata*	*Anodontoides ferussacianus*	*Cyclonaias tuberculata*	*Elliptio dilatata*	*Epioblasma triquetra*	*Fusconaia flava*	*Lampsilis cardium*	*Lampsilis fasciola*	*Lampsilis siliquoidea*	*Lasmigona complanata*	*Lasmigona compressa*	*Lasmigona costata*	*Leptodea fragilis*	*Ligumia nasuta*	*Ligumia recta*	*Pleurobema sintoxia*	*Potamilus alatus*	*Potamilus ohiensis*	*Ptychobranchus fasciolaris*	*Pyganodon grandis*	*Quadrula quadrula*	*Strophitus undulatus*	*Toxolasma parvum*	*Truncilla donaciformis*	*Truncilla truncata*	*Utterbackia imbecillis*	*Venustaconcha ellipsiformis*	*Villosa iris*	# of species per HUC10
Manistee	Peterson Creek																															0
	Bear Creek																							x		x						2
	Pine River												x													x						2
	Silver Creek					x							x		x									x		x						5
	Little Manistee River																															0
	Manistee River (lower main stem)												x																			1
P. M.-White	Big Sable River																															0
	Stoney Creek-frontal Lake Michigan					x		x		x	x		x	x			x				x			x		x						10
	Lincoln River					x																		x								2
	Pere Marq. River (lower main stem)					x							x			x								x		x				x		6
	Little S. Branch Pere Marq. River																															0
	Big S. Branch Pere Marq. River			x									x											x		x						4
	Pentwater River					x					x		x										x	x								5
	South Branch White River			x		x				x	x		x		x	x								x		x						9
	North Branch White River																															0
	White River (lower main stem)					x							x	x										x								4
Muskegon	Clam River			x		x							x		x									x		x						6
	Hardy Dam Pond-Muskegon River	x	x	x		x		x		x	x		x			x			x	x				x		x					x	14
	Little Muskegon River			x		x		x		x	x		x		x	x								x		x						10
	Brooks Creek-Muskegon River	x	x			x		x		x	x		x		x	x			x	x	x			x		x						14
	Rouge River												x													x						2
	Muskegon River (lower main stem)	x		x	x	x		x		x	x		x	x			x		x		x			x		x		x			x	16
Au Sable	East Branch Au Sable River			x		x							x		x	x								x		x						7
	South Branch Au Sable River																															0
	Perry Creek-Au Sable River														x																	1
	Big Creek										x																					1
	Au Sable River (lower main stem)			x		x					x		x					x						x								6
	Pine River												x				x	x						x								4
Au Gres-Rifle	East Branch Au Gres River																															0
	Tawas River																															0
	Black River-Frontal Lake Huron			x		x							x					x						x		x						6
	Rifle River			x		x		x					x		x									x		x					x	8
	Upper S. Branch Thunder Bay River																															0
	Wolf Creek																															0
	Lower S. Branch Thunder Bay River			x		x							x											x		x						5
	# of HUC10 watersheds per species	3	2	11	1	17	0	6	0	6	10	0	22	4	8	6	4	3	3	2	3	1	0	21	0	18	0	1	0	1	0	3	

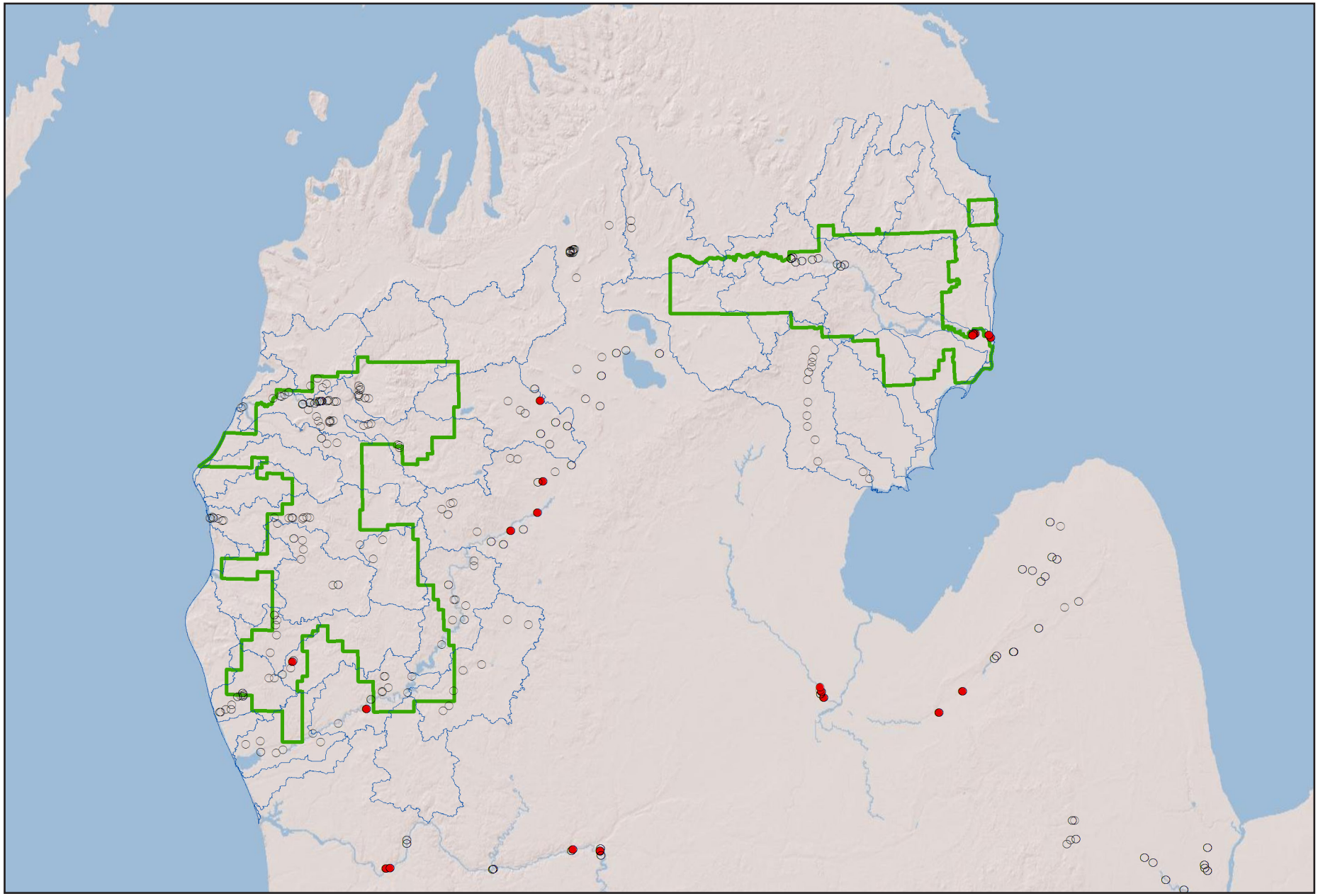
Table 5. Unionid mussel species documented in each watershed in recent surveys (1998-2015). An "x" denotes live individuals or shells of that species was found at one or more survey sites in the watershed. The number of sites surveyed where no mussels (live or shell) were found are given for each HUC10 watershed. *Records from the Big Sable River watershed are from 1981-2000.

HUC8	HUC10	*Actinonaias ligamentina*	*Alasmidonta marginata*	*Alasmidonta viridis*	*Amblema plicata*	*Anodontoides ferussacianus*	*Cyclonaias tuberculata*	*Elliptio dilatata*	*Epioblasma triquetra*	*Fusconaia flava*	*Lampsilis cardium*	*Lampsilis fasciola*	*Lampsilis siliquoidea*	*Lasmigona complanata*	*Lasmigona compressa*	*Lasmigona costata*	*Leptodea fragilis*	*Ligumia nasuta*	*Ligumia recta*	*Pleurobema sintoxia*	*Potamilus alatus*	*Potamilus ohiensis*	*Ptychobranchus fasciolaris*	*Pyganodon grandis*	*Quadrula quadrula*	*Strophitus undulatus*	*Toxolasma parvum*	*Truncilla donaciformis*	*Truncilla truncata*	*Utterbackia imbecillis*	*Venustaconcha ellipsiformis*	*Villosa iris*	# of species per HUC10	# of sites zero species found
Manistee	Peterson Creek												x	x																		2	9
	Bear Creek																							x									1	3
	Pine River												x																				1	5
	Silver Creek																																	
	Little Manistee River									x			x													x							3	2
	Manistee River (lower main stem)		x	x		x		x		x	x	x	x	x					x					x		x				x			13	15
P. M.-White	Big Sable River*										x		x	x			x							x		x							6	na
	Stoney Creek-frontal Lake Michigan																																	
	Lincoln River																																	
	Pere Marq. River (lower main stem)							x		x			x											x									4	14
	Little S. Branch Pere Marq. River																																0	2
	Big S. Branch Pere Marq. River							x		x			x		x											x							5	4
	Pentwater River																																	
	South Branch White River	x		x									x			x										x							5	1
	North Branch White River					x		x		x																							3	4
	White River (lower main stem)					x				x	x		x	x			x		x					x					x	x			10	3
Muskegon	Clam River	x	x	x		x		x		x			x			x								x		x							10	2
	Hardy Dam Pond-Muskegon River					x		x			x		x											x		x							6	5
	Little Muskegon River			x						x																						x	3	6
	Brooks Creek-Muskegon River	x						x	x	x	x		x	x		x			x							x							10	8
	Rouge River																																	
	Muskegon River (lower main stem)									x	x			x																			3	4
Au Sable	East Branch Au Sable River	x																															1	1
	South Branch Au Sable River																																	
	Perry Creek-Au Sable River			x		x							x		x									x									5	0
	Big Creek																																	
	Au Sable River (lower main stem)	x		x		x		x		x	x		x	x			x	x	x		x				x	x							14	0
	Pine River																																	
Au Gres-Rifle	East Branch Au Gres River																																	
	Tawas River																																	
	Black River-Frontal Lake Huron																																	
	Rifle River			x				x																									2	7
	Upper S. Branch Thunder Bay River																																	
	Wolf Creek																																	
	Lower S. Branch Thunder Bay River																																	
	# of HUC10 watersheds per species	5	2	7	0	7	0	9	1	11	6	1	13	6	2	3	2	1	4	0	1	0	0	7	1	8	0	0	1	2	0	1		

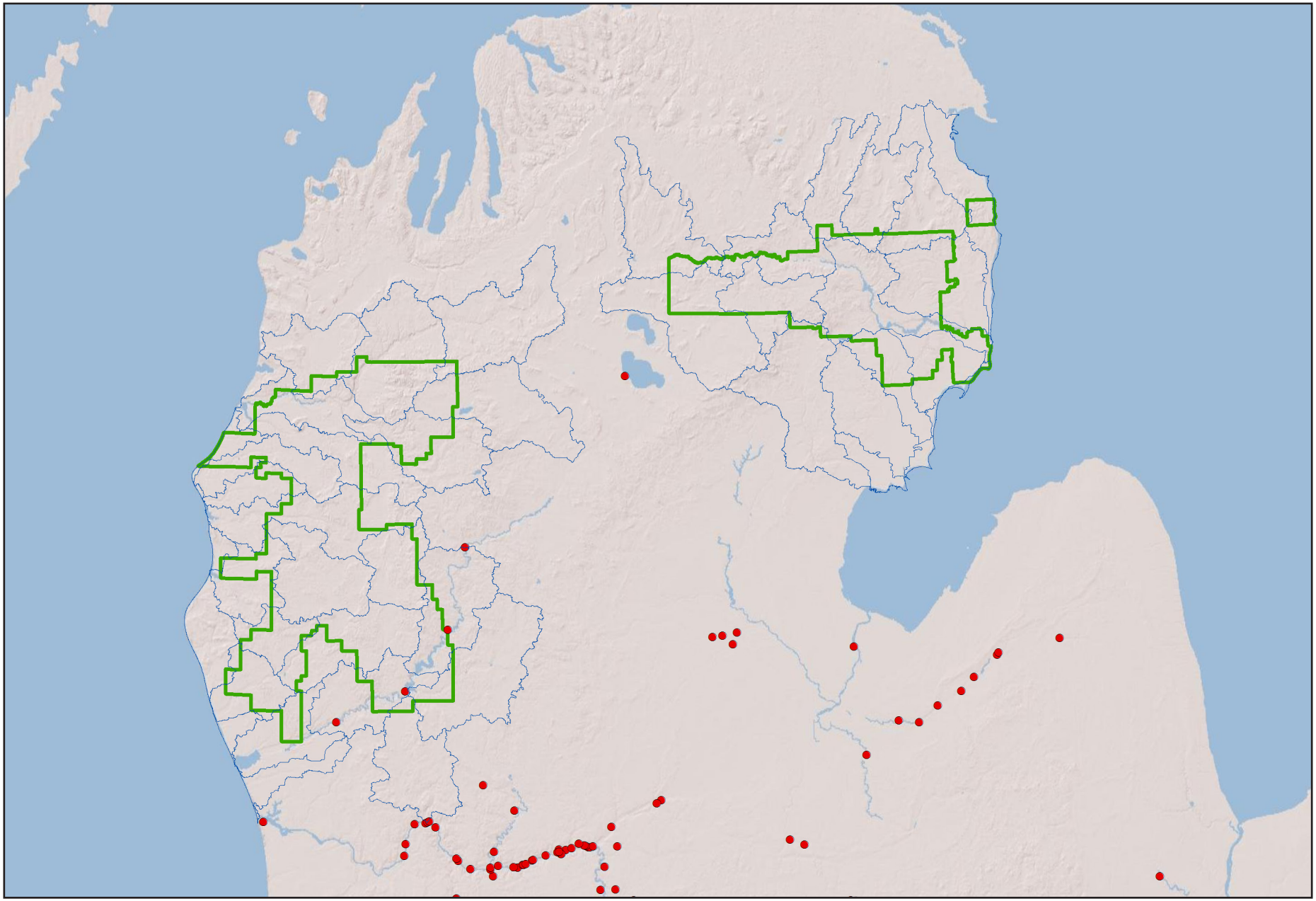
Maps (pgs. 18-79): Unionid mussel occurrences in watersheds (HUC10) intersecting or contained within the Huron-Manistee National Forest (HMNF) boundary. Maps of historical occurrences are based on records (ca. 1900-1973) from the University of Michigan Museum of Zool**o**gy Mollusk Collection and The Ohio State University Museum of Biological Diversity. Maps of recent occurrences are based on 1998-2015 records from field surveys by Michigan Natural Features Inventory (MNFI) and Huron-Manistee National Forest (HMNF), and records from the Natural Heriage Database maintained by MNFI. Records from MNFI and HMNF surveys include non-listed and listed species, and survey sites where no mussels were found. Records from the Natural Heritage Database include occurrences of endangered, threatened, and special concern species only. Four species (*Cyclonaias tuberculata, Ptychobranchus fasciolaria, Toxolasma parvum,* and *Venustaconcha ellipsiformis*) are included which have occurrences nearby, but not within the targeted watersheds. Blue polygons delineate USGS ten digit hydrologic unit code watersheds (HUC10). Green polygons delineate the HMNF boundary. GIS base map layer: World_Shaded_Relief - Copyright:© 2014 Esri



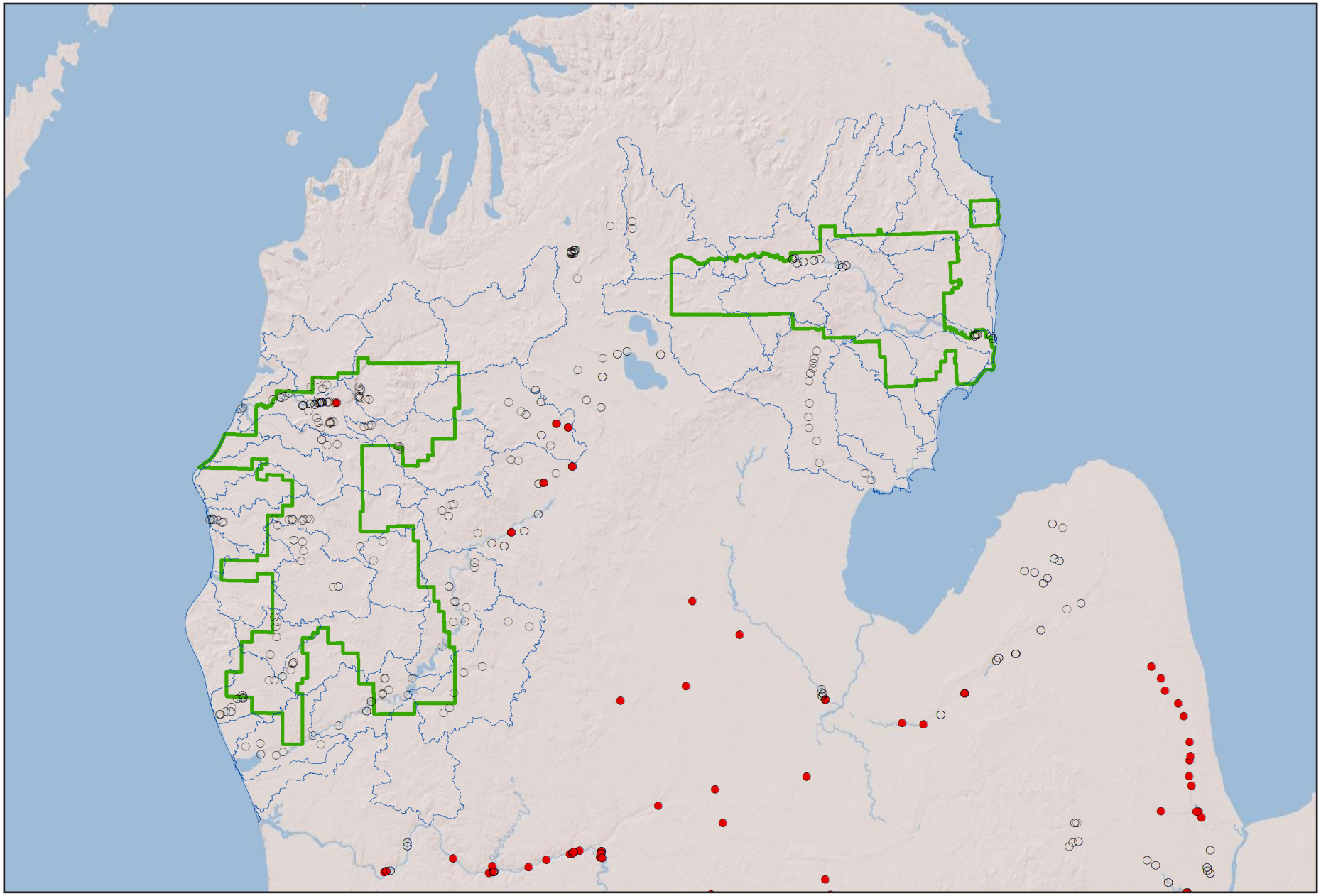
***Actinonaias ligamentina*, Mucket:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



***Actinonaias ligamentina*, Mucket:** Recent records (1998-2015); Red dots represent survey sites where species was found. Circles represent survey sites where species was not found.



***Alasmidonta marginata*, Elktoe:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



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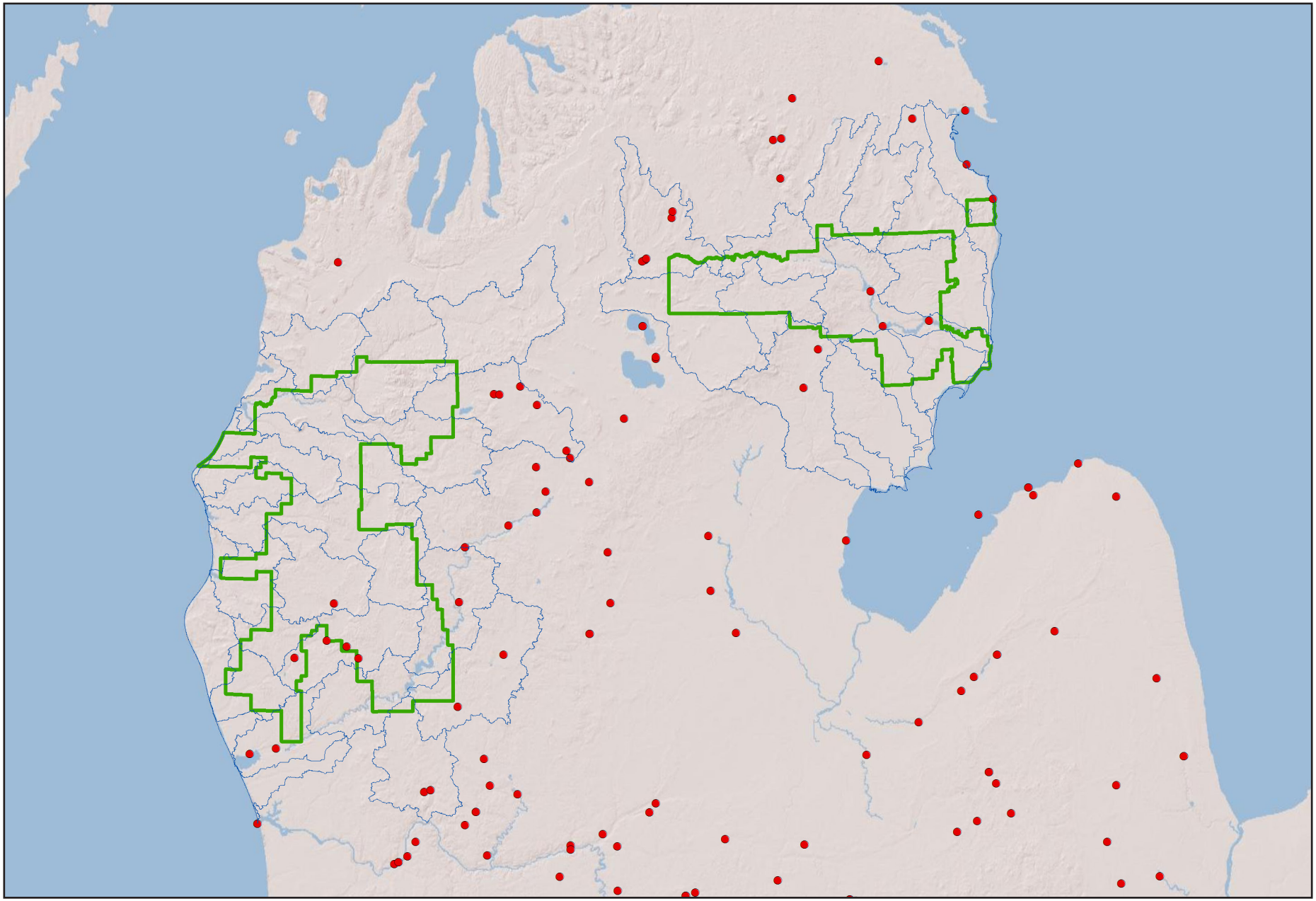
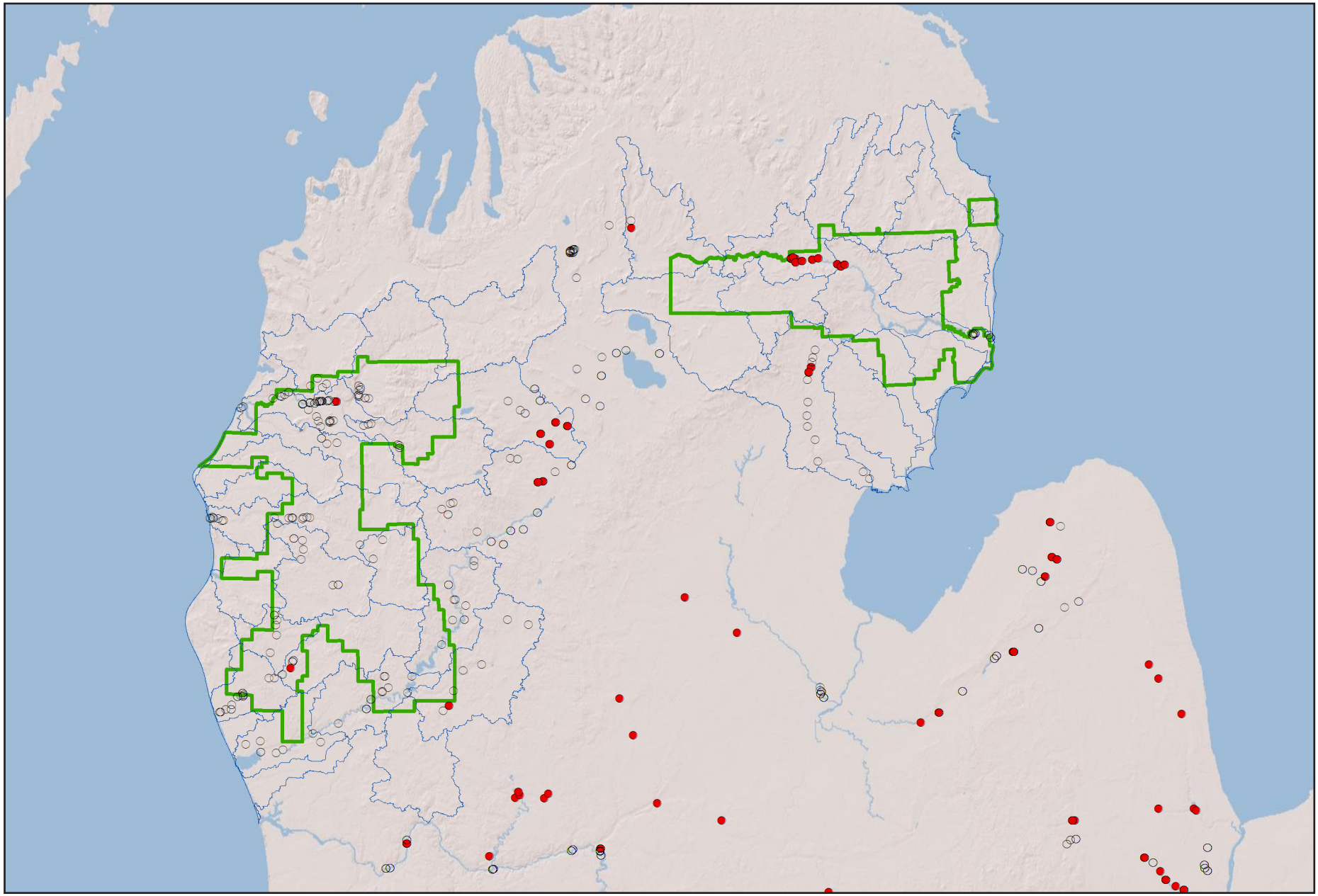
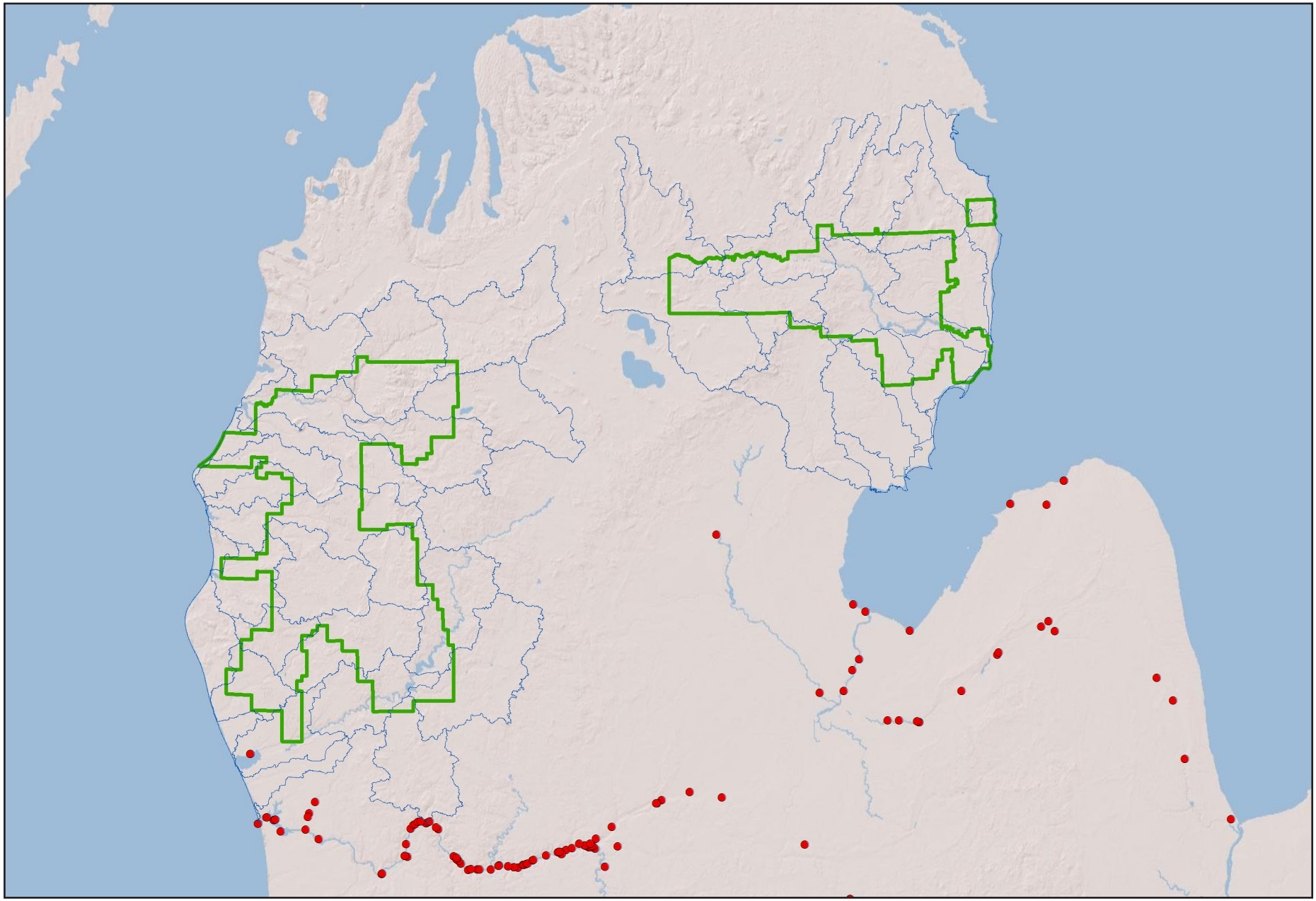


***Alasmidonta viridis*, Slippershell:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



***Alasmidonta viridis*, Slippershell:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



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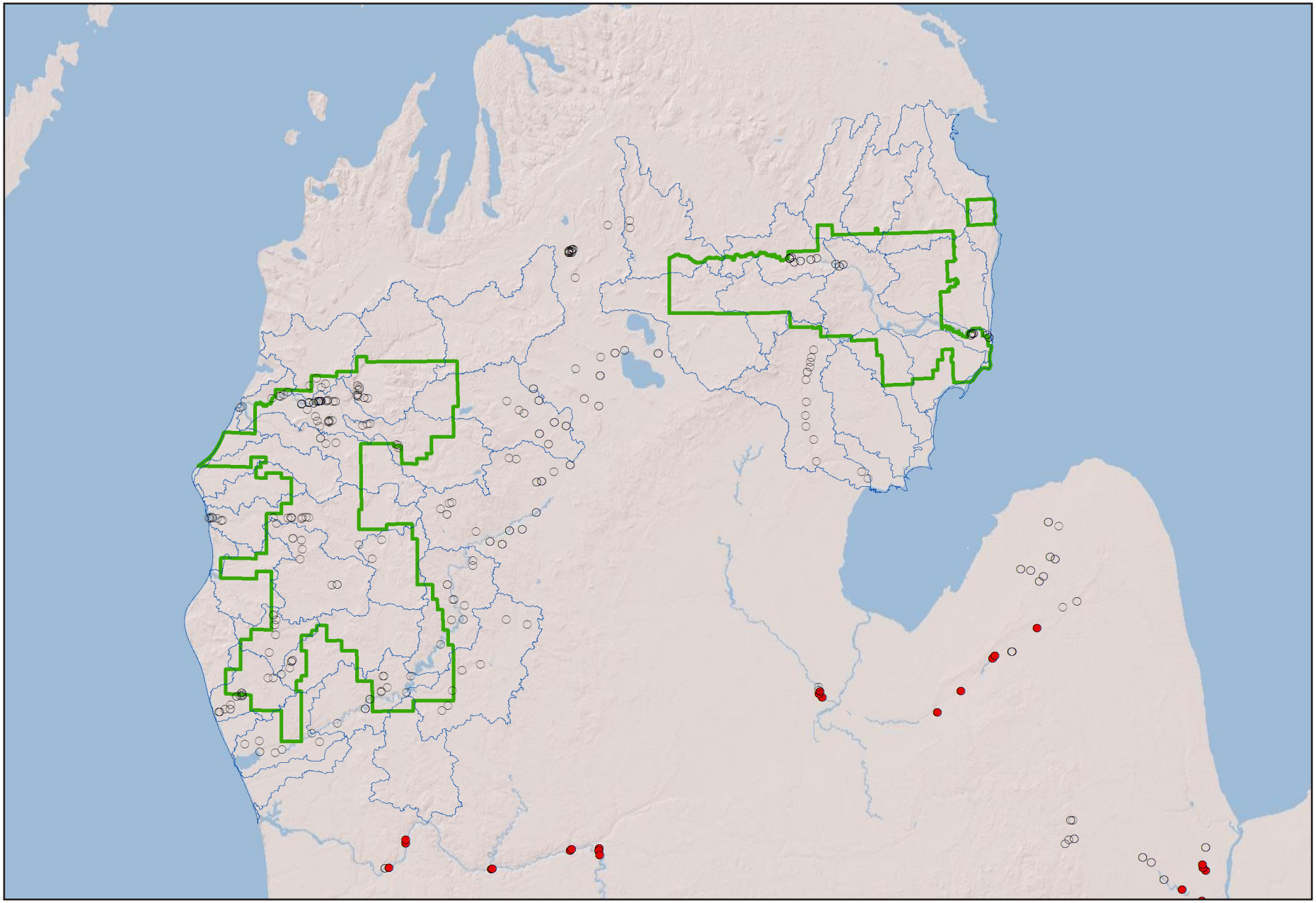
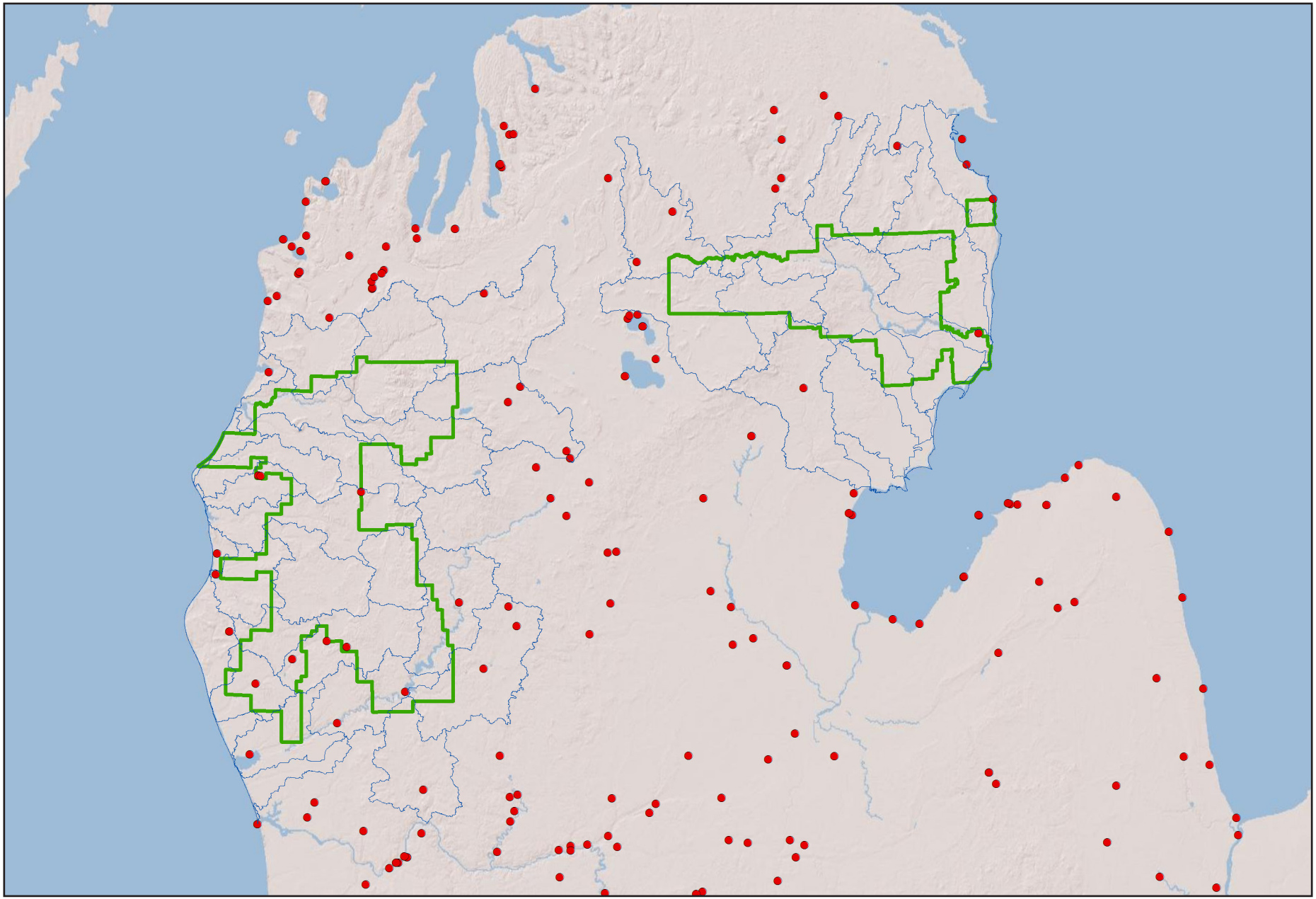
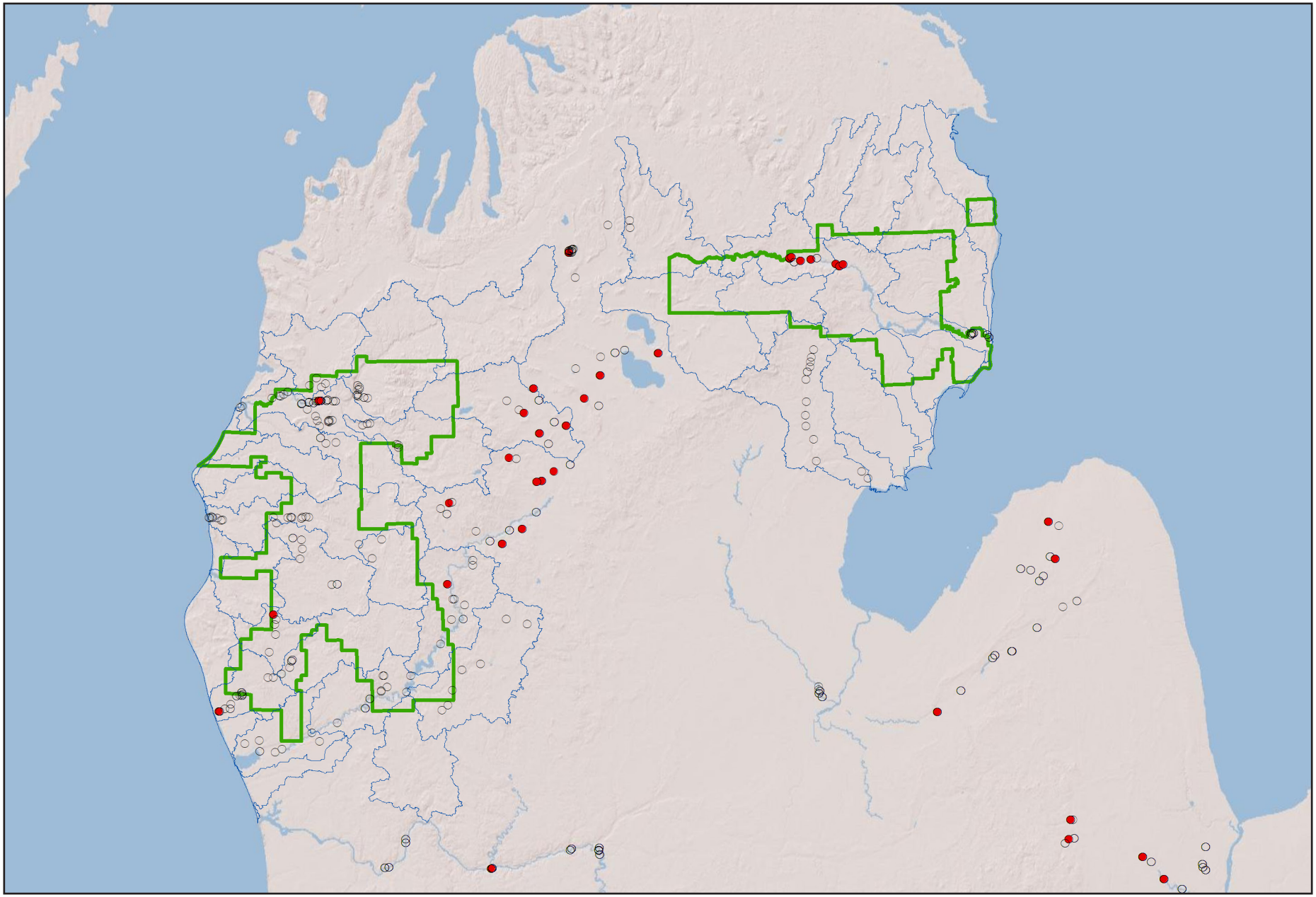


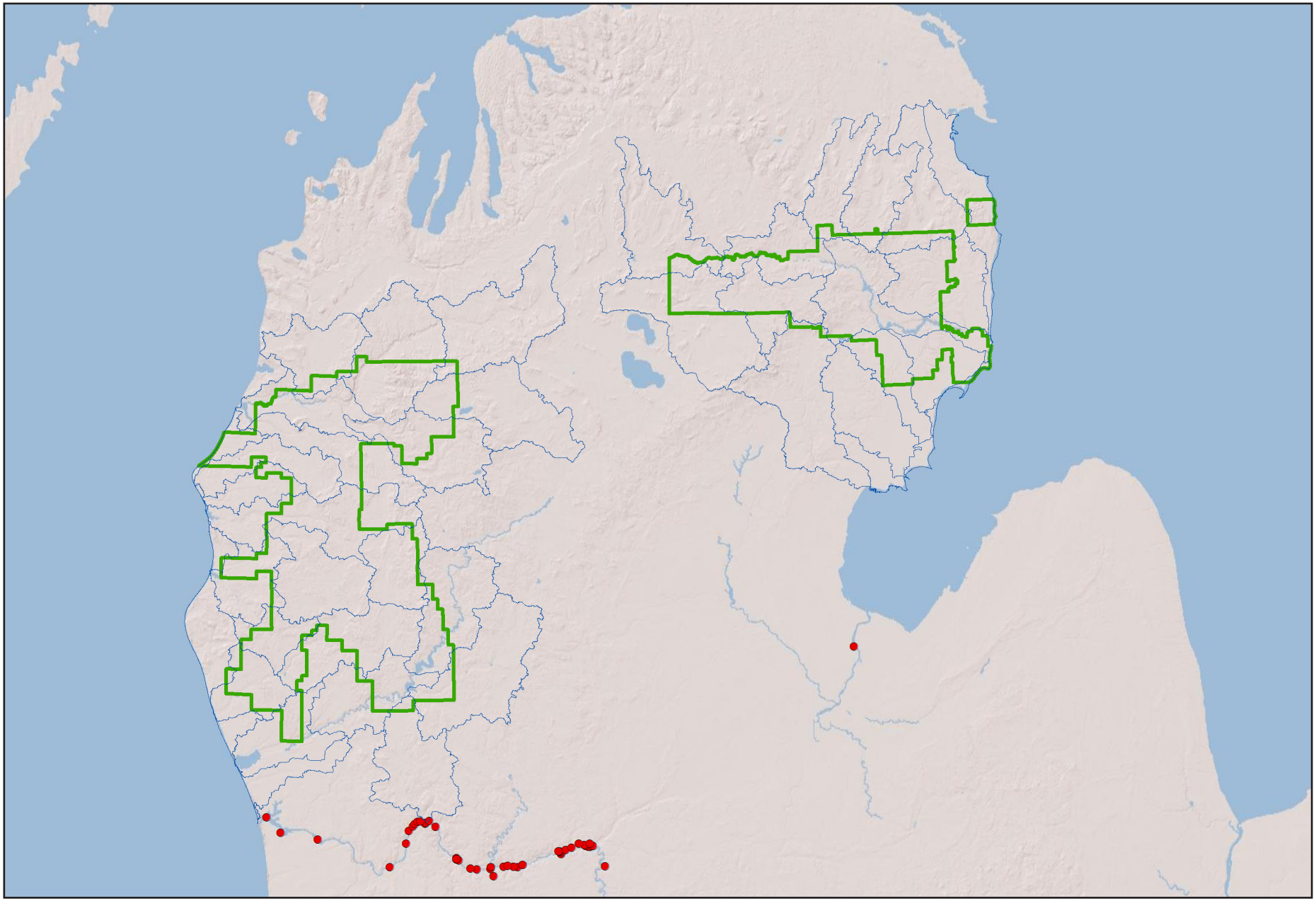
***Amblema plicata*, Threeridge:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



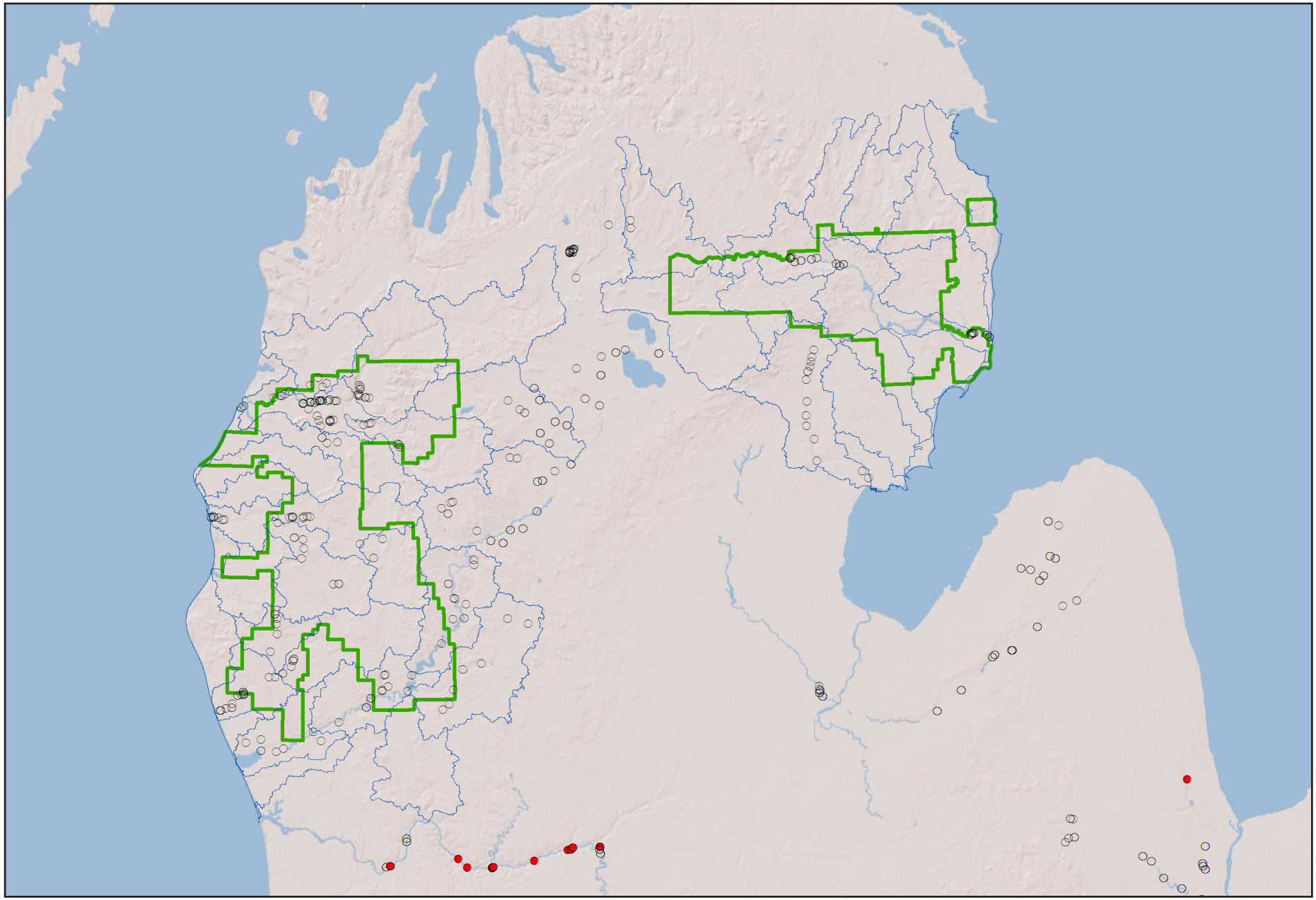
***Anodontoides ferussacianus*, Cylindrical papershell:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



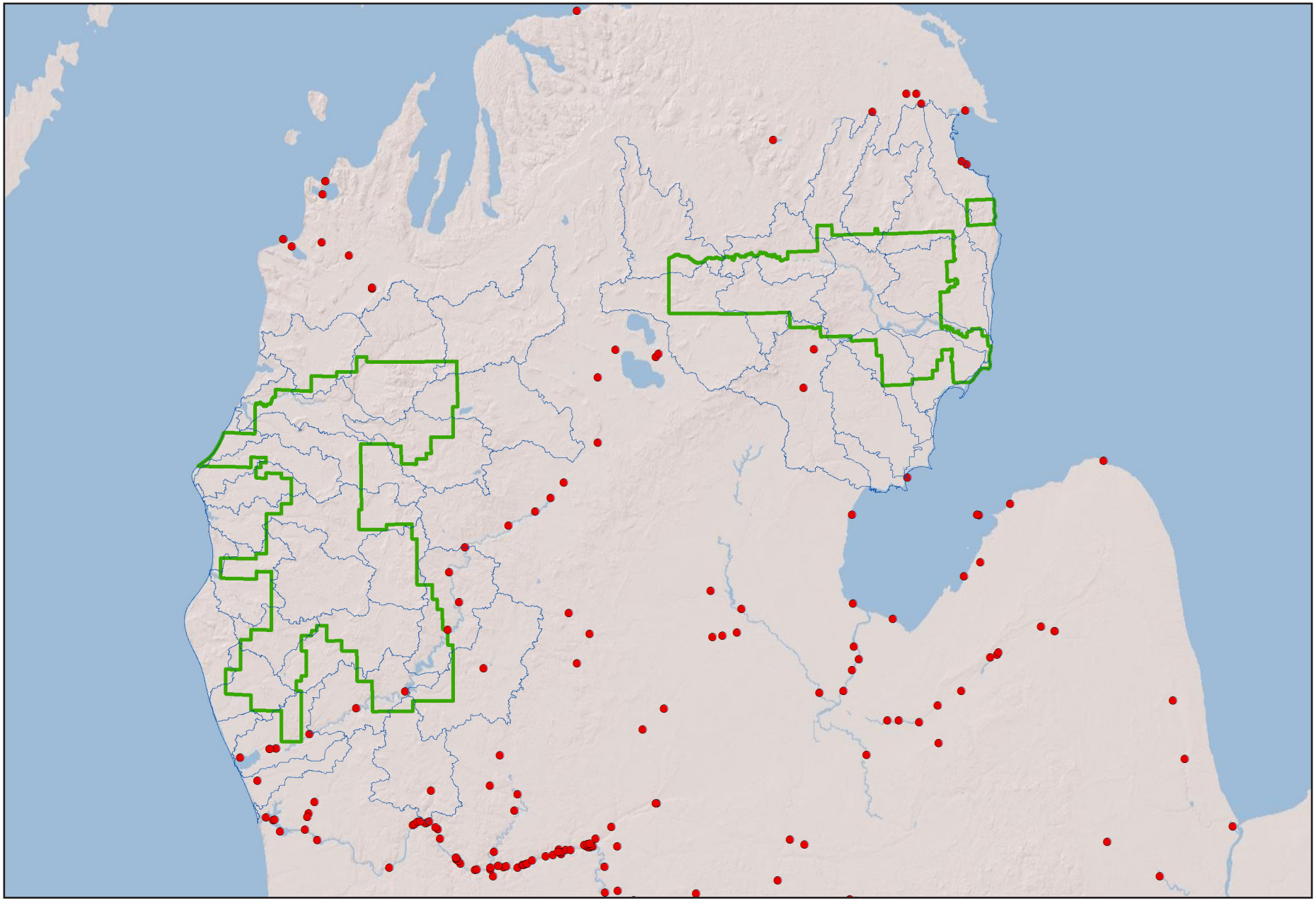
***Anodontoides ferussacianus*, Cylindrical papershell:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



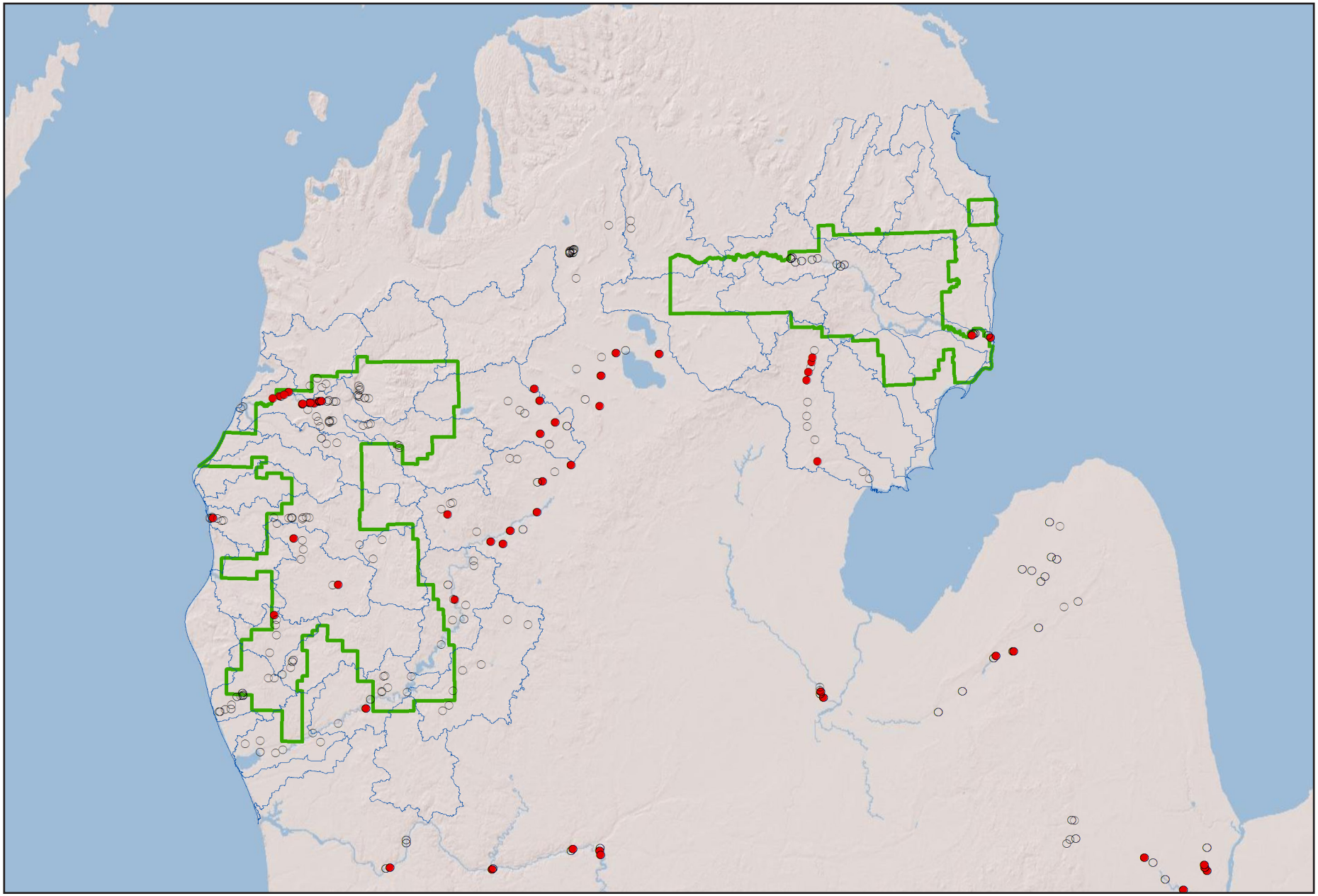
***Cyclonaias tuberculata*, Purple wartyback:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



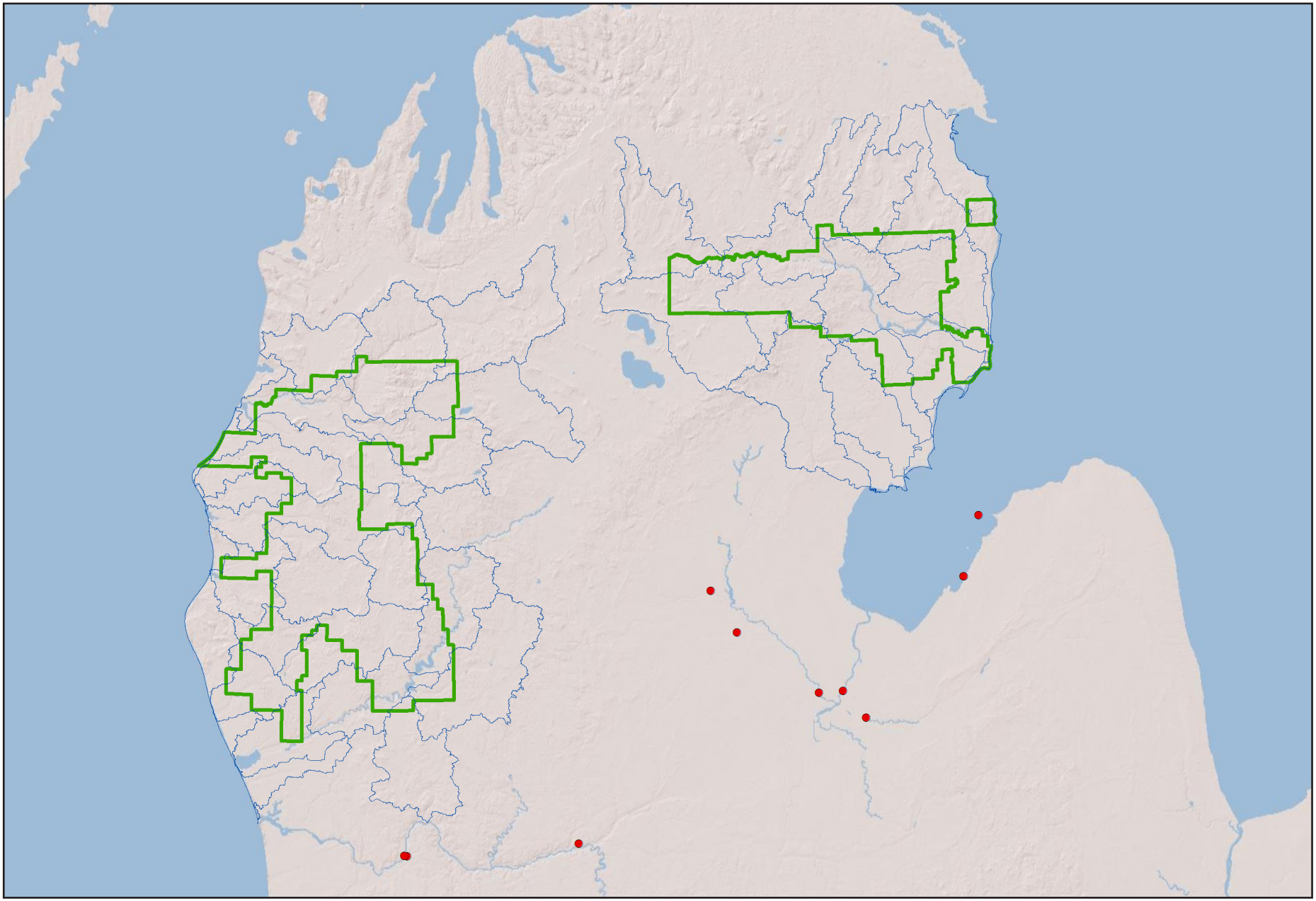
***Cyclonaias tuberculata*, Purple wartyback:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



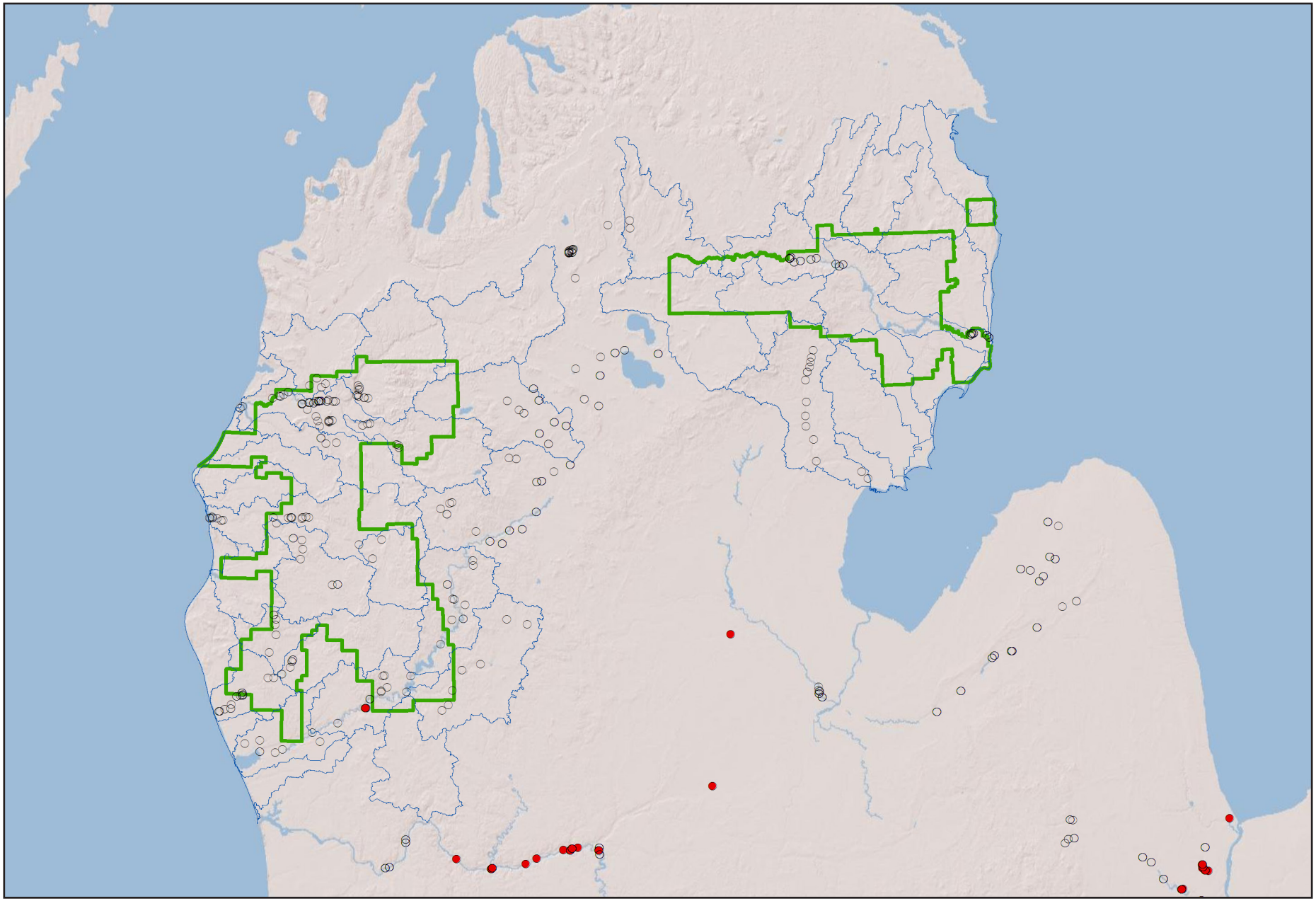
***Elliptio dilatata*, Spike:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



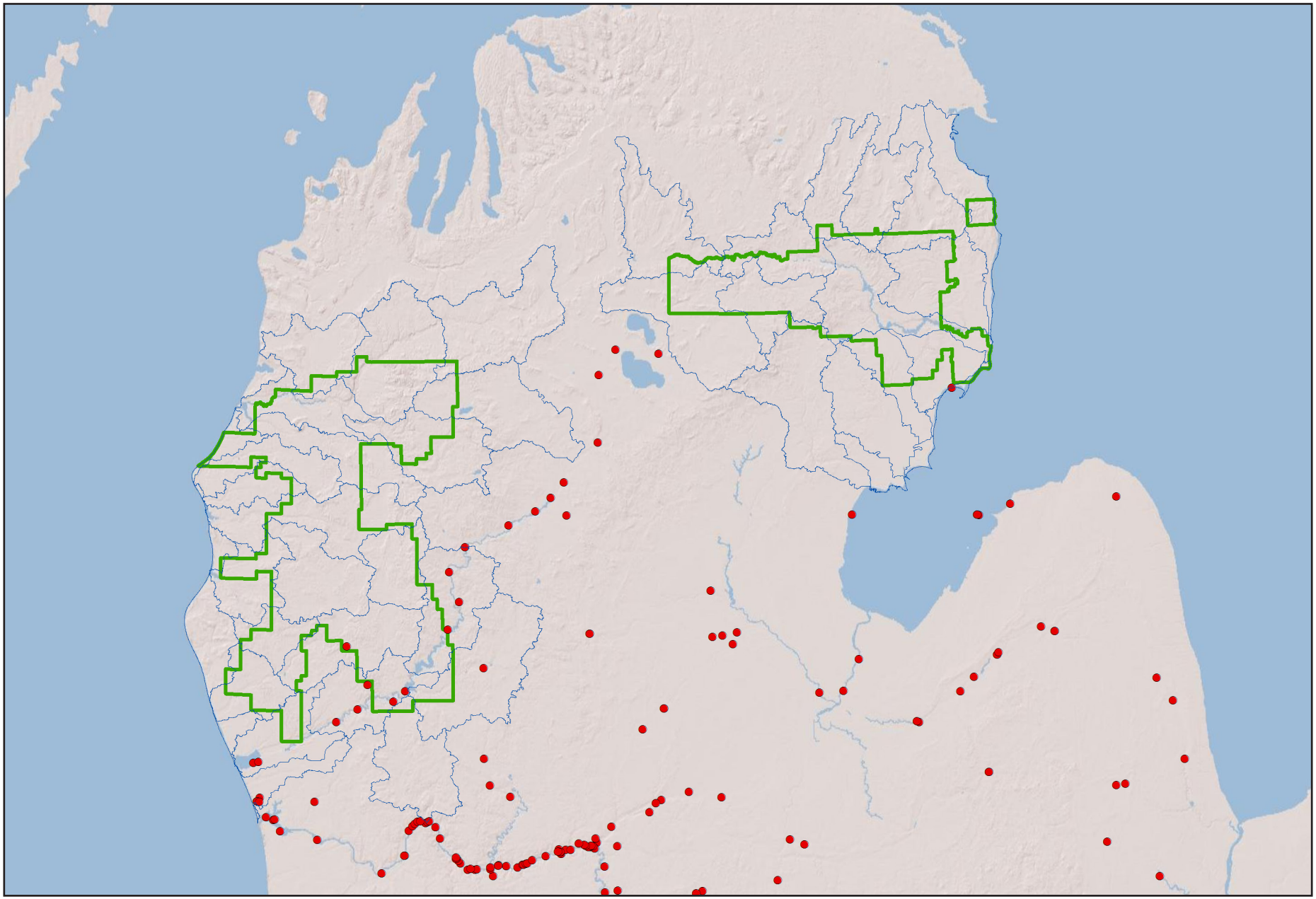
***Elliptio dilatata*, Spike:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



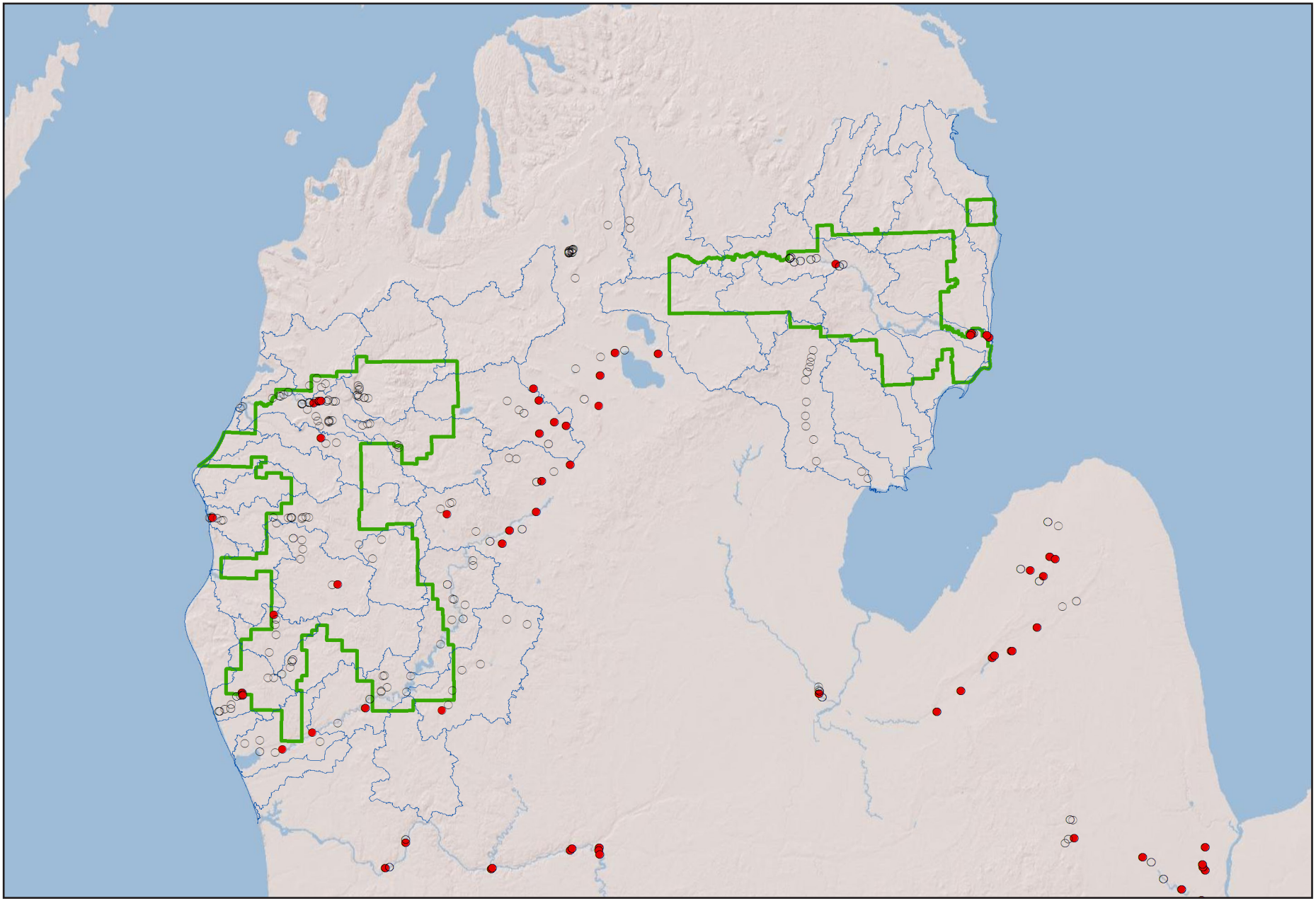
***Epioblasma triquetra*, Snuffbox:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



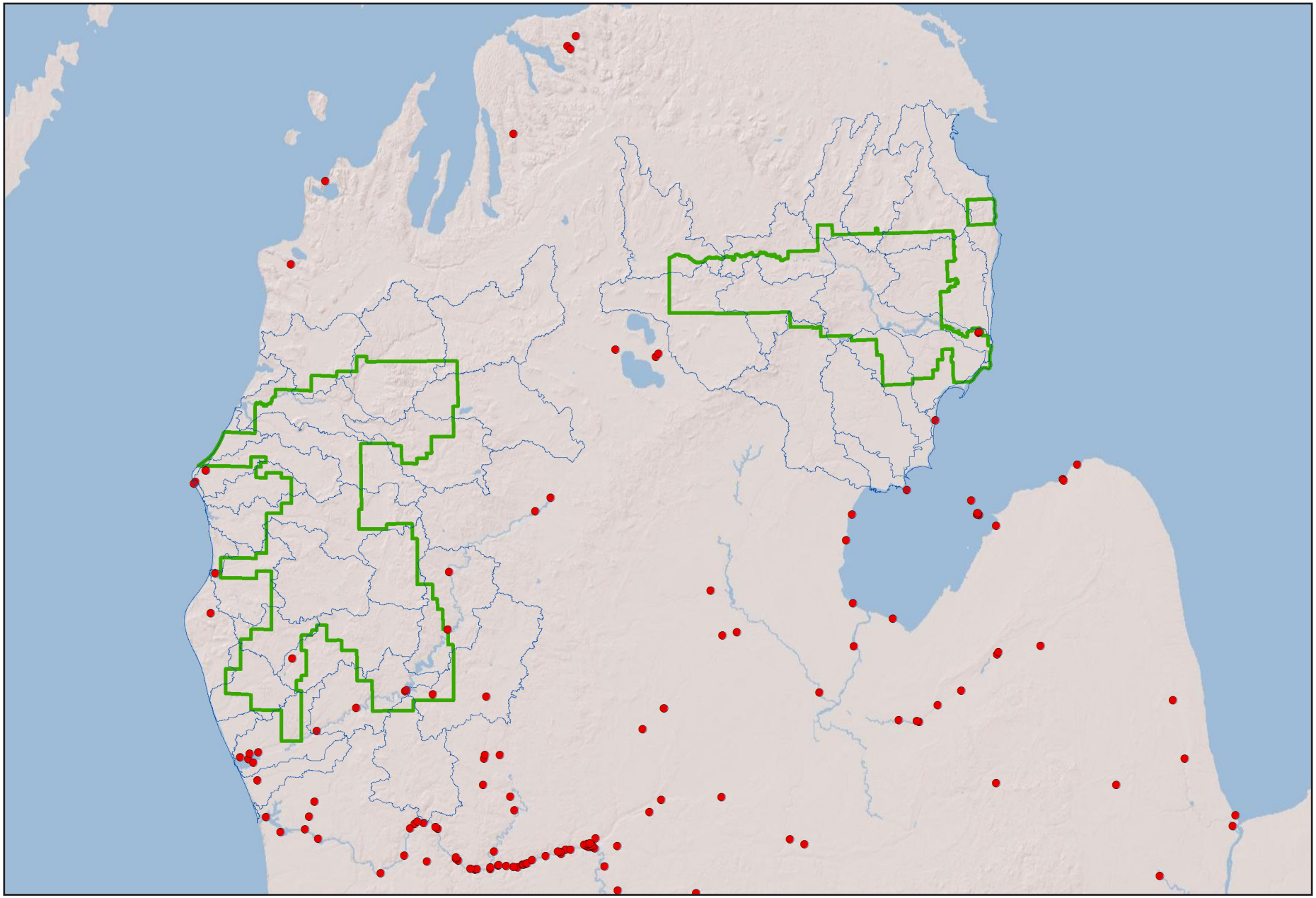
***Epioblasma triquetra*, Snuffbox:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



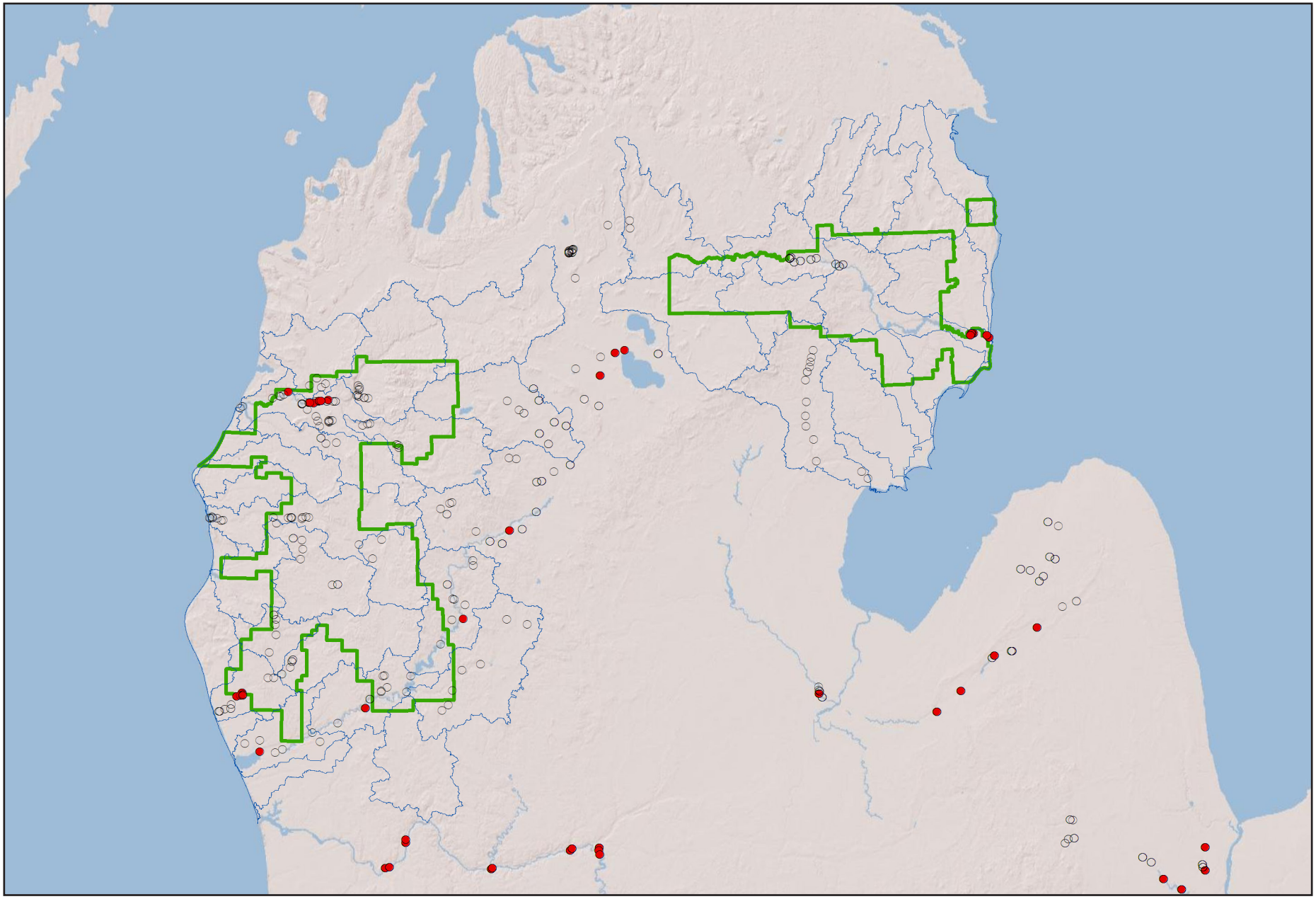
***Fusconaia flava*, Wabash pigtoe:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



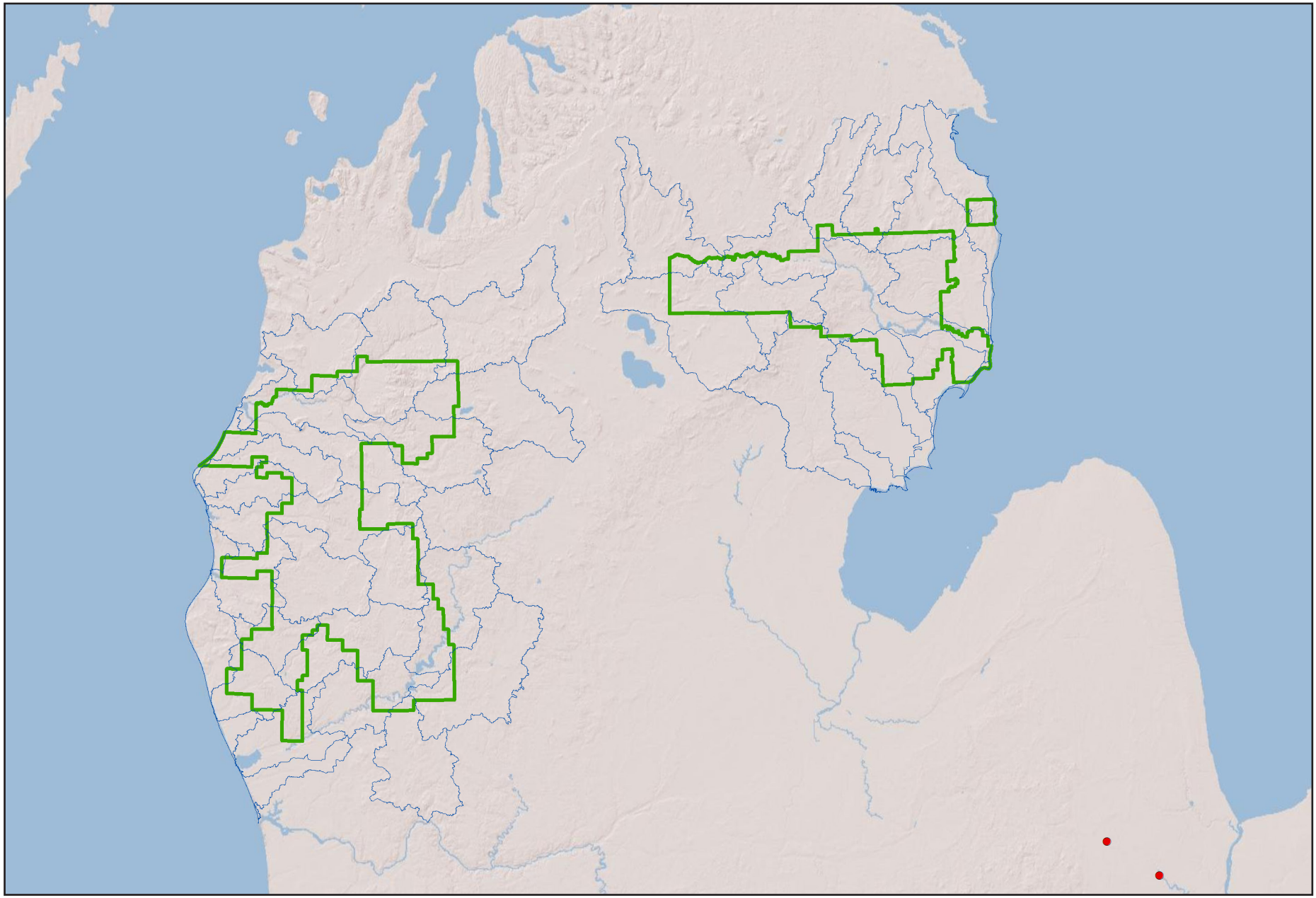
***Fusconaia flava*, Wabash Pigtoe:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



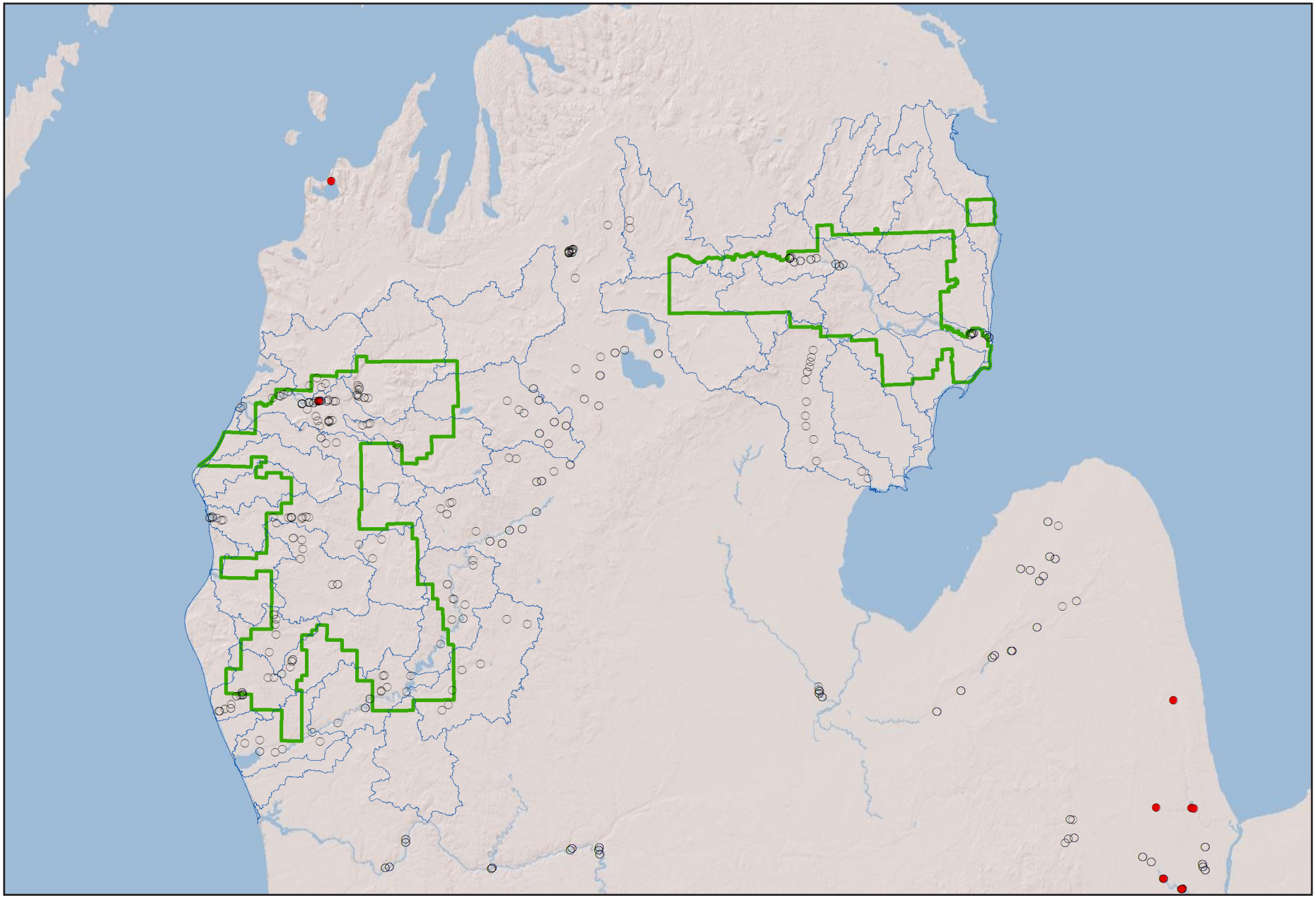
***Lampsilis cardium*, Pocketbook:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found. *L. cardium* records from the Big Sable River watershed are from 1983 and 2000.



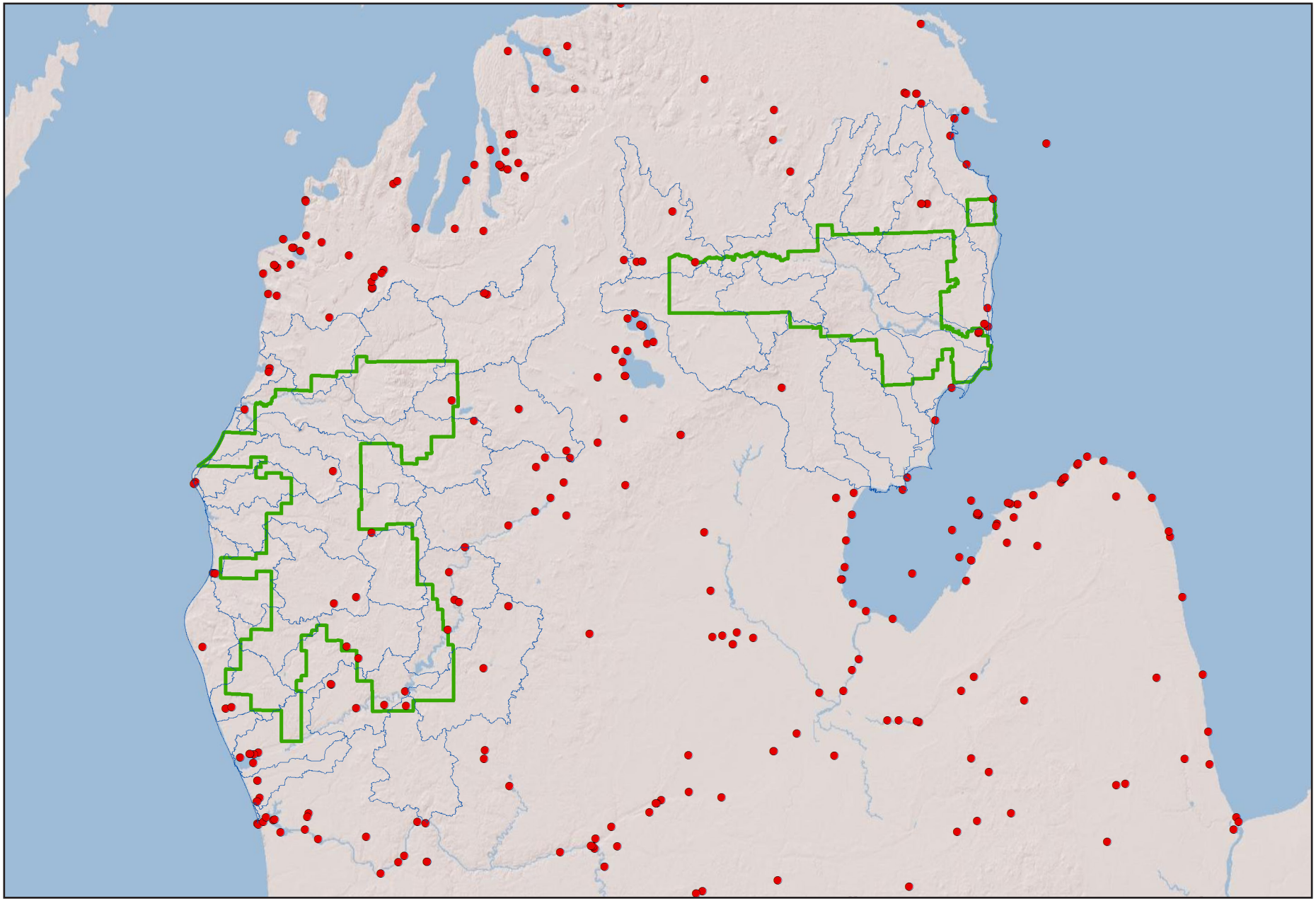
***Lampsilis cardium*, Pocketbook:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



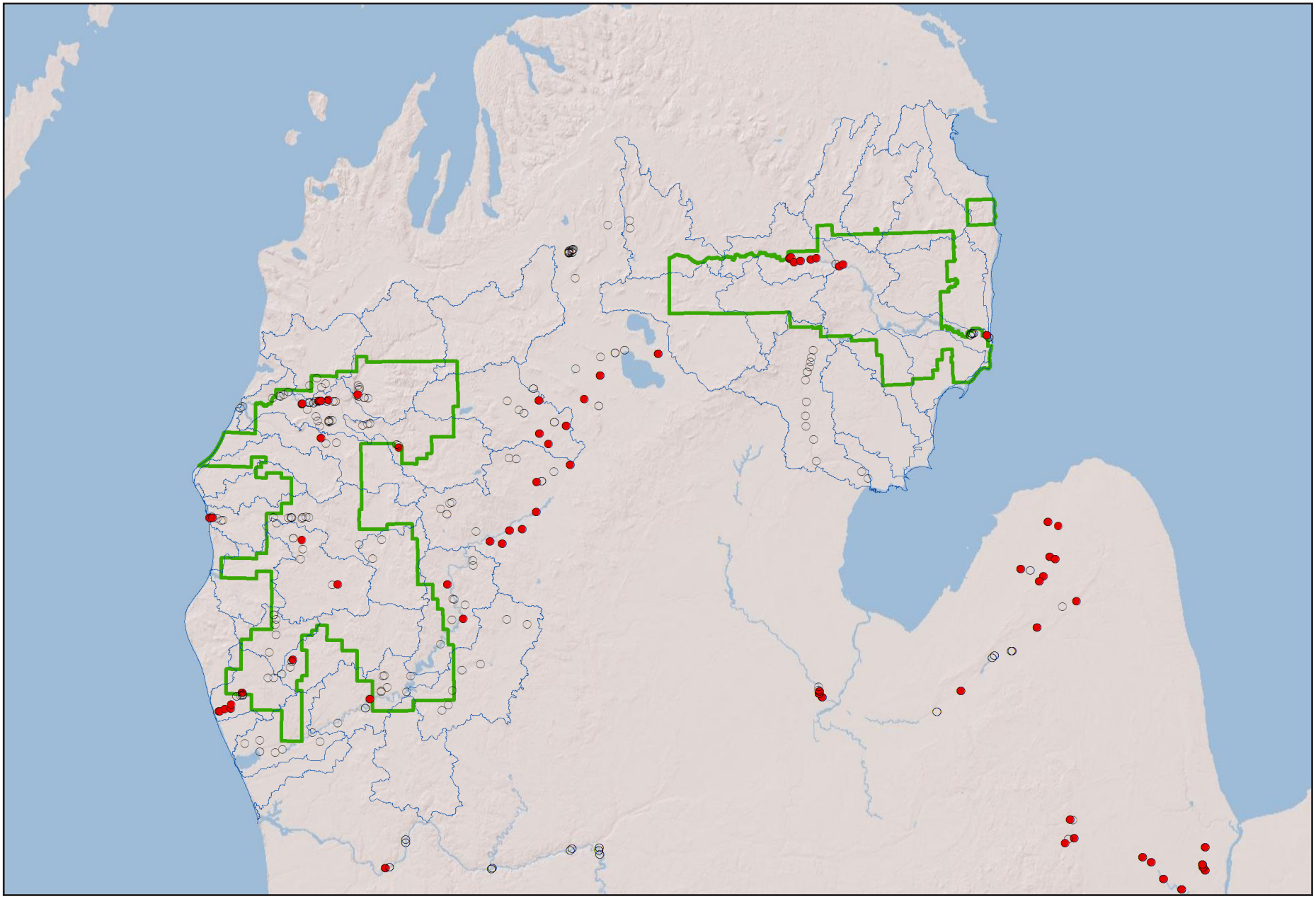
***Lampsilis fasciola*, Wavy-rayed lampmussel:** Historical range (ca. 1900-1973); Red dots represent sites where this species was found.



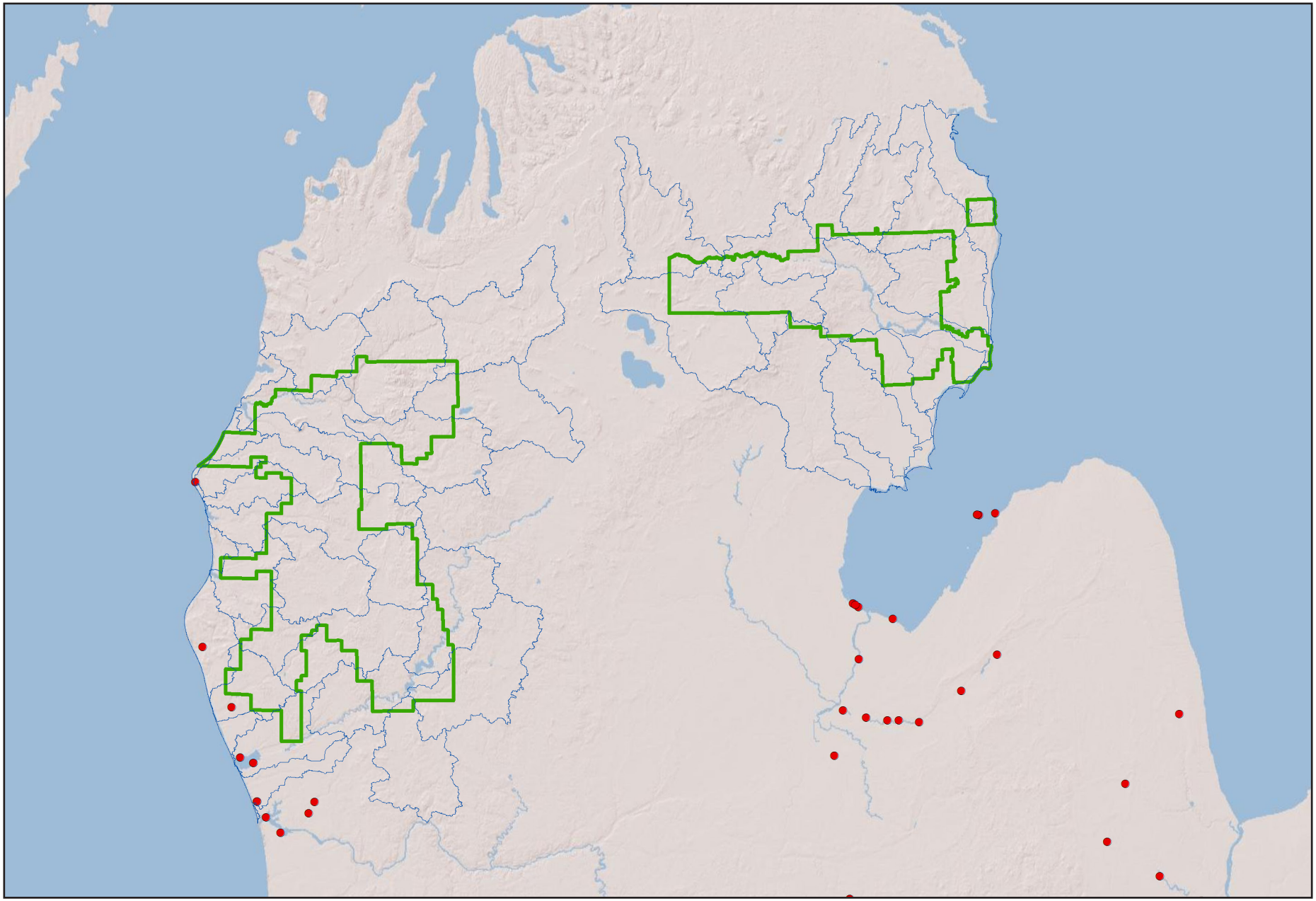
***Lampsilis fasciola*, Wavy-rayed lampmussel:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



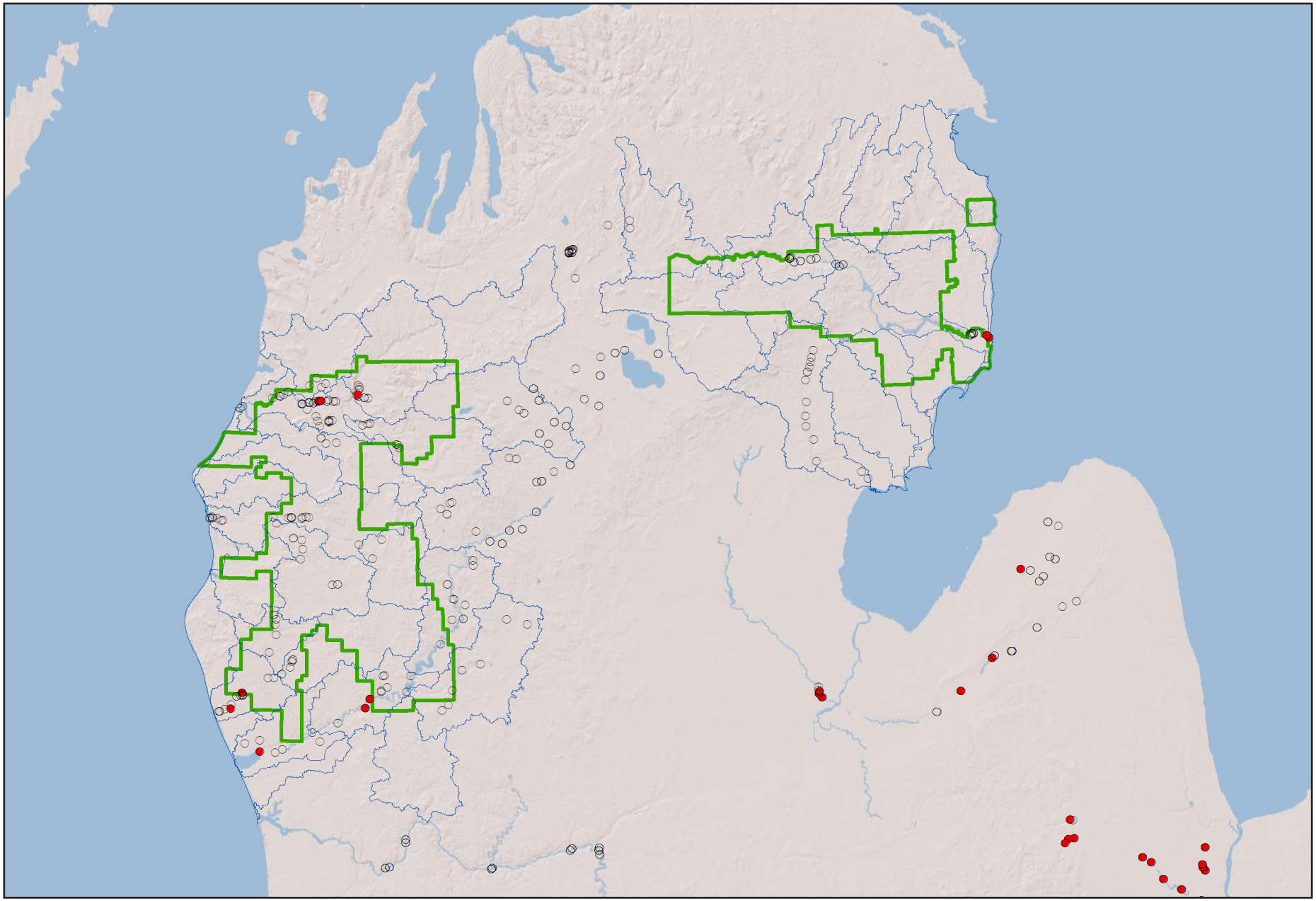
***Lampsilis siliquoidea*, Fatmucket:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found. *L. siliquoidea* records from the Big Sable River watershed are from 1981, 1983, and 2000.



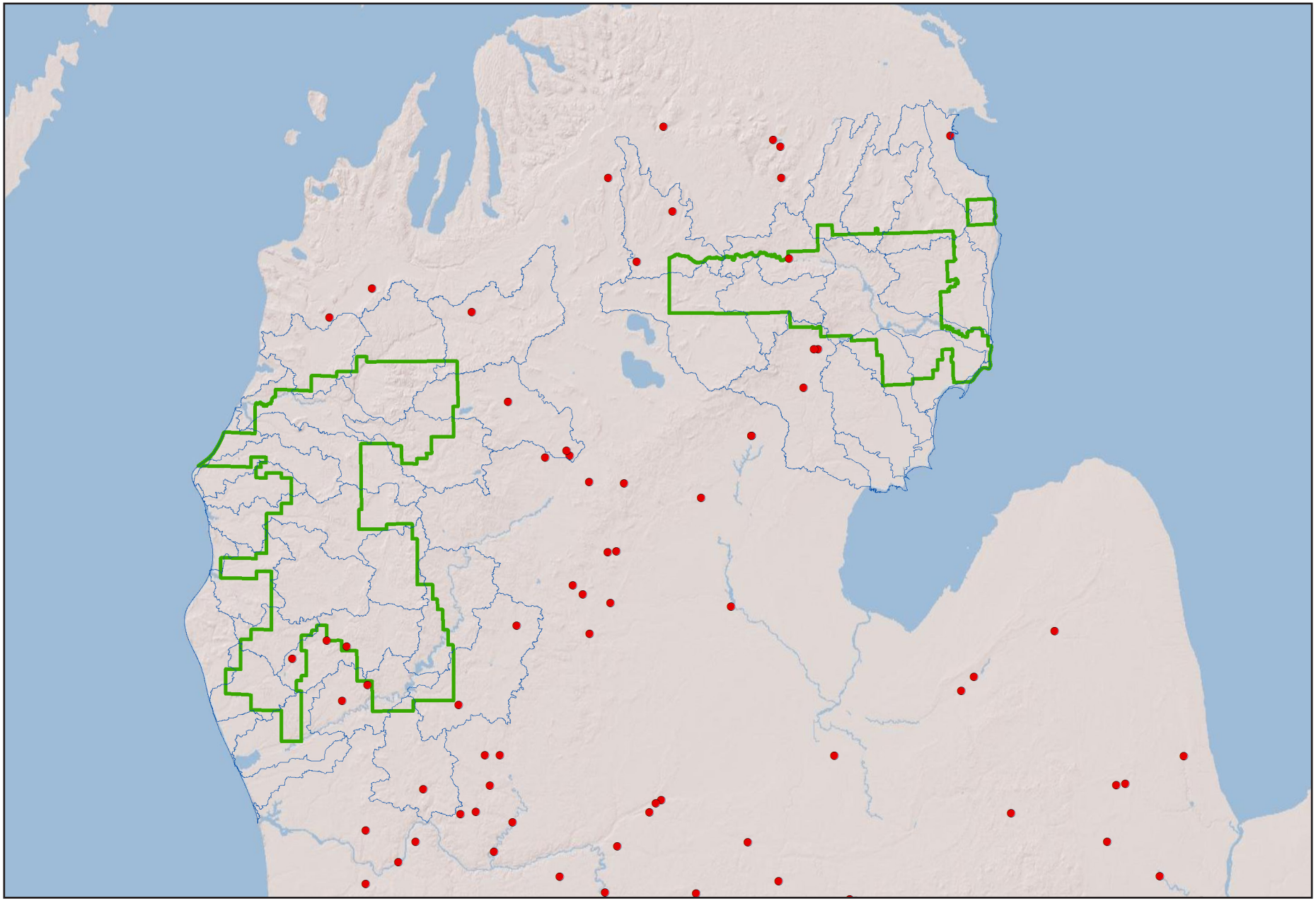
***Lampsilis siliquoidea*, Fatmucket:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



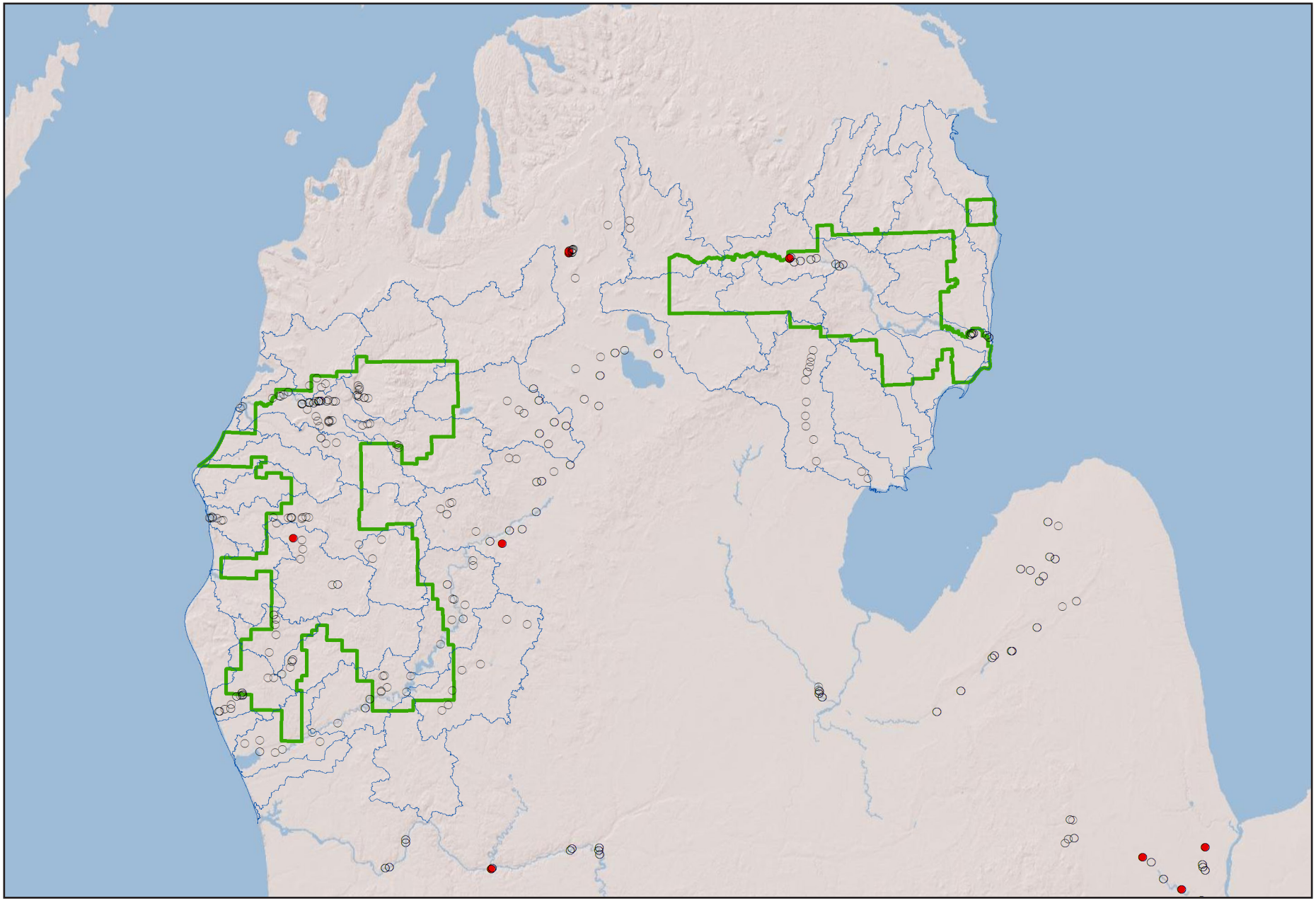
***Lasmigona complanata*, White heelsplitter:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found. The *L. complanata* record from the Big Sable River watershed is from 2000.



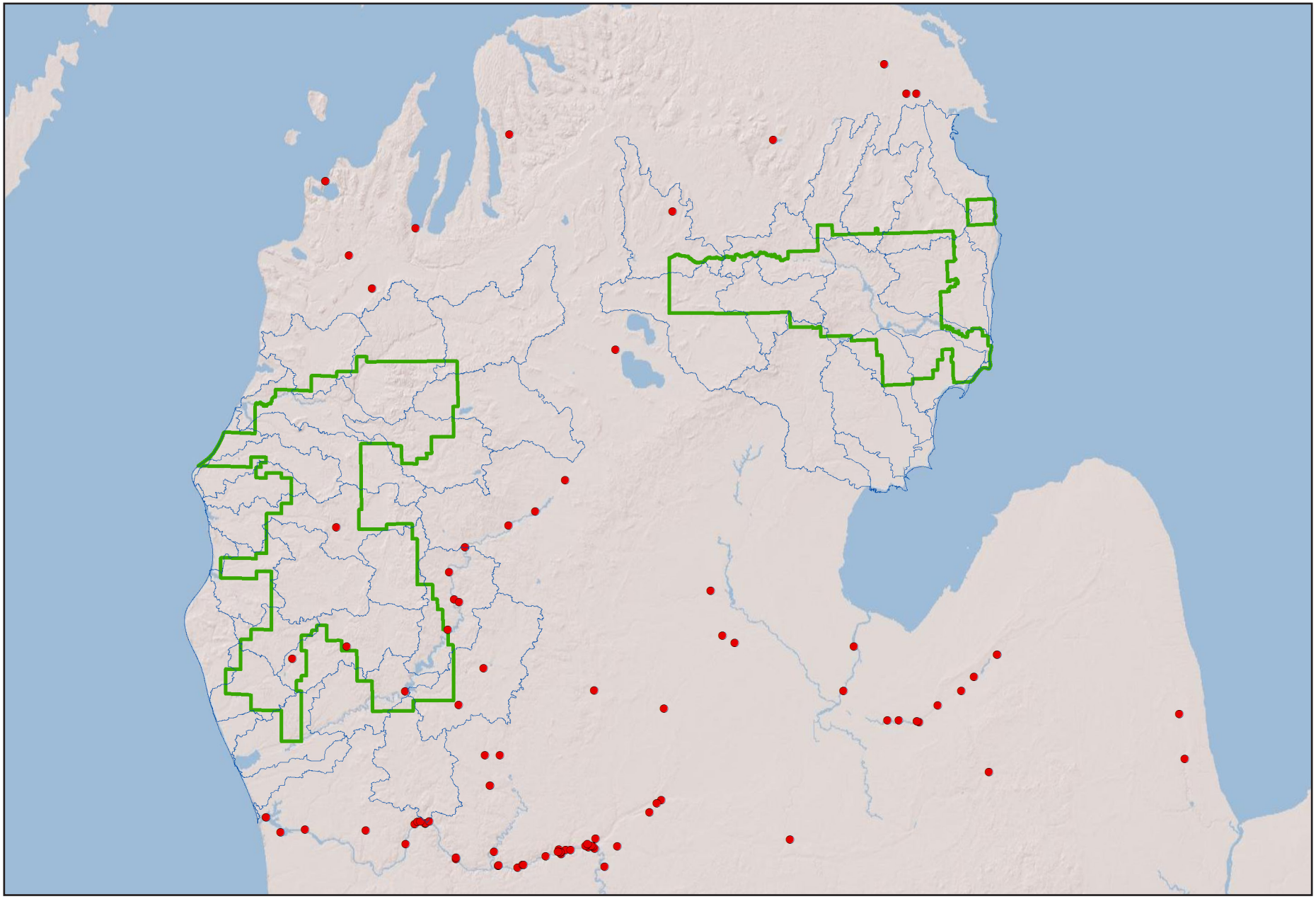
***Lasmigona complanata*, White heelsplitter:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



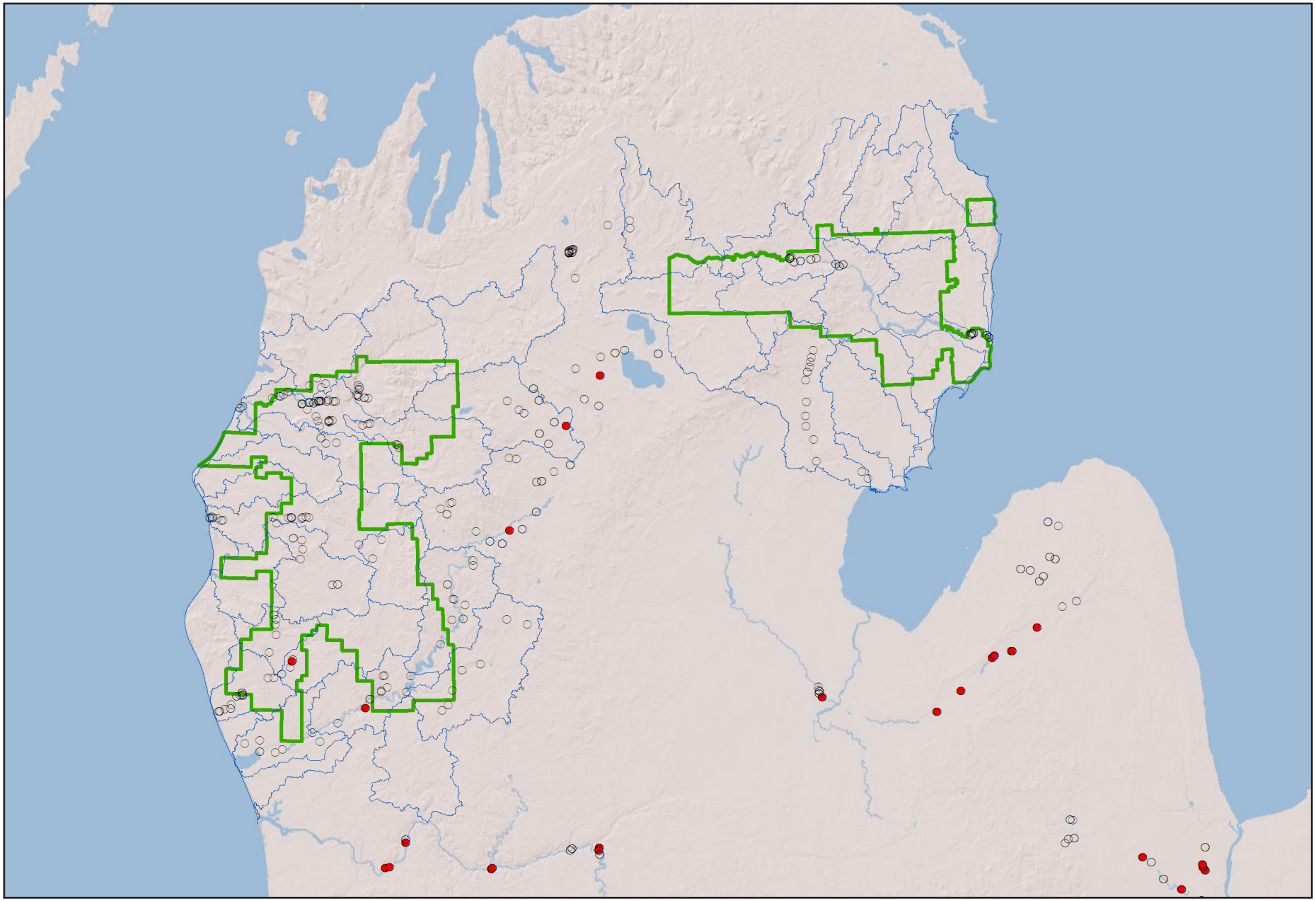
***Lasmigona compressa*, Creek heelsplitter:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



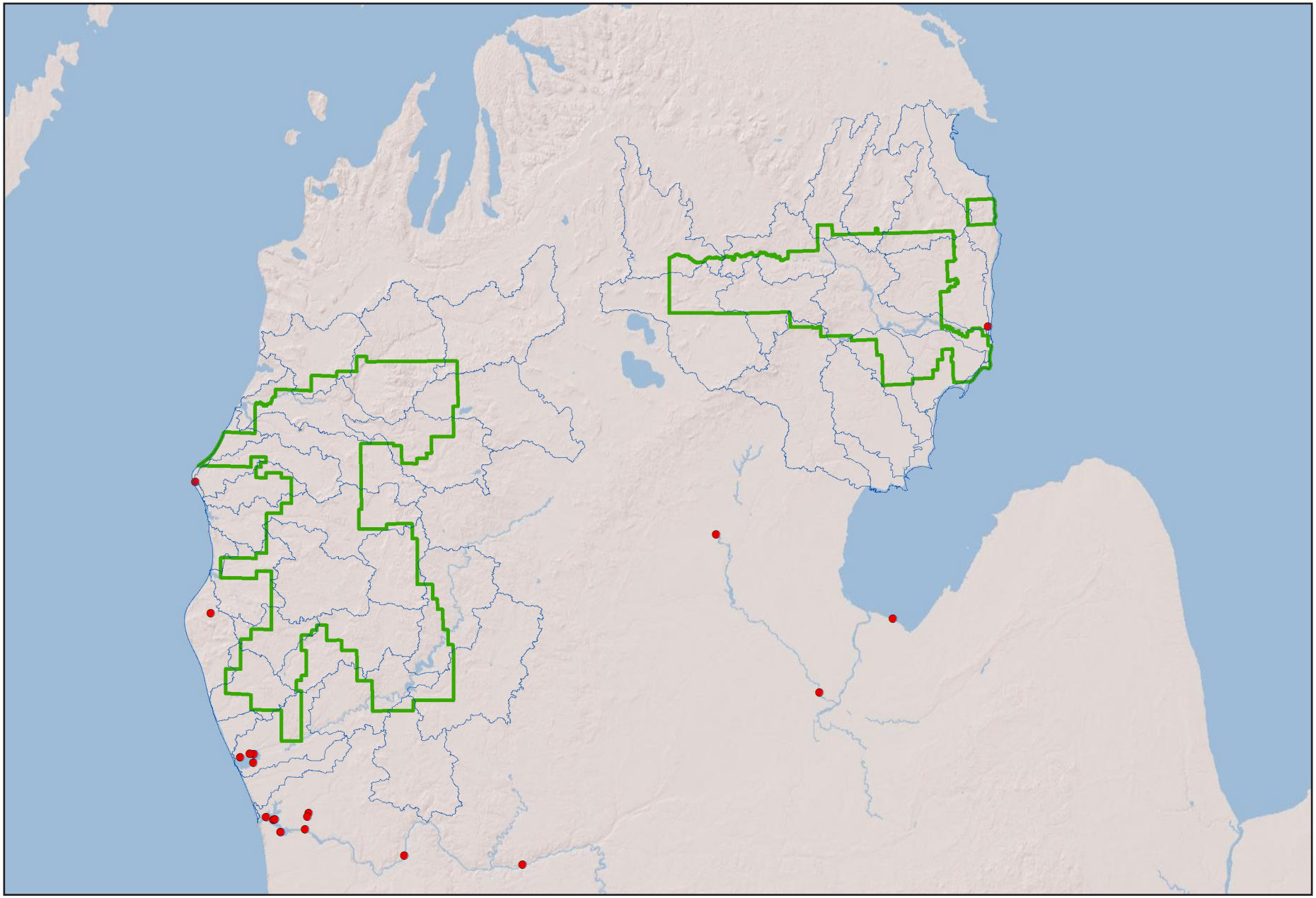
***Lasmigona compressa*, Creek heelsplitter:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



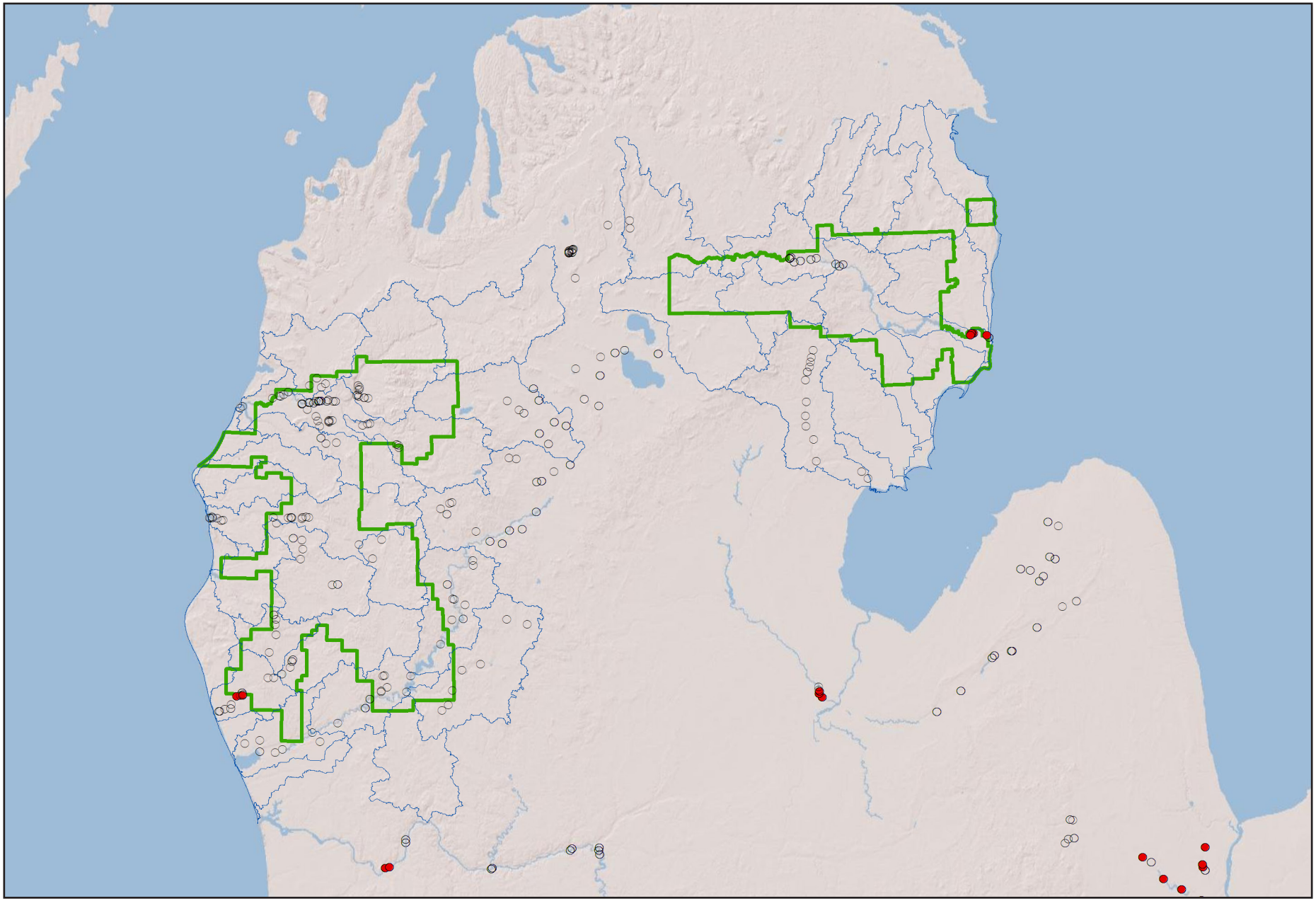
***Lasmigona costata*, Fluted-shell:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



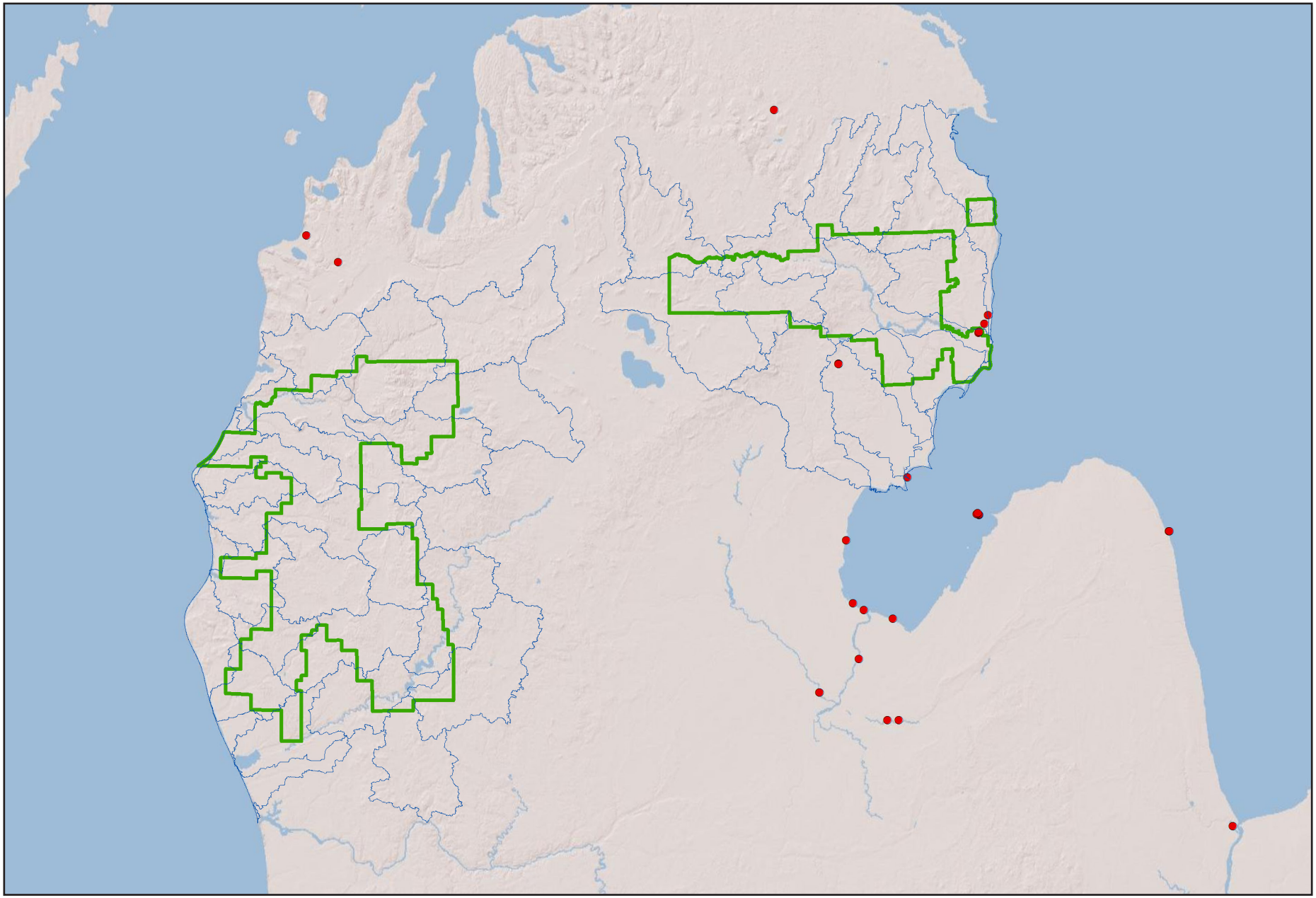
***Lasmigona costata*, Fluted-shell:** Recent records (ca. 1900-1973); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



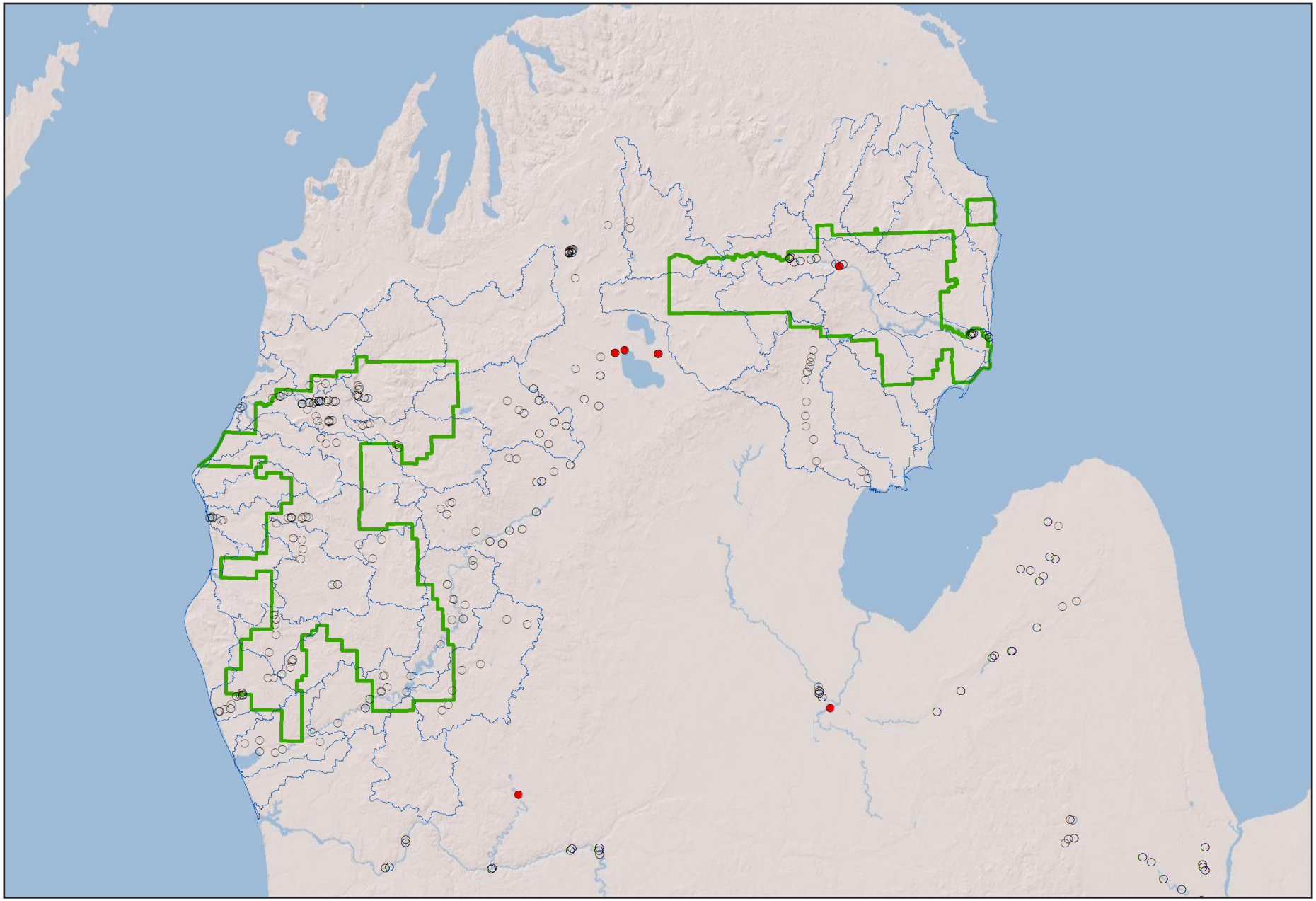
***Leptodea fragilis*, Fragile papershell:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found. The *L. fragilis* record from the Big Sable River watershed is from 2000.



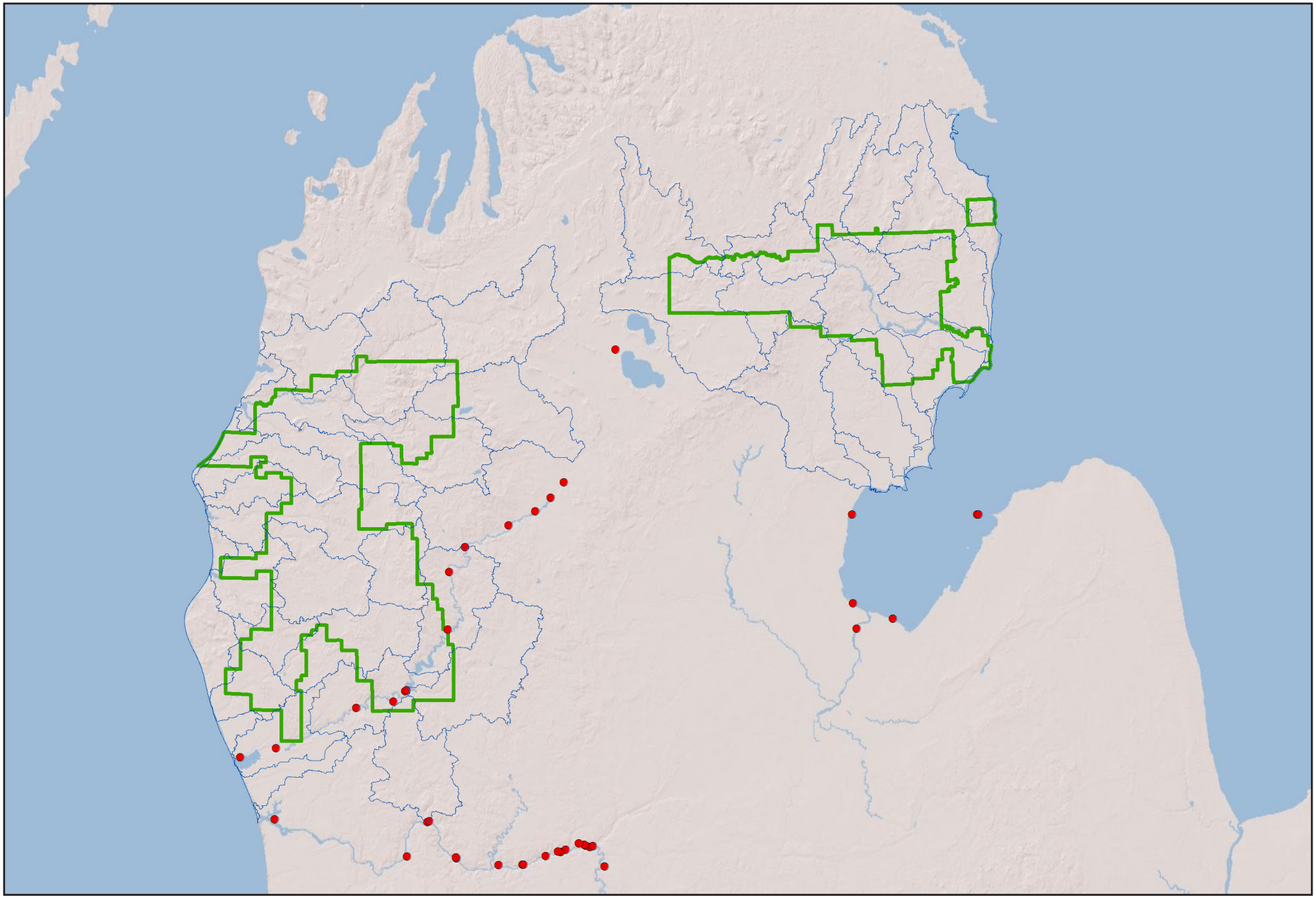
***Leptodea fragilis*, Fragile papershell:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



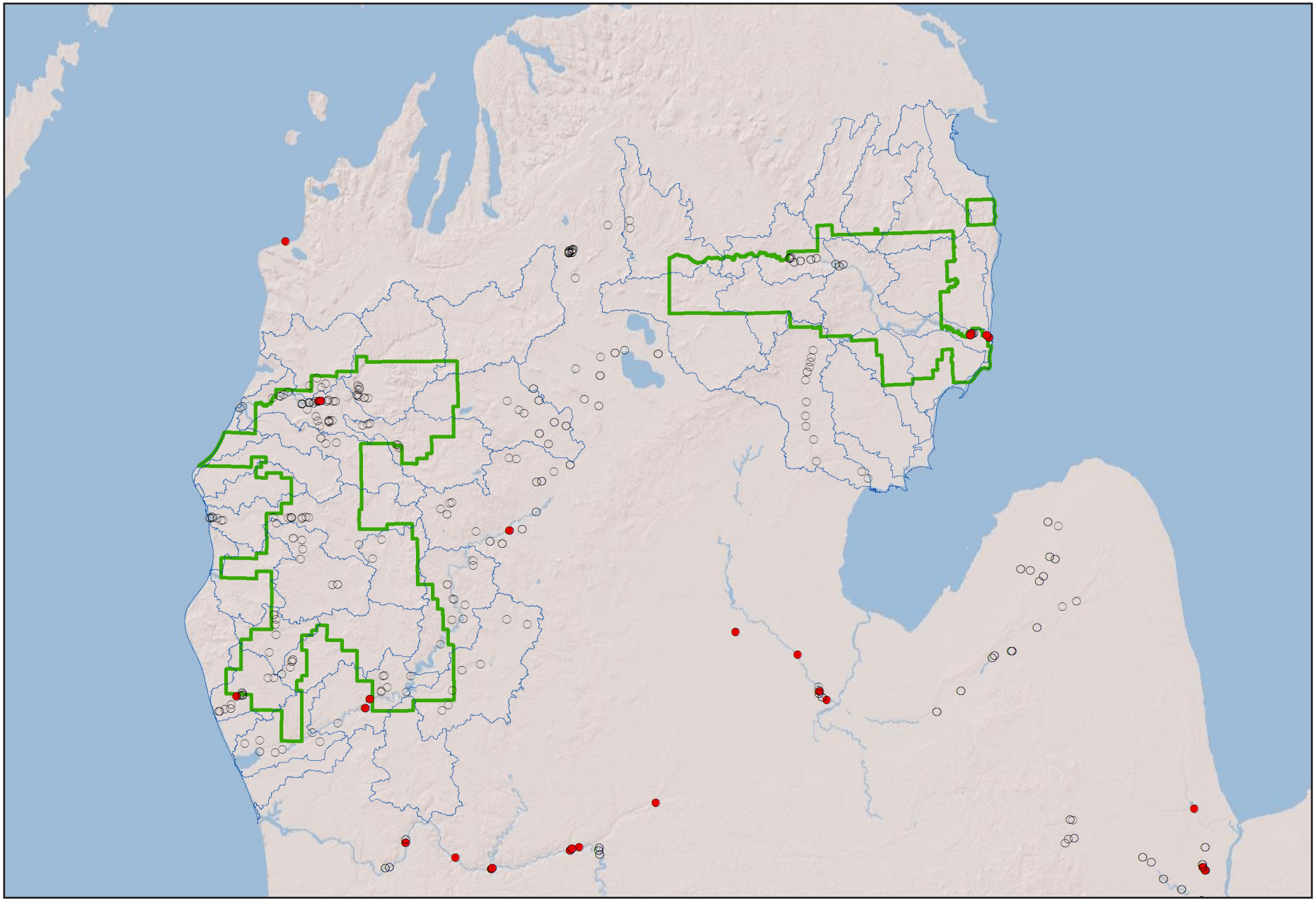
***Ligumia nasuta*, Eastern pondmussel:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



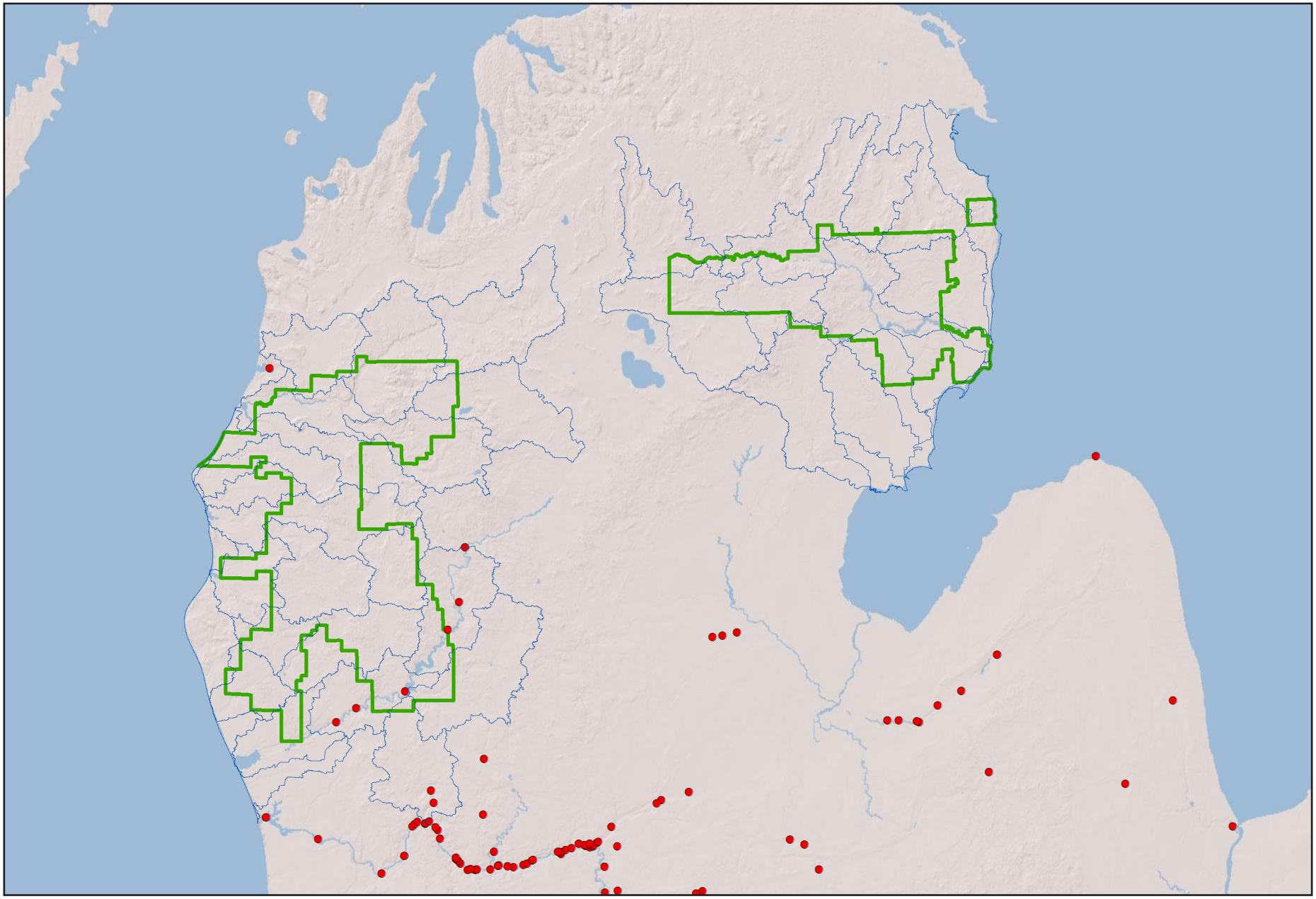
***Ligumia nasuta*, Eastern pondmussel:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



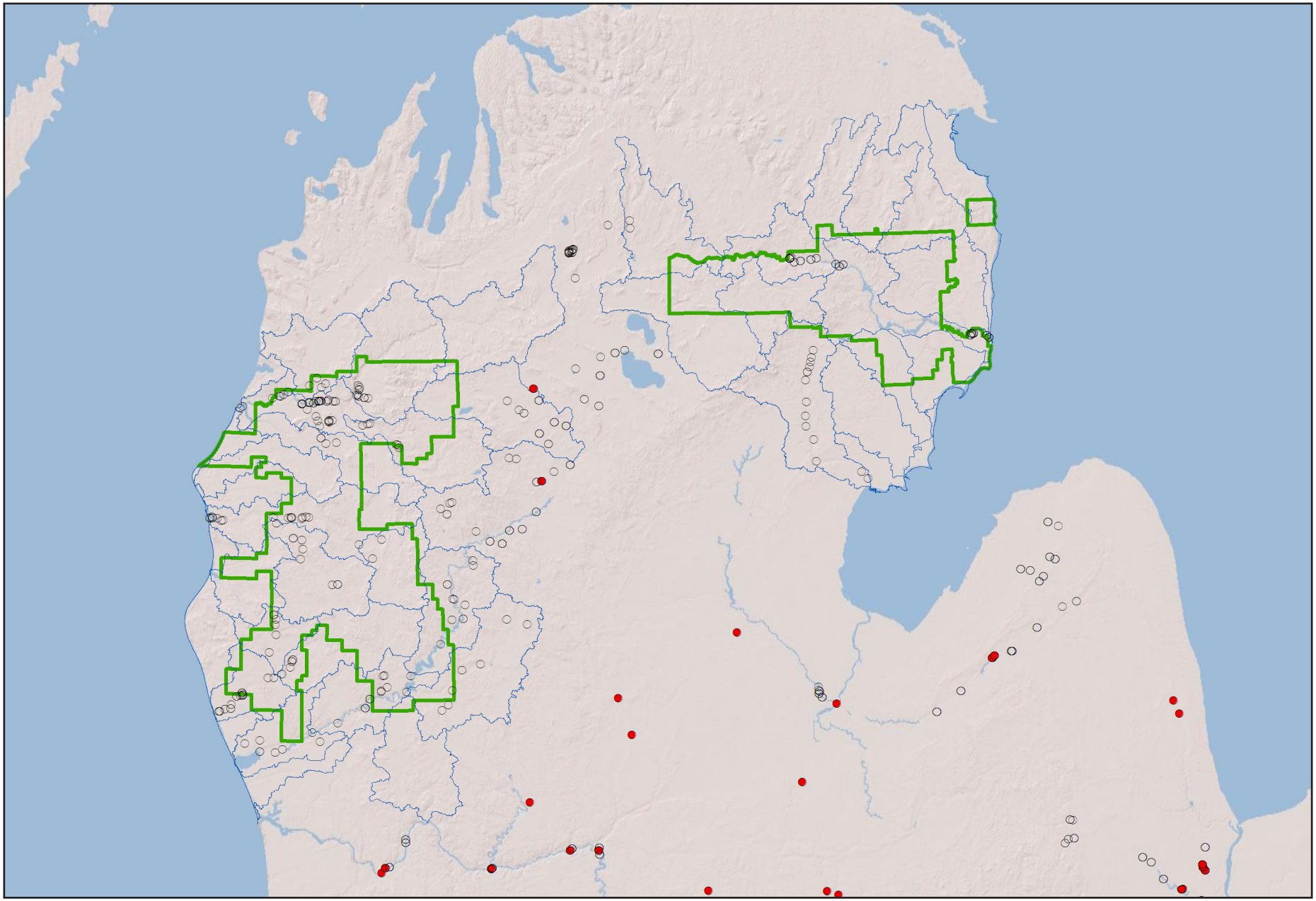
***Ligumia recta*, Black sandshell:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



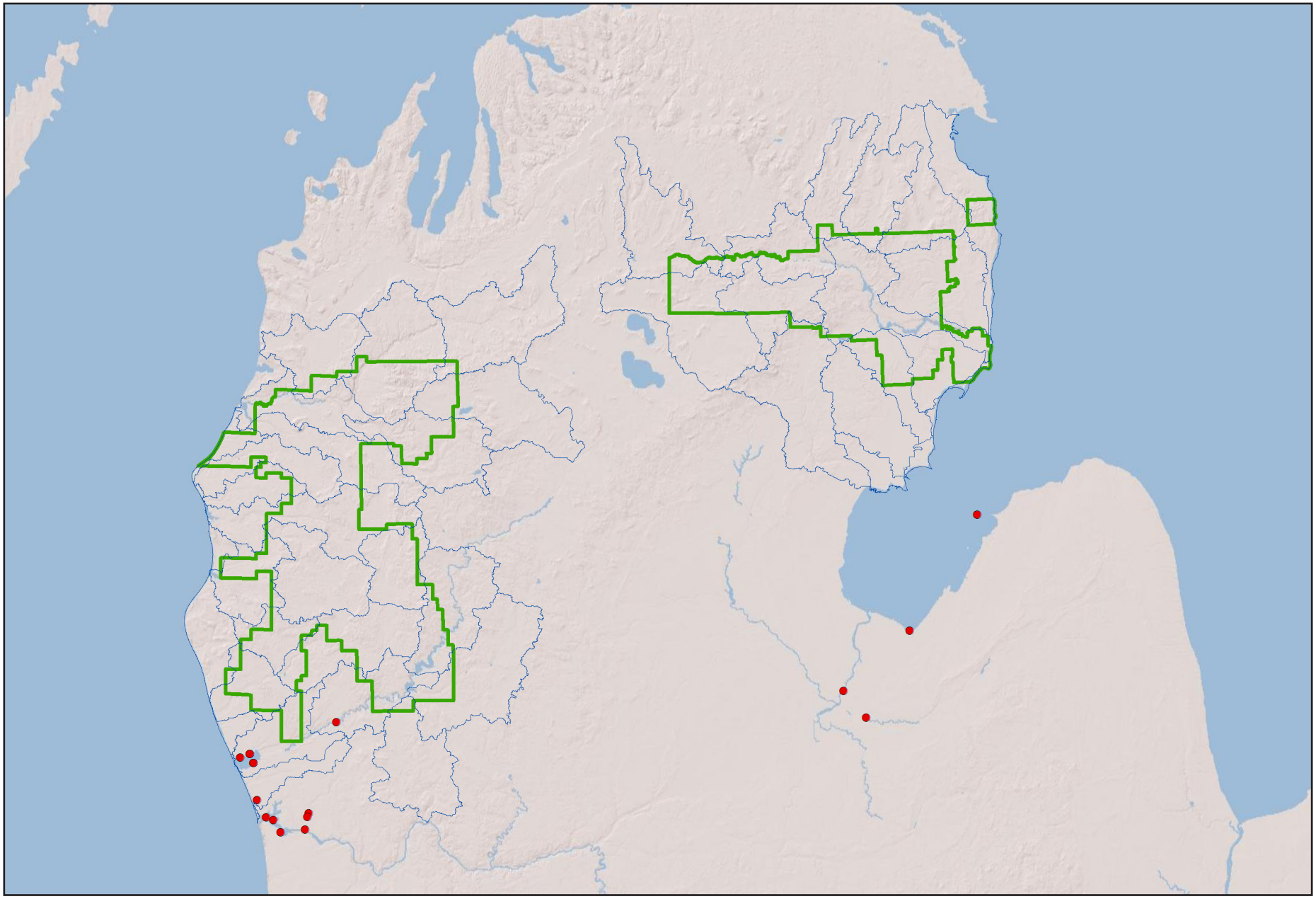
***Ligumia recta*, Black sandshell:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



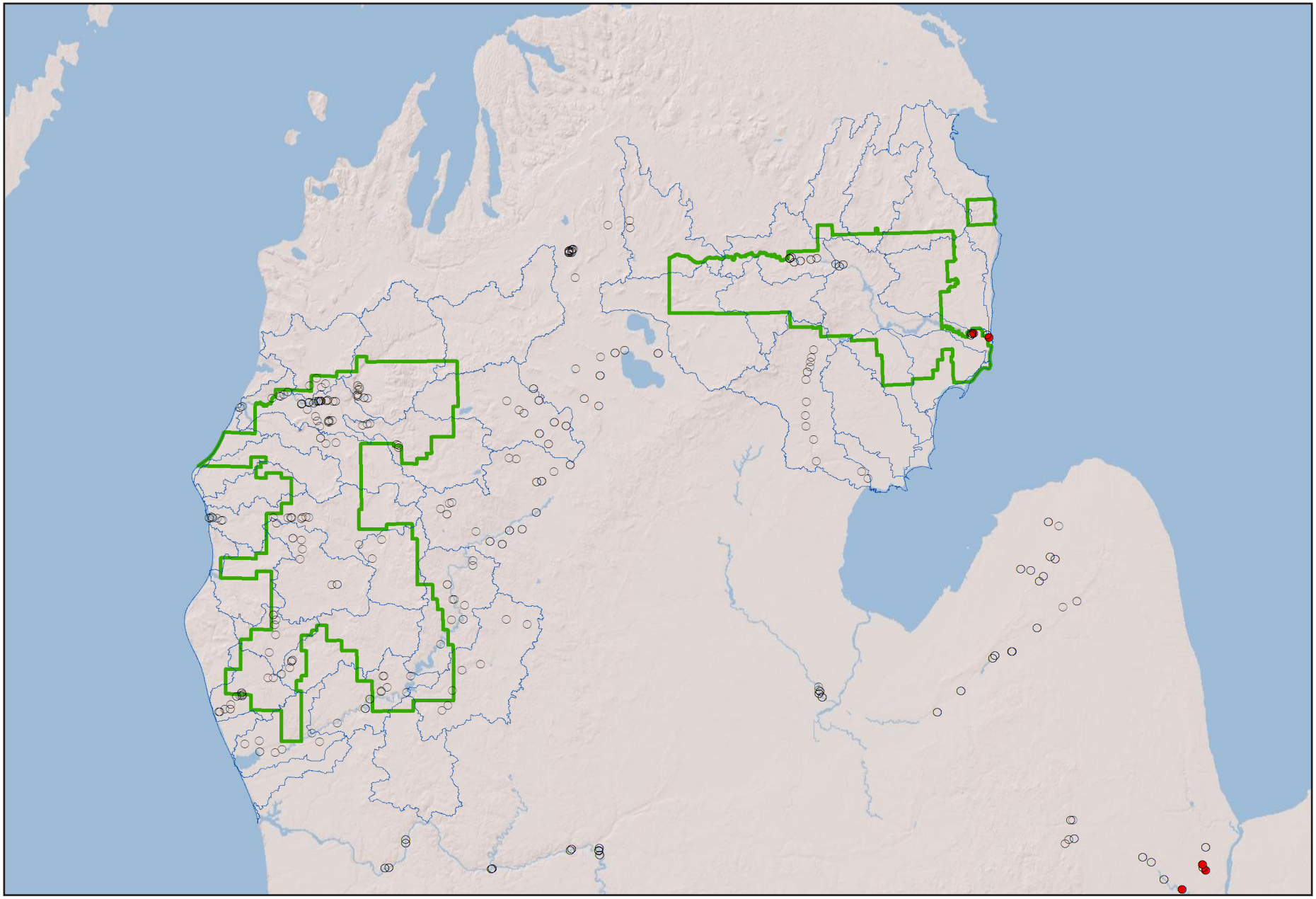
***Pleurobema sintoxia*, Round pigtoe:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



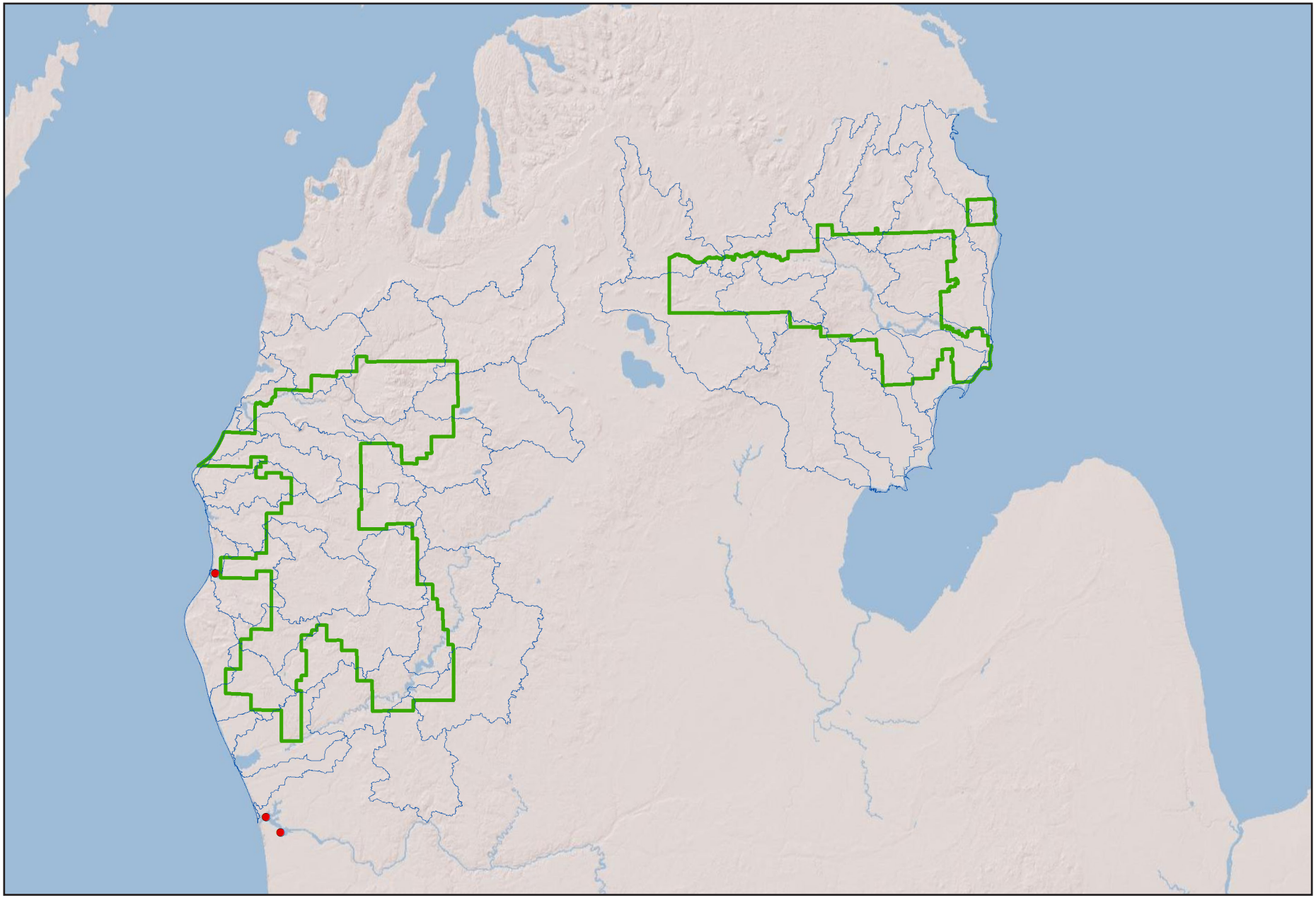
***Pleurobema sintoxia*, Round pigtoe:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



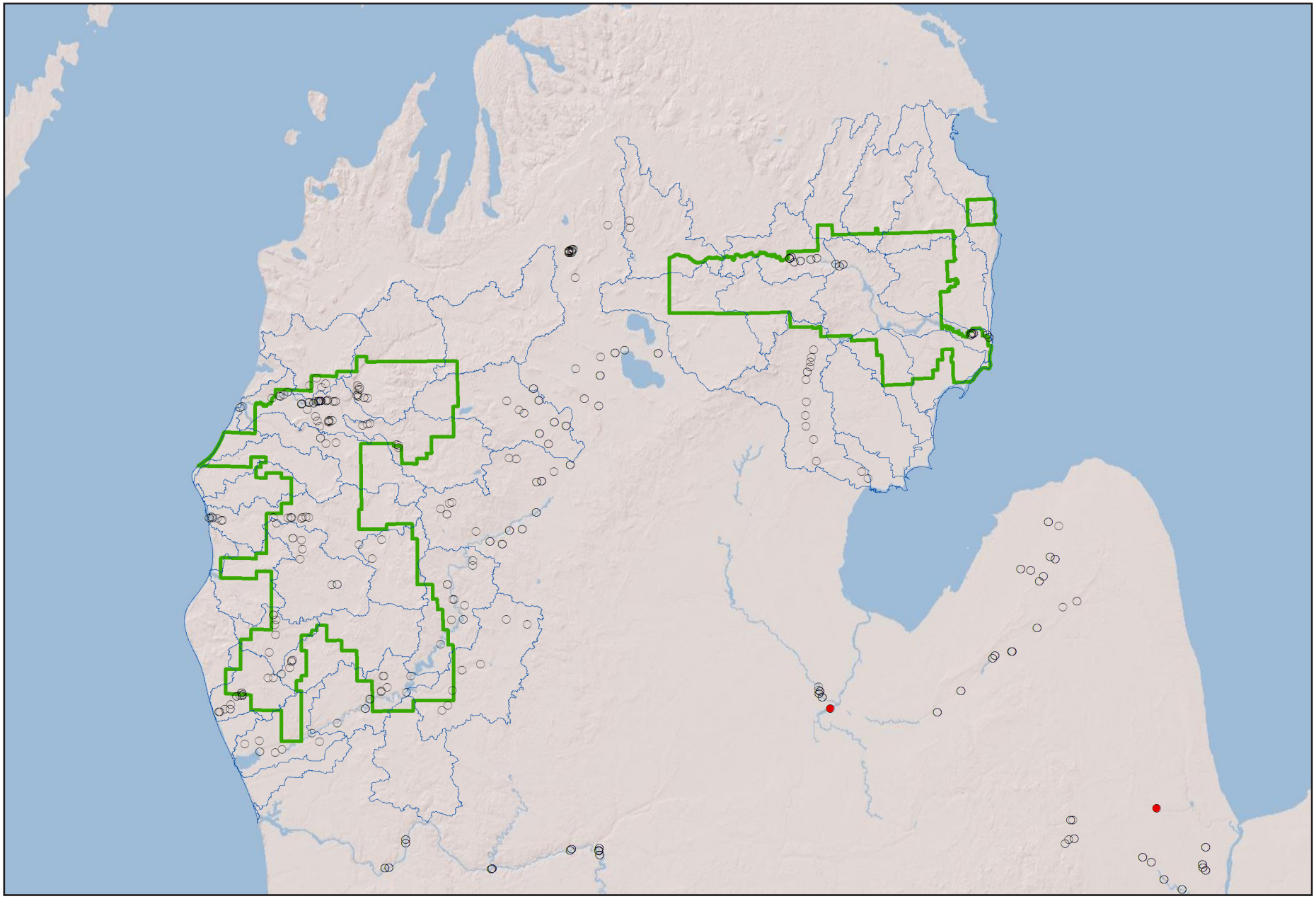
***Potamilus alatus*, Pink heelsplitter:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



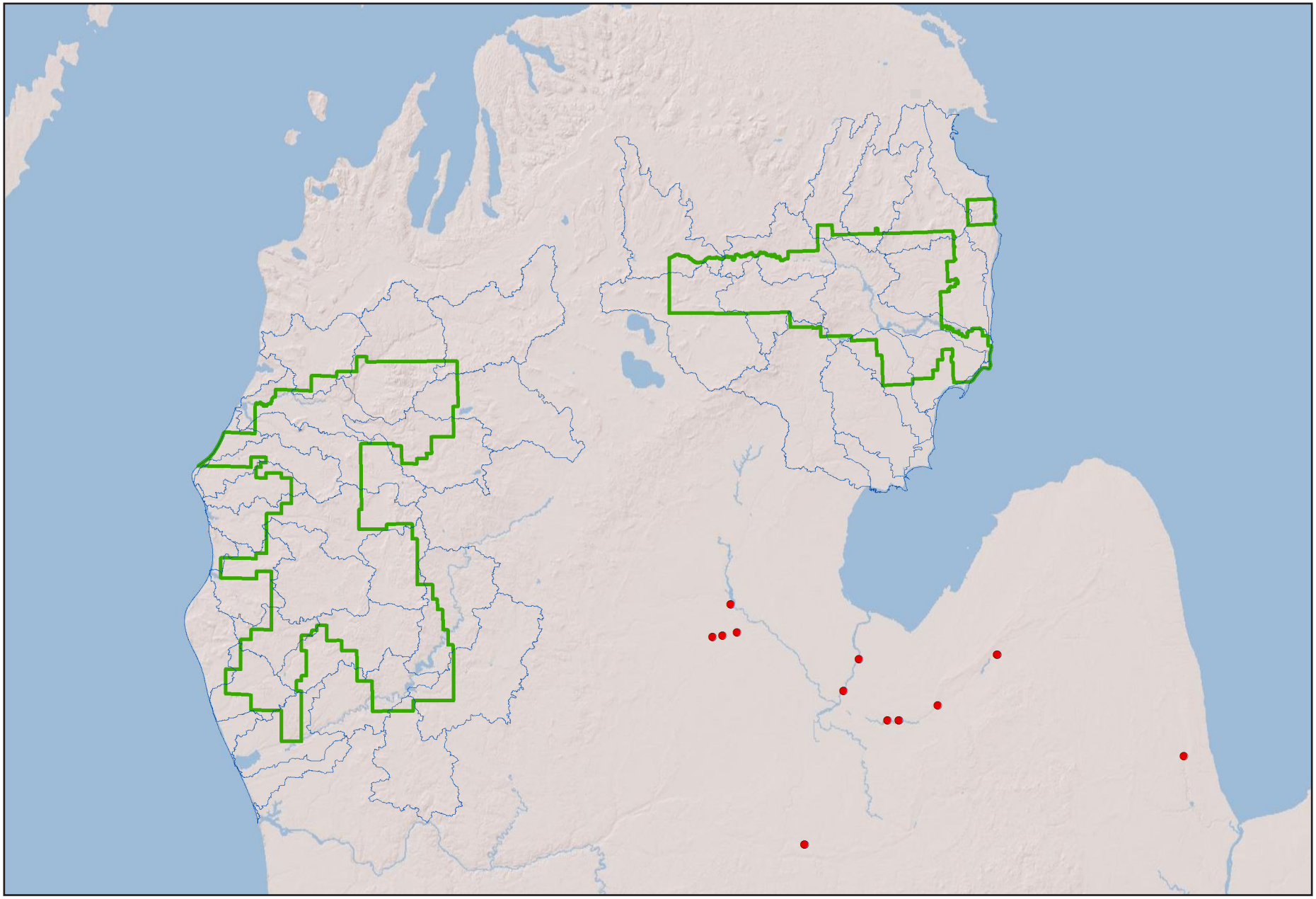
***Potamilus alatus*, Pink heelsplitter:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



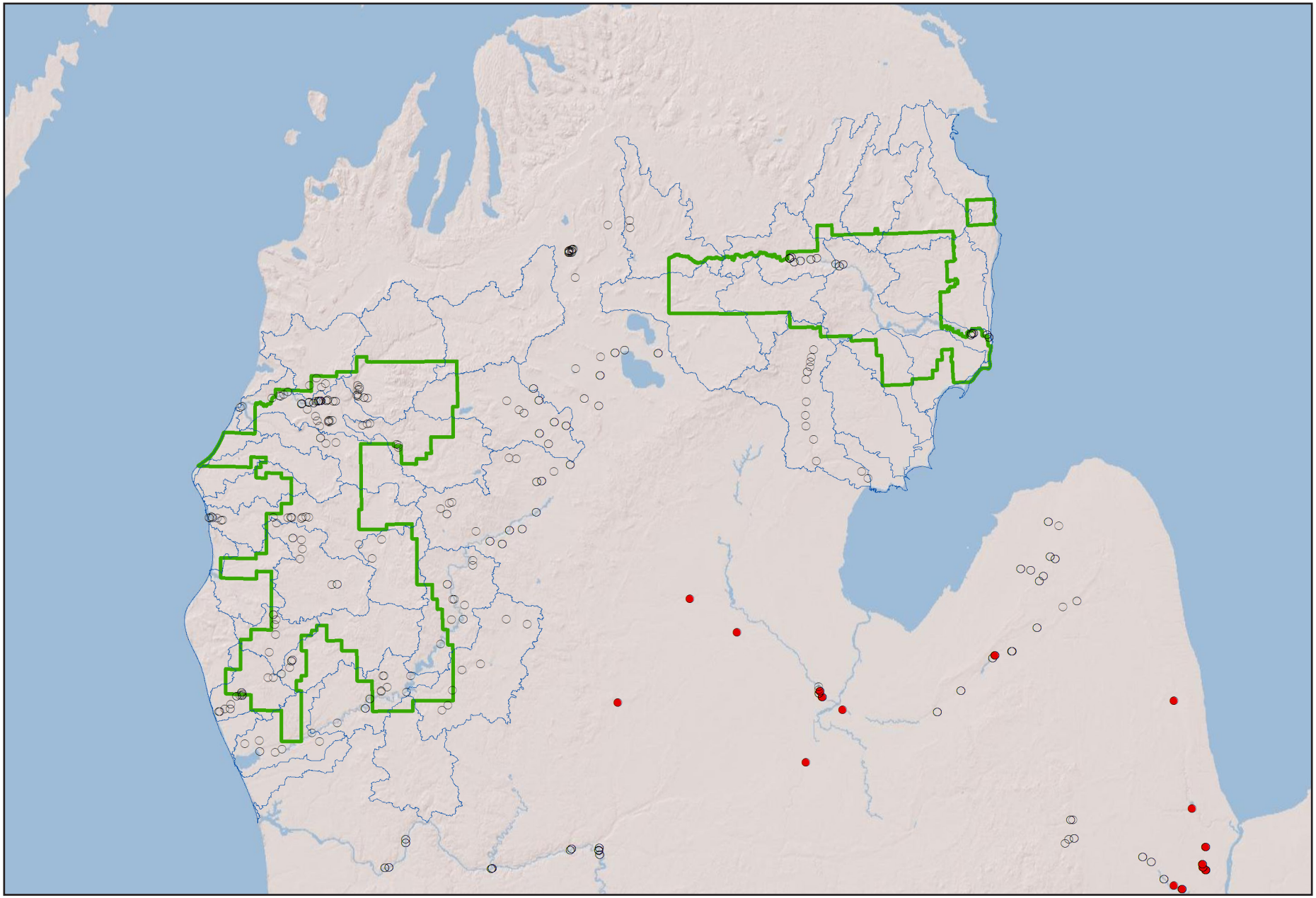
***Potamilus ohiensis*, Pink papershell:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



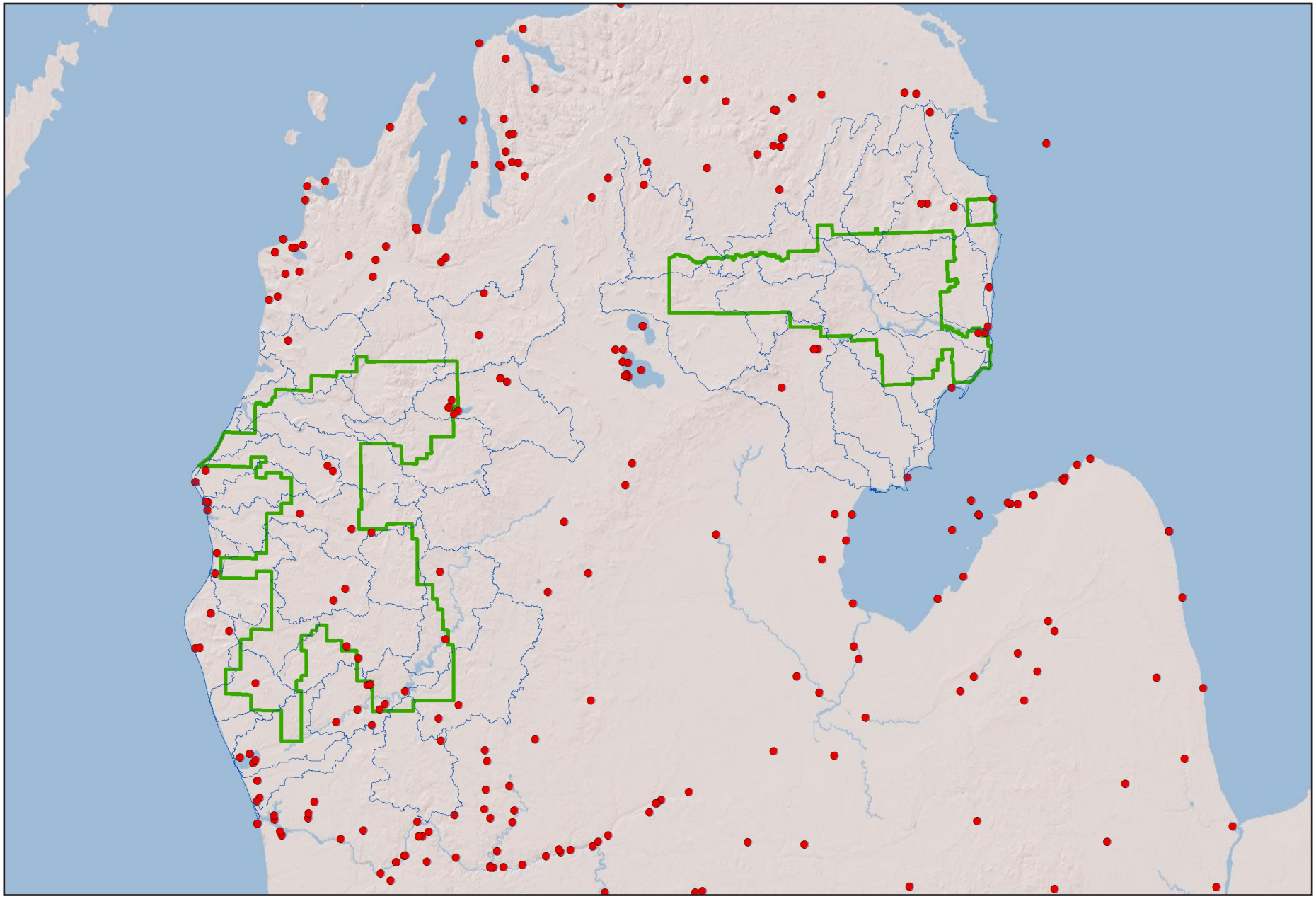
***Potamilus ohiensis*, Pink papershell:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



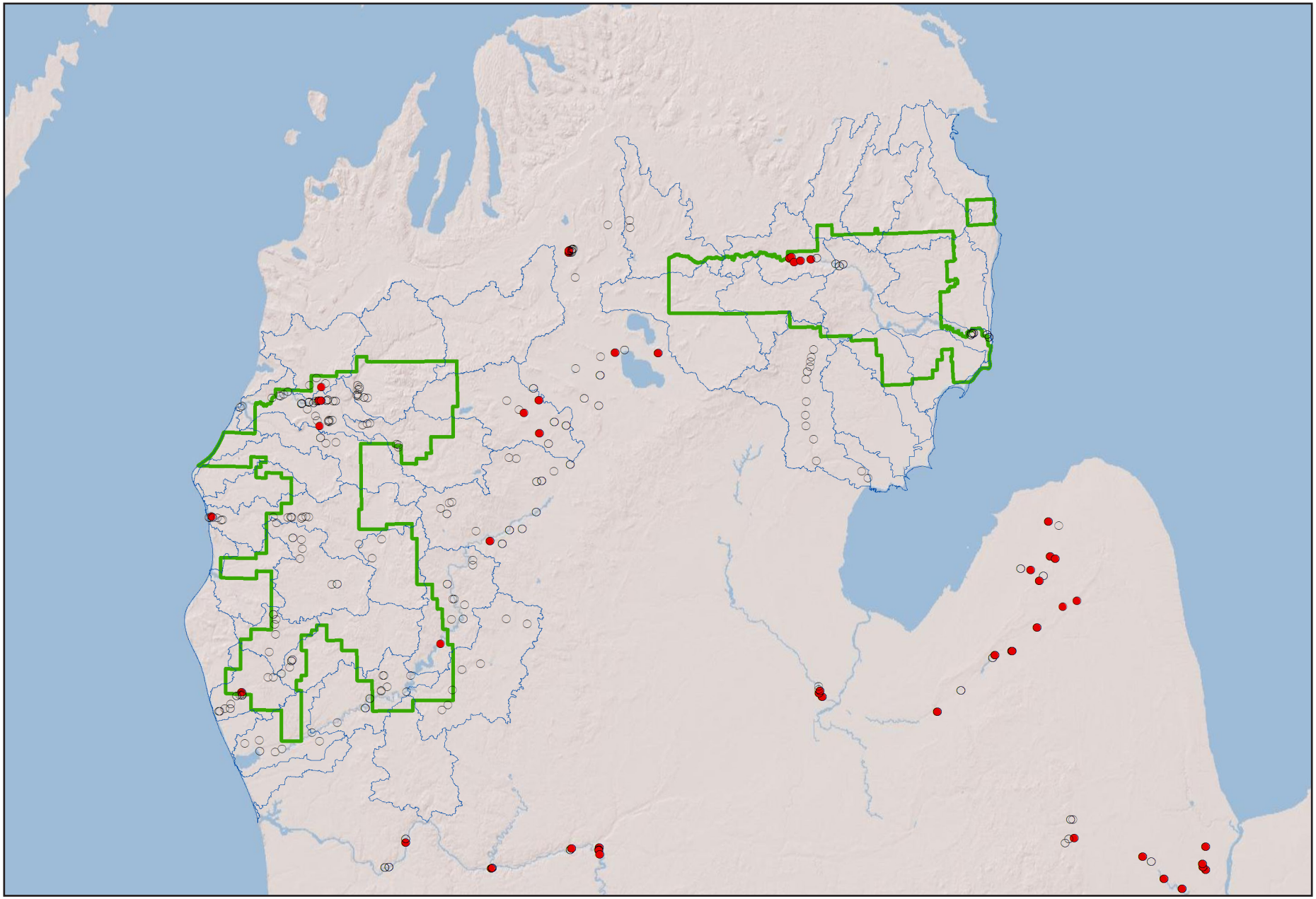
***Ptychobranchus fasciolaris*, Kidney-shell:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



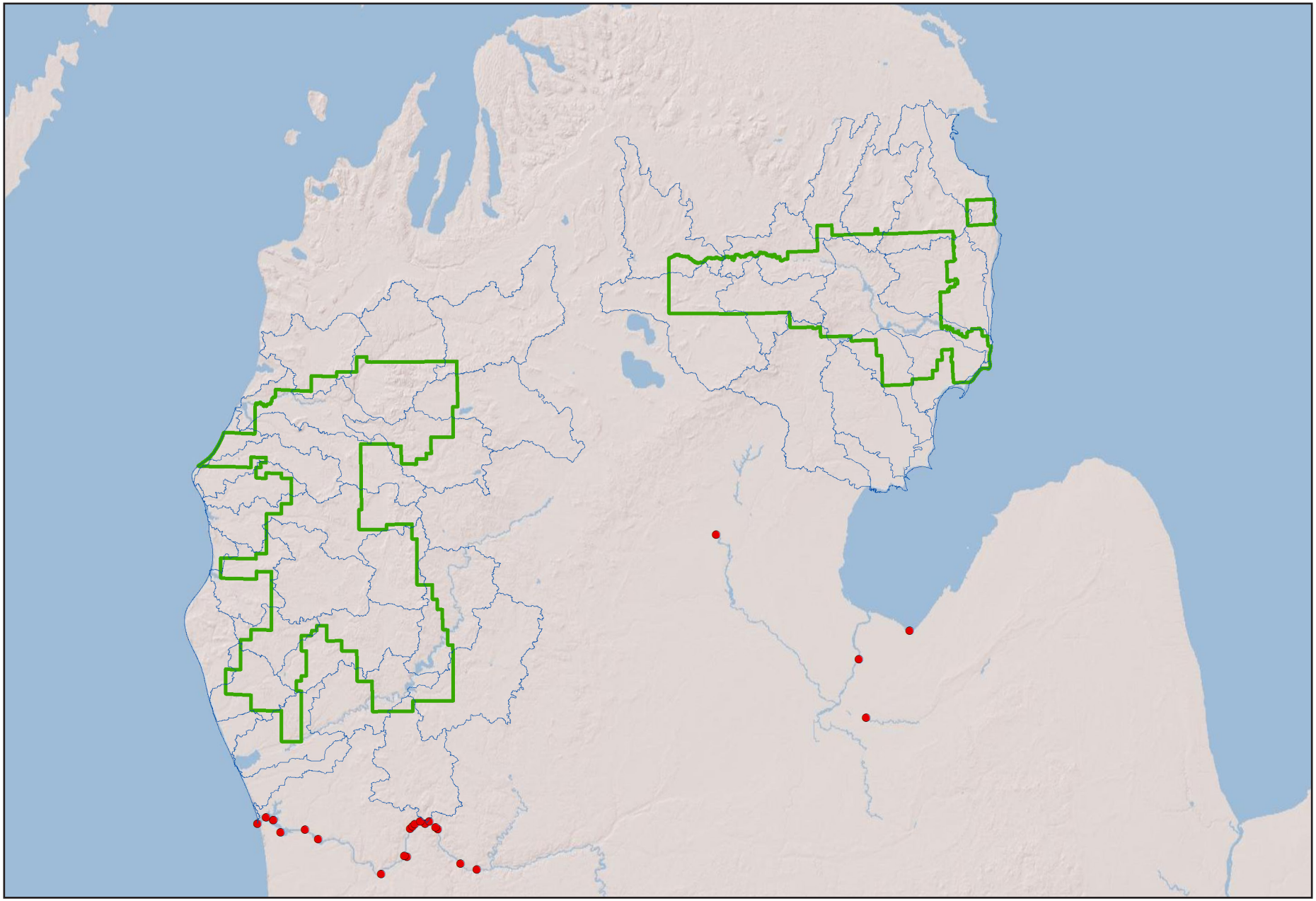
***Ptychobranchus fasciolaris*, Kidney-shell:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



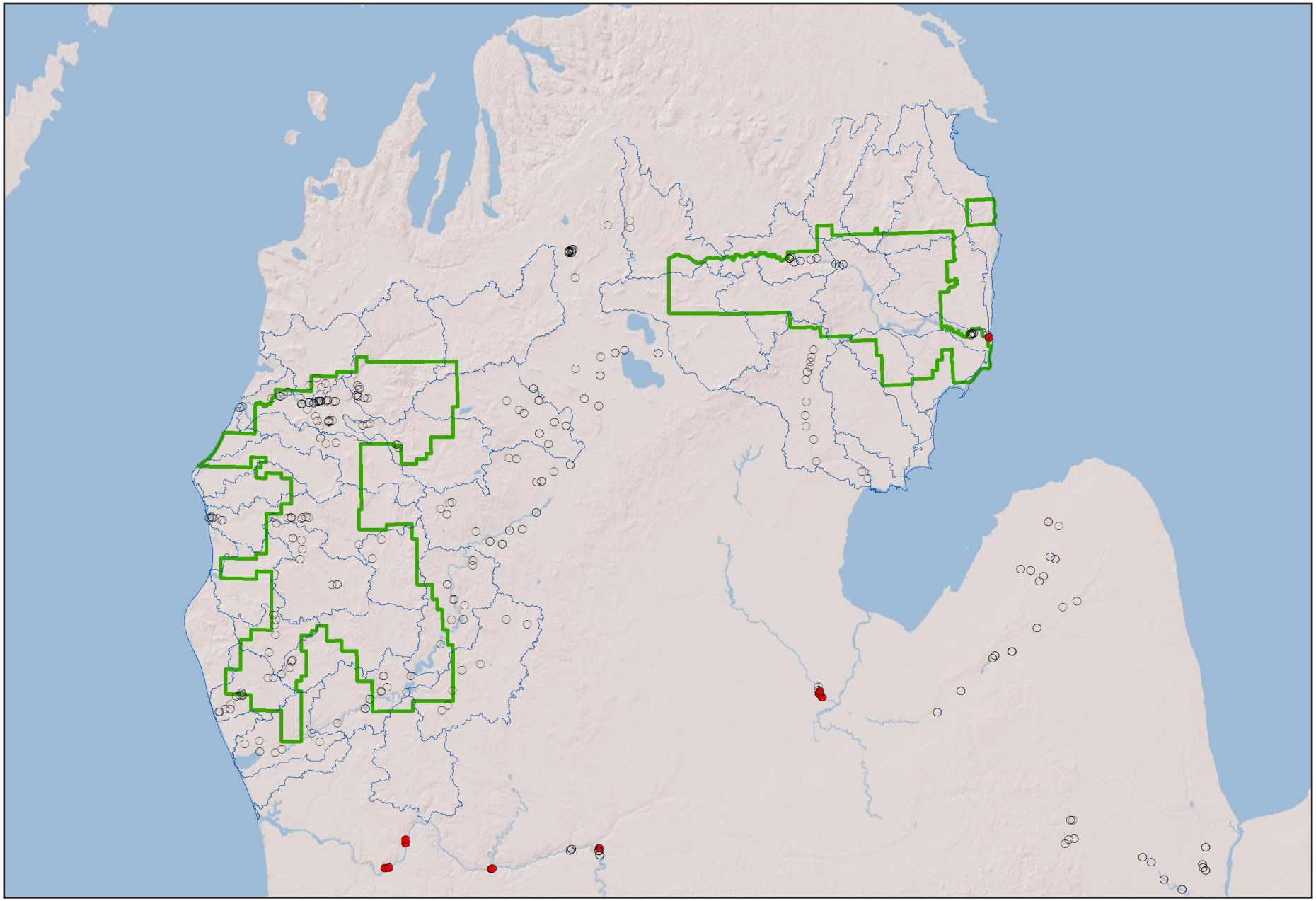
***Pyganodon grandis*, Giant floater:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found. Two of the P. grandis records from the Big Sable River watershed are dated 1981 and 2000.



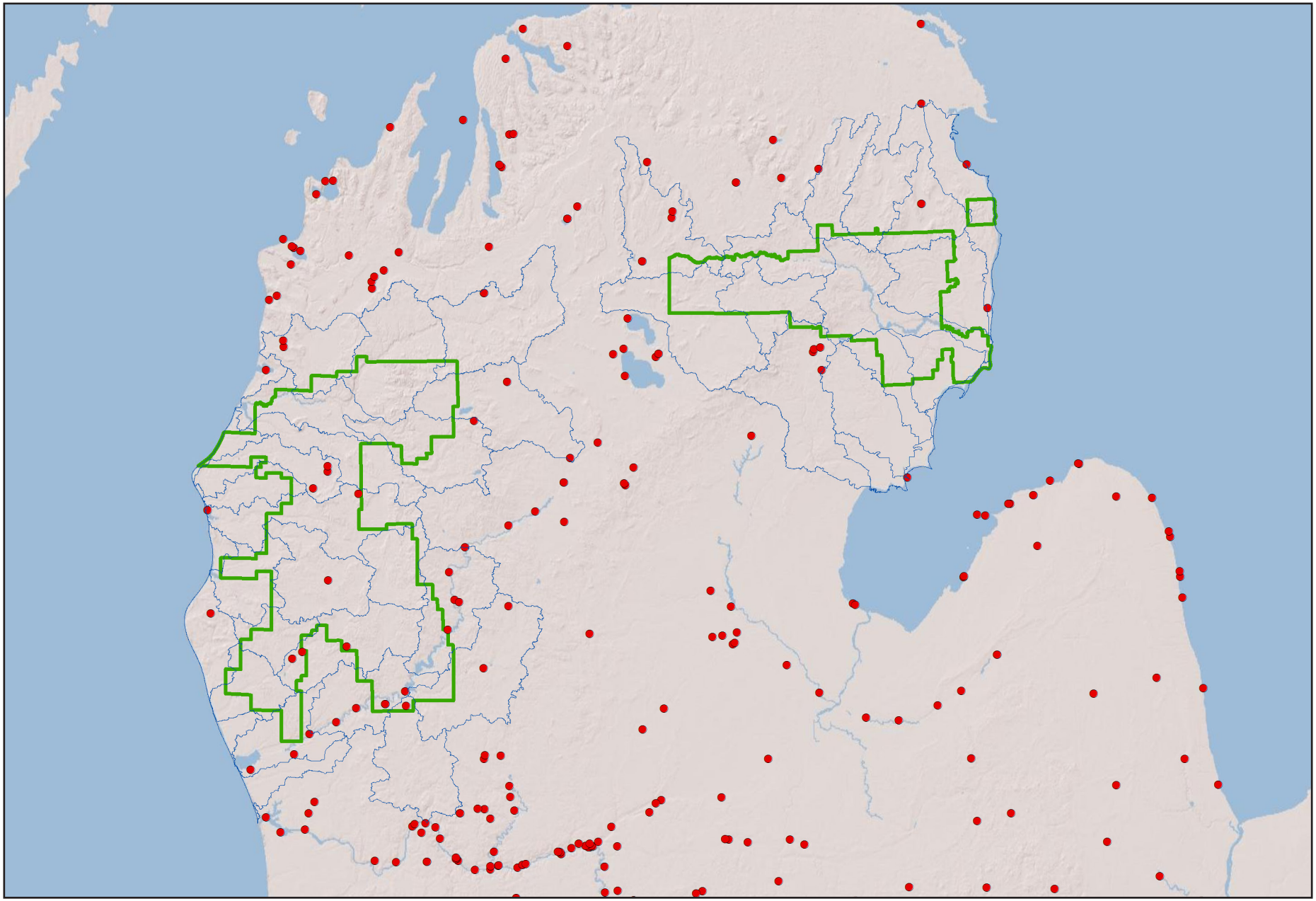
***Pyganodon grandis*, Giant floater:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



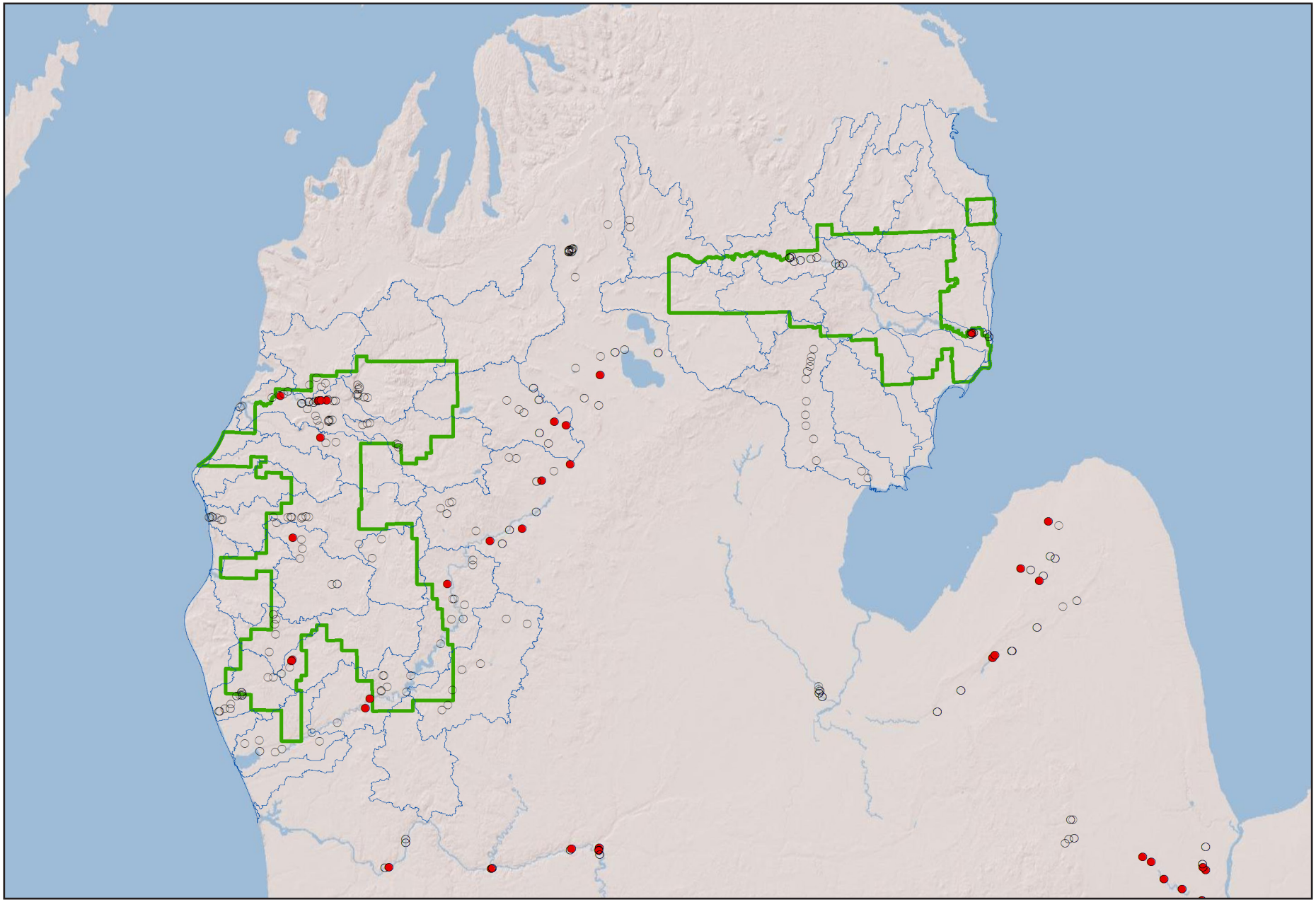
***Quadrula quadrula*, Mapleleaf:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



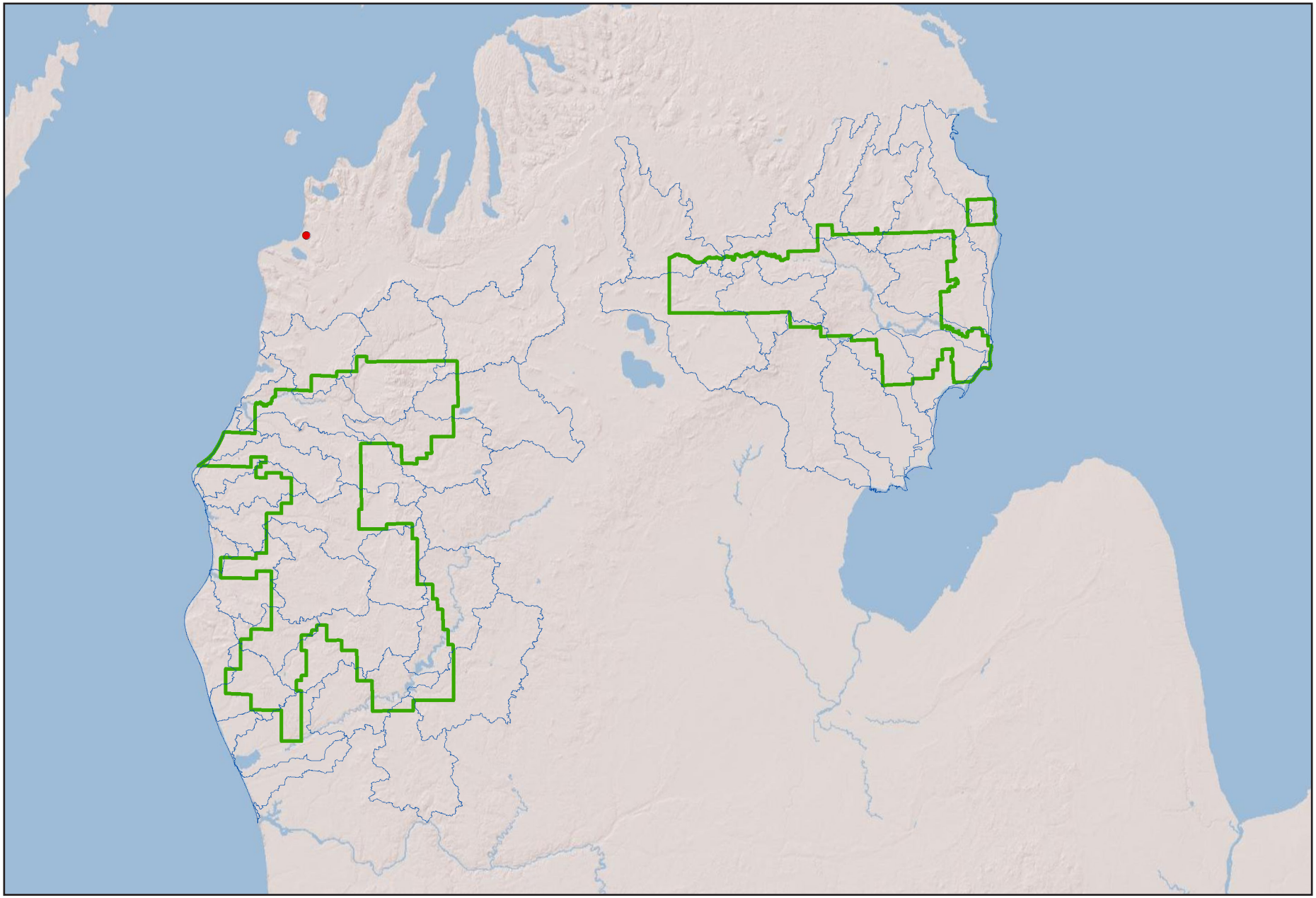
***Quadrula quadrula*, Mapleleaf:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



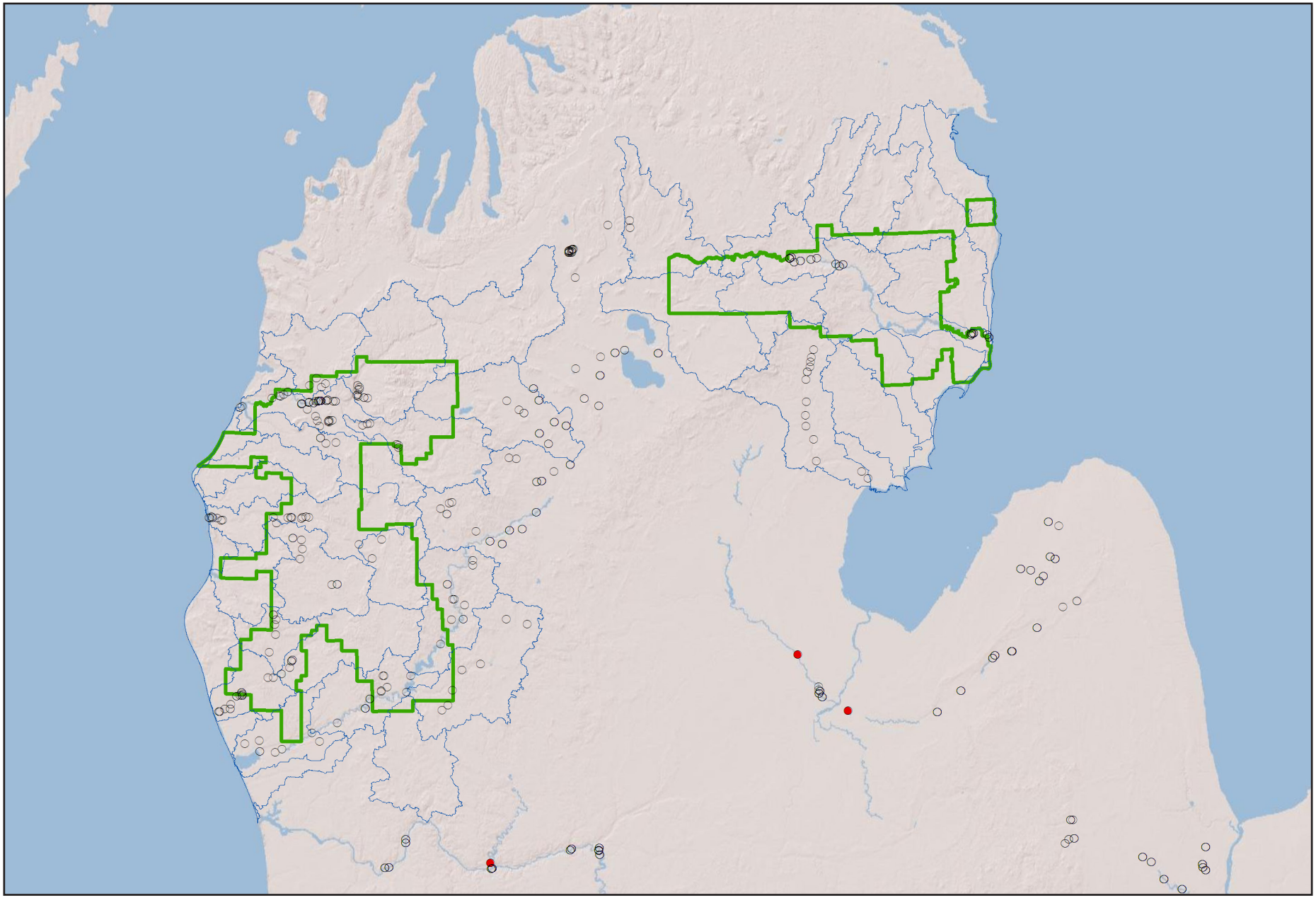
***Strophitus undulatus*, Strange floater:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



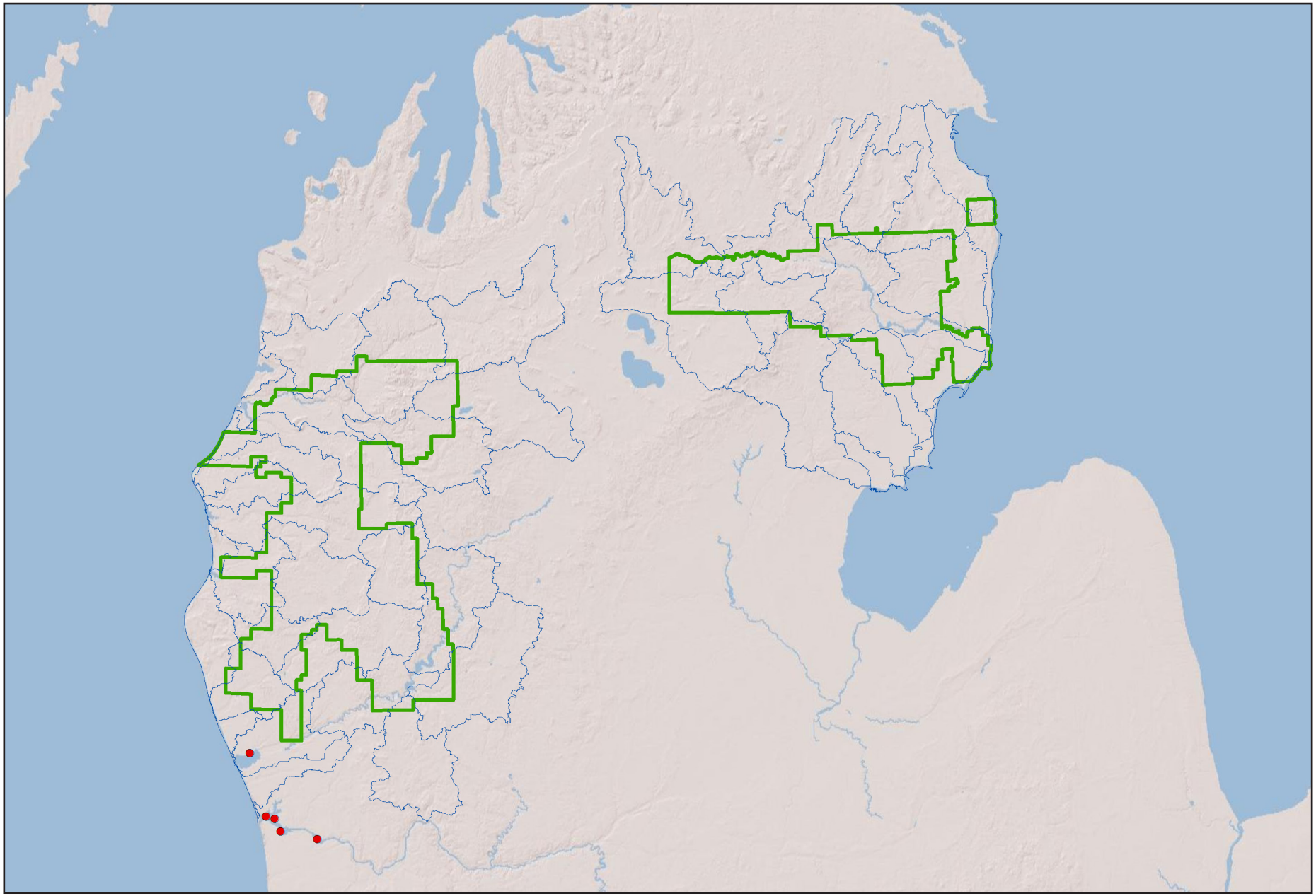
***Strophitus undulatus*, Strange floater:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



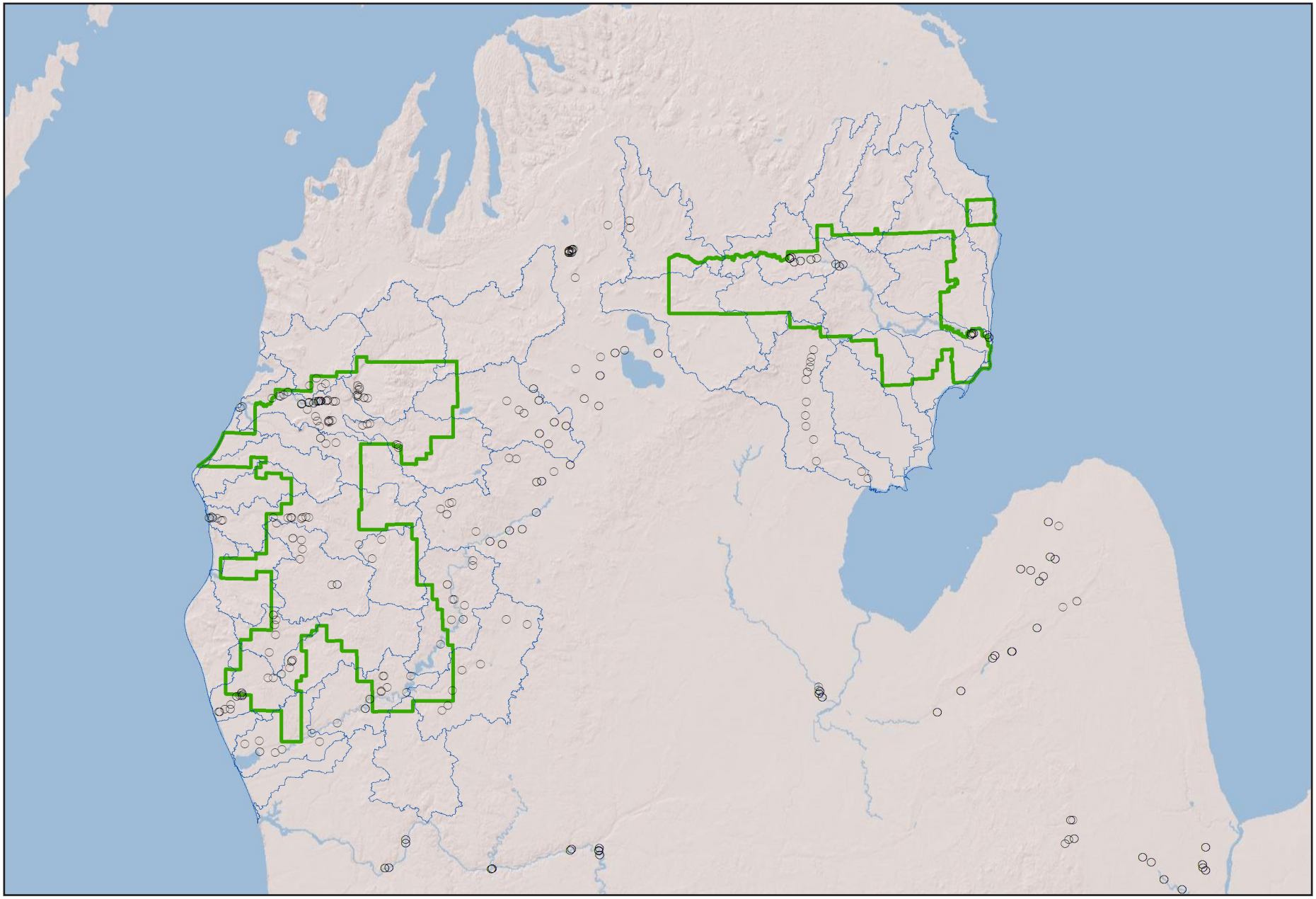
***Toxolasma parvum*, Lilliput:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



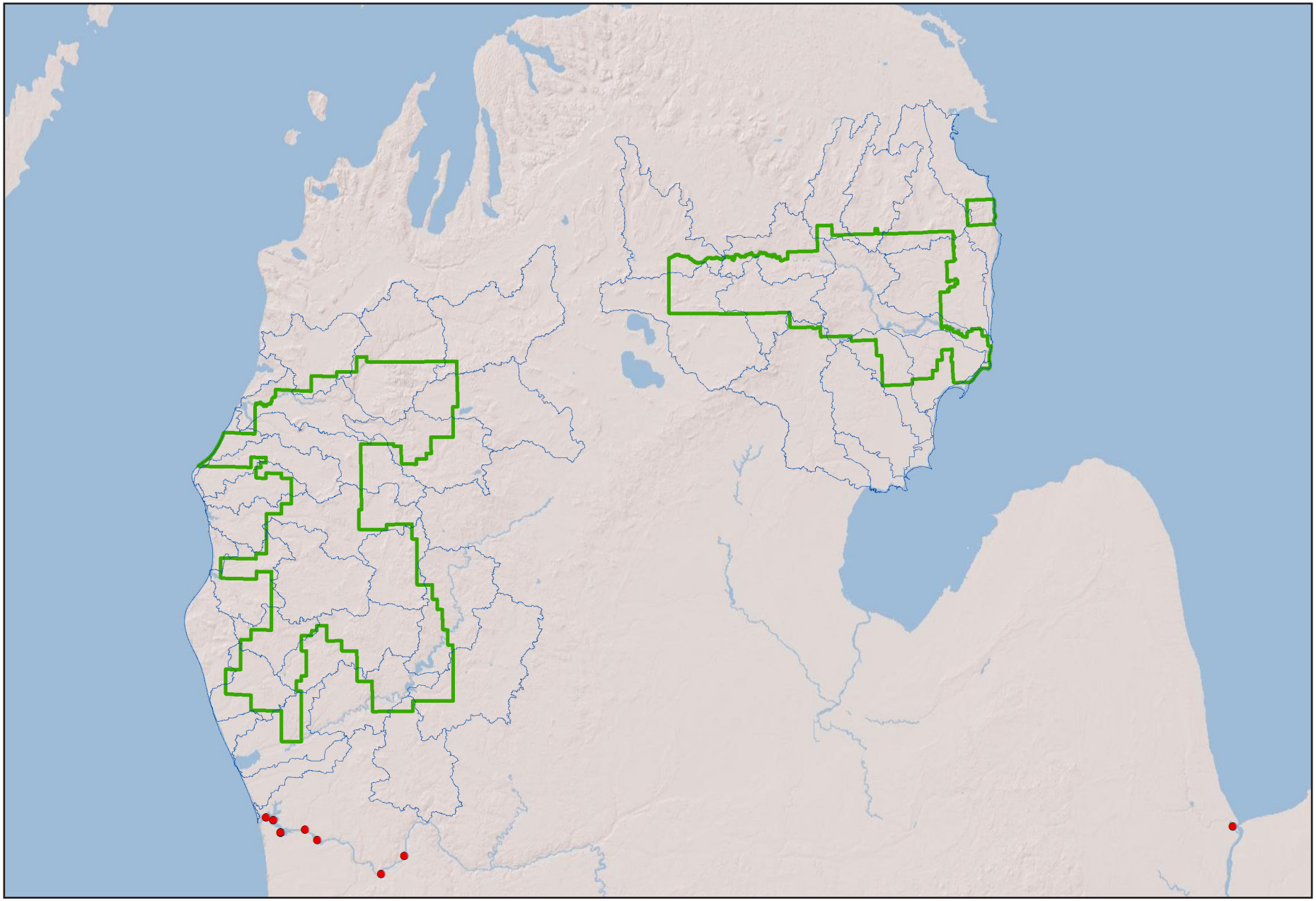
***Toxolasma parvum*, Lilliput:** Recent records (ca. 1900-1973); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



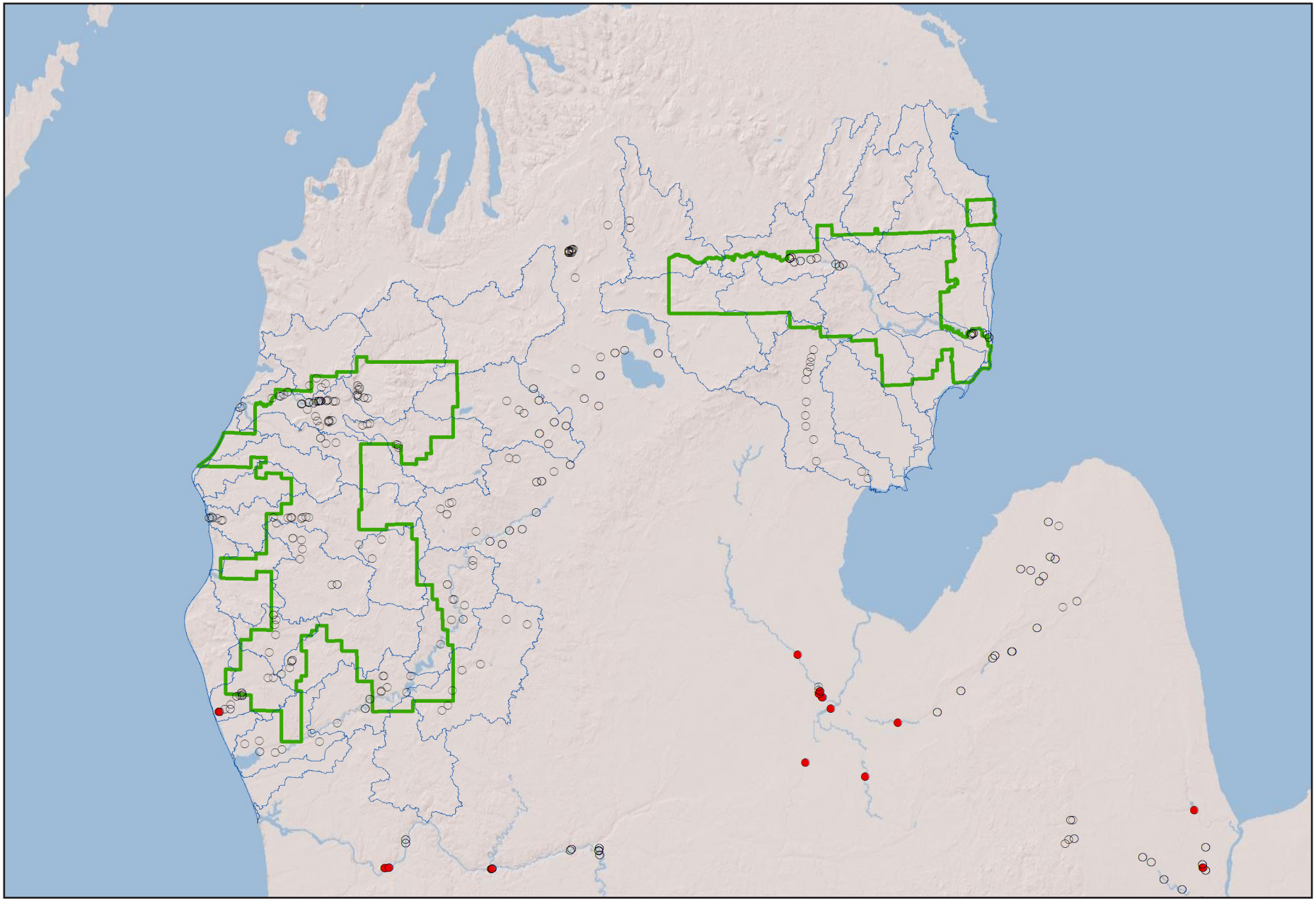
***Truncilla donaciformis*, Fawnsfoot:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



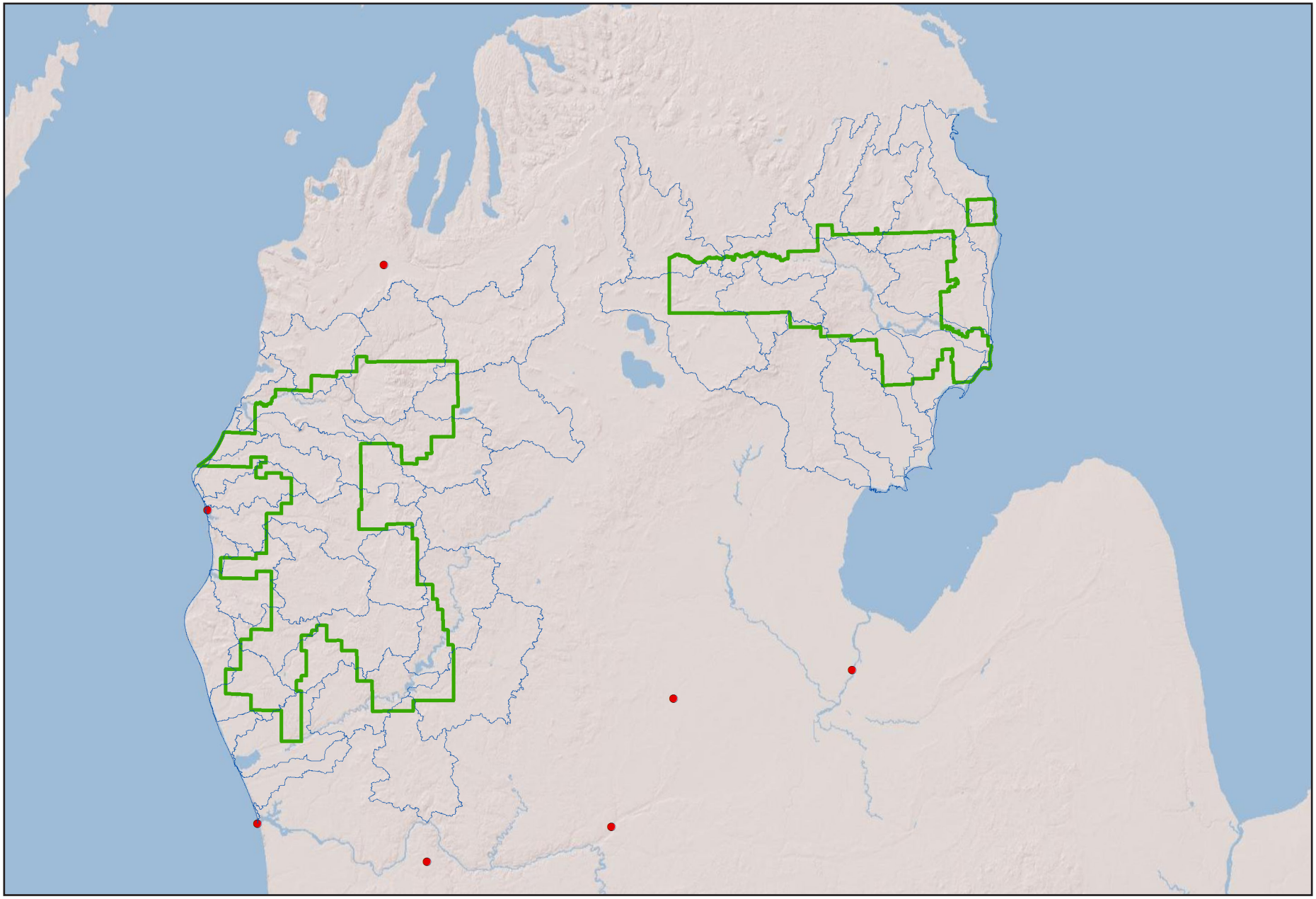
***Truncilla donaciformis*, Fawnsfoot:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



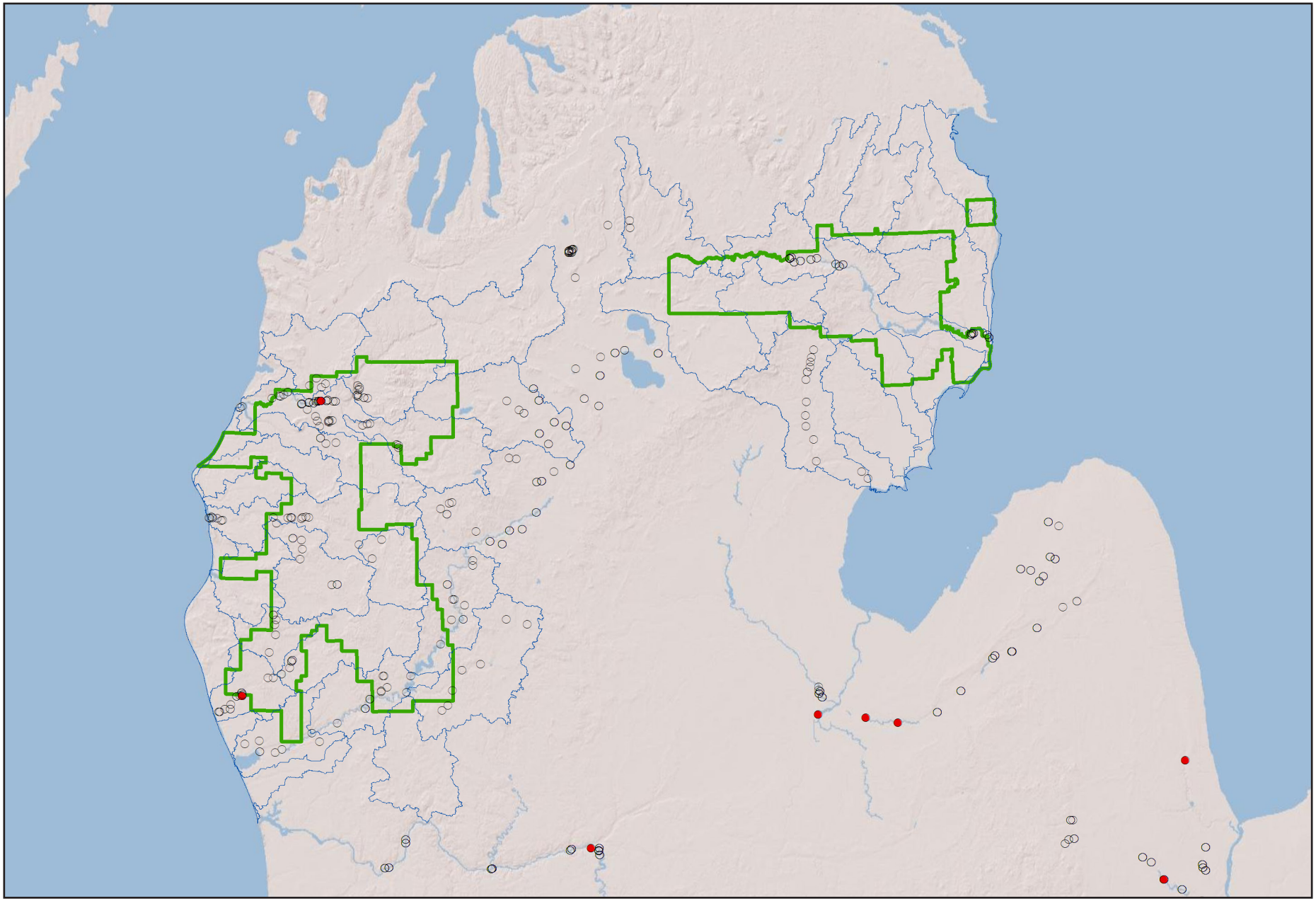
***Truncilla truncata*, Deertoe:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



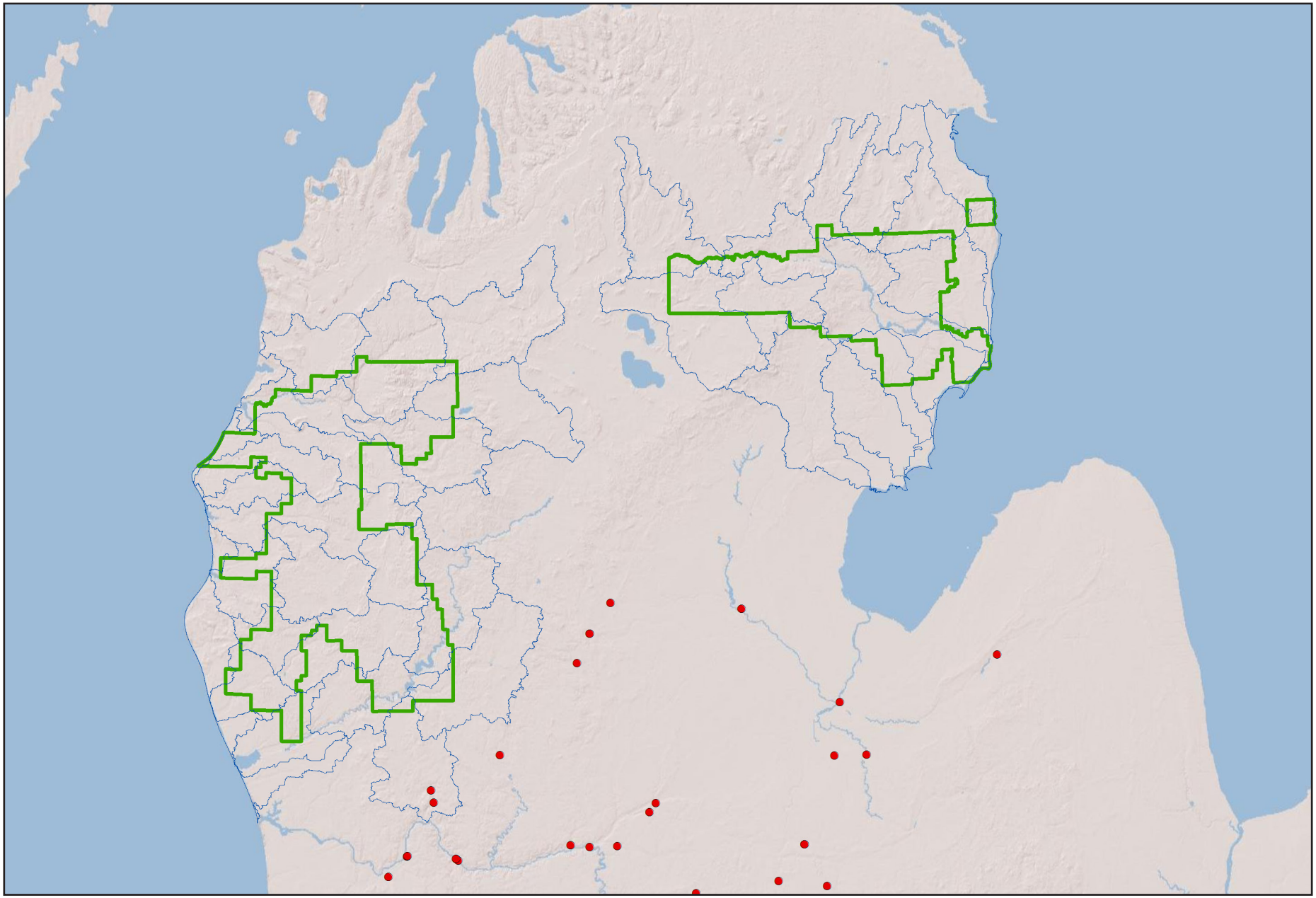
***Truncilla truncata*, Deertoe:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



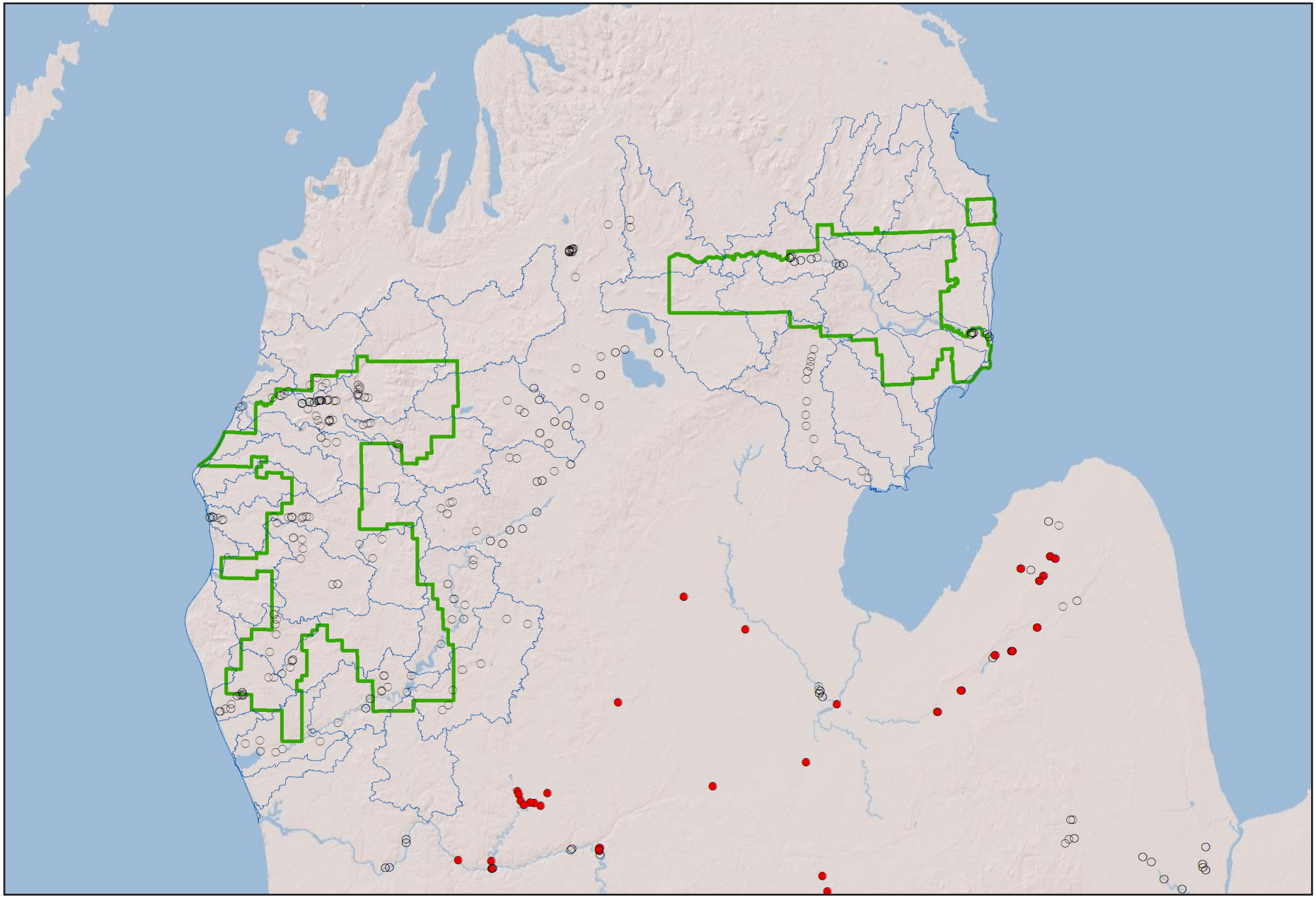
***Utterbackia imbicillus*, Paper pondshell:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



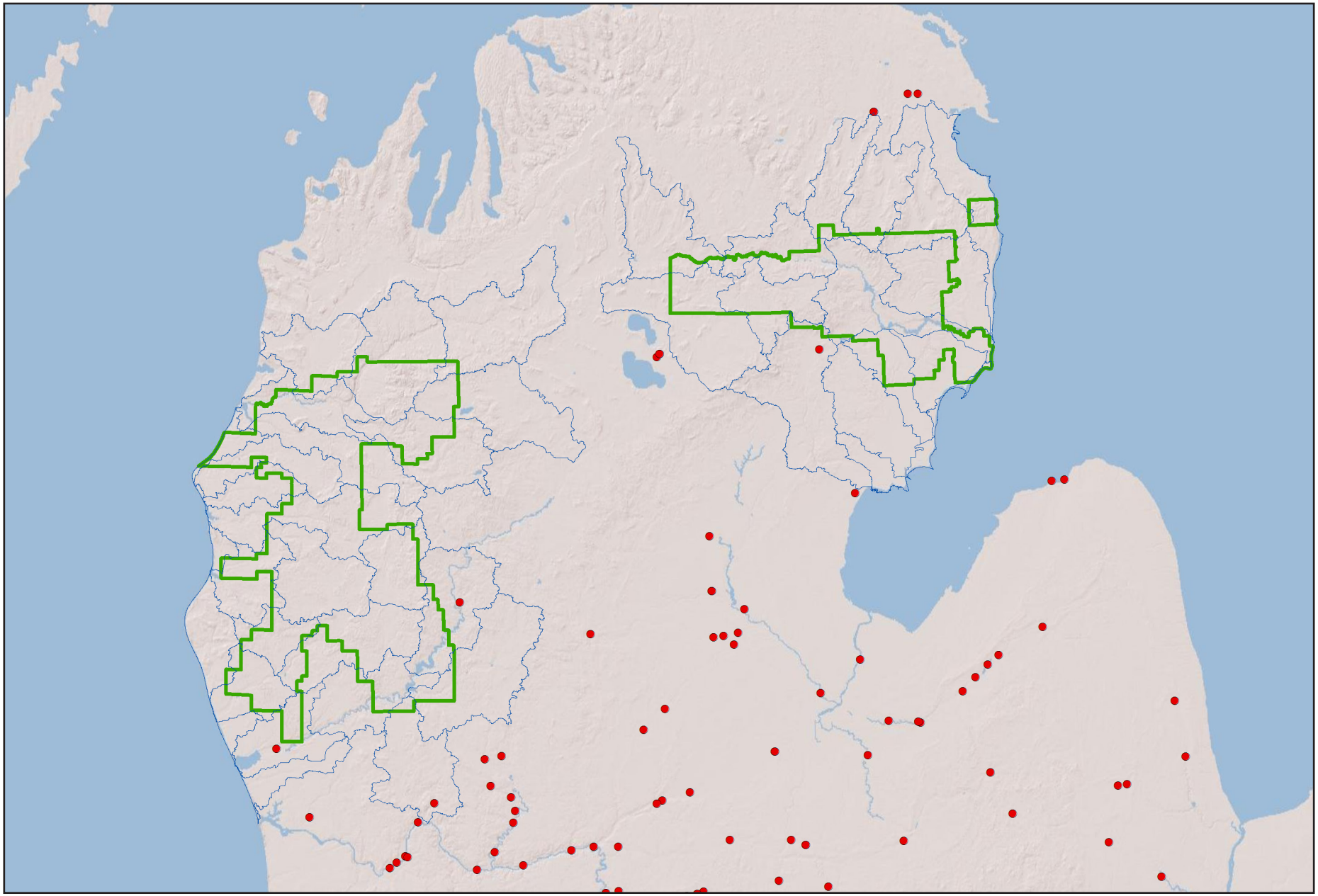
***Utterbackia imbicillus*, Paper pondshell:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



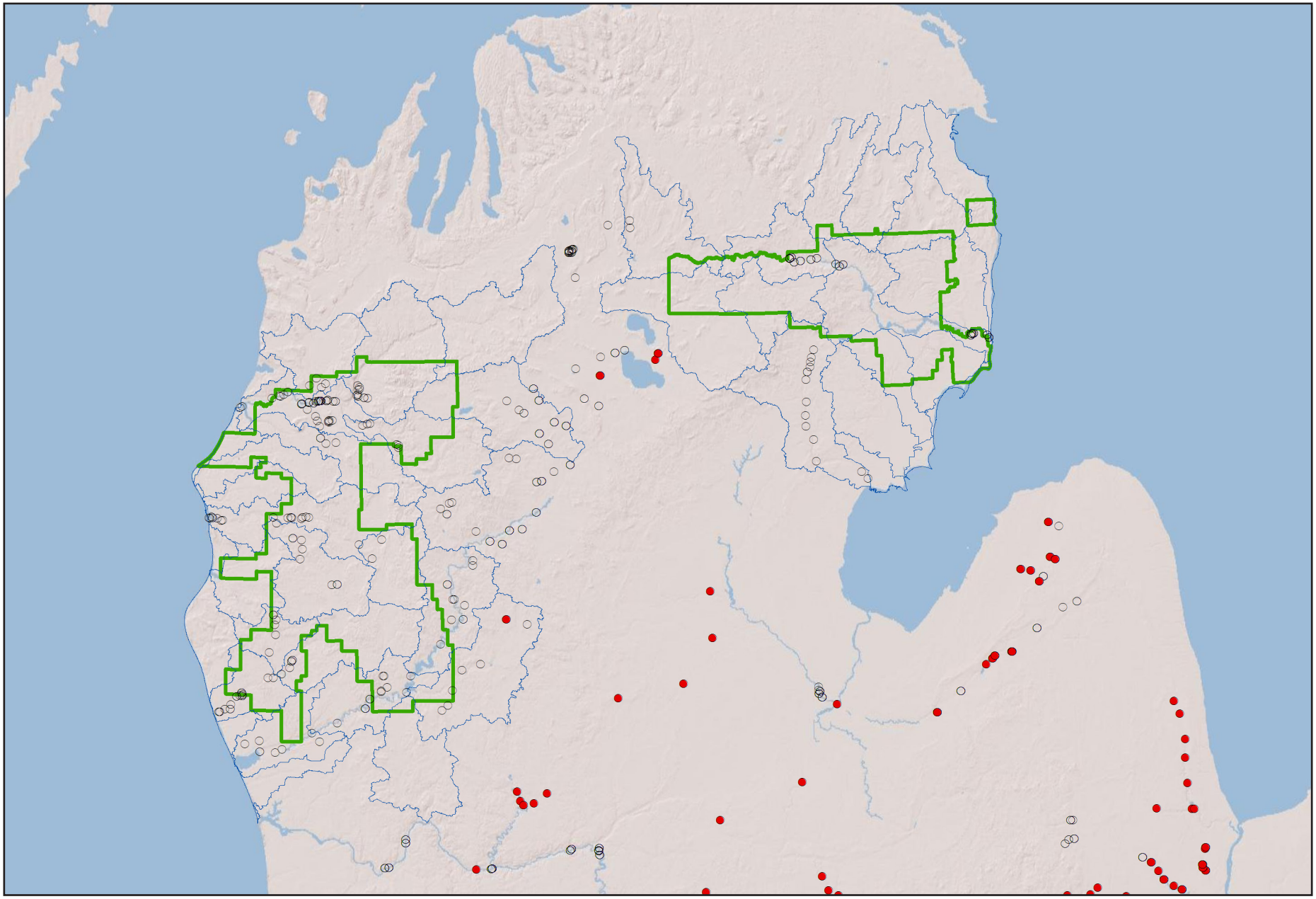
***Venustaconcha ellipsiformis*, Ellipse:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



***Venustaconcha ellipsiformis*, Ellipse:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.



***Villosa iris*, Rainbow:** Historical records (ca. 1900-1973); Red dots represent sites where this species was found.



***Villosa iris*, Rainbow:** Recent records (1998-2015); Red dots represent survey sites where this species was found. Circles represent survey sites where this species was not found.

Appendix A.1. Historical unionid mussel occurrence records from the University of Michigan, Museum of Zoology Mollusk Collection located within Huron-Manistee National Forest ownership.

ID #	Catalog #	Species	County	Location	Latitude	Longitude	Collector and Collection Date	# of Specimens	Collection Note
4111	61264	Alasmidonta viridis	Oceana	[South Branch] White River, 4.0 mi. SW of Hesperia approx. 43┬▒32'01"N, 86┬▒06'23"W	43.533611	-86.106389	van der Schalie & Stoll; 00/___/1934	Dry 1.0	
2106	39569	Alasmidonta viridis	Iosco	pond above Loud Dam approx. 44┬▒27'39"N, 83┬▒45'20"W	44.460833	-83.755556	Hubbs & Langlois; 09/Aug/1924	Dry 1.0	Fish Department & Department of Conservation
4106	61263	Anodontoides ferussacianus	Oceana	White River, 4.0 mi. SW of Hesperia approx. 43.5305┬▒N, 86.1145┬▒W	43.530500	-86.114500	van der Schalie & Stoll; 00/___/1934	Dry 19.0	
4107	61265	Lampsilis cardium	Oceana	White River, 4.0 mi. SW of Hesperia approx. 43.5305┬▒N, 86.1145┬▒W	43.530500	-86.114500	van der Schalie & Stoll; 00/___/1934	Dry 1.0	
4108	61266	Lasmigona compressa	Oceana	White River, 4.0 mi. SW of Hesperia approx. 43.5305┬▒N, 86.1145┬▒W	43.530500	-86.114500	van der Schalie & Stoll; 00/___/1934	Dry 1.0	
4167	104127	Lasmigona compressa	Oscoda	Wolf Creek USGS 44.6605694┬▒N, 84.1247274┬▒W	44.660569	-84.124727	Streator, Geo. J.;	Dry 1.0	Bryant Walker Collection
4109	61267	Lasmigona costata	Oceana	White River, 4.0 mi. SW of Hesperia approx. 43.5305┬▒N, 86.1145┬▒W	43.530500	-86.114500	van der Schalie & Stoll; 00/___/1934	Dry 2.0	
3841	39567	Pyganodon grandis	Newaygo	Nichols Lake, north shore approx. 43.729878┬▒N, 85.906805┬▒W	43.729878	-85.906805	Langlois & Moody; 19/Aug/1926	Dry 2.0	Collected by the Fish Dept. and the Dept. of Conservation
404	39613	Strophitus undulatus	Newaygo	Big South Branch of Pere Marquette River approx. 43.7550┬▒N, 85.9746┬▒W	43.755000	-85.974600	Langlois & Moody; 22/Jul/1926	Dry 1.0	Fish Depart. and Depart. of Conservation
4110	61268	Strophitus undulatus	Oceana	White River, 4.0 mi. SW of Hesperia approx. 43.5305┬▒N, 86.1145┬▒W	43.530500	-86.114500	van der Schalie & Stoll; 00/___/1934	Dry 15.0	
5833	171956	Strophitus undulatus	Oceana	White River, Sec 2, Greenwood Twp approx. 43.5501┬▒N, 86.0762┬▒W	43.550100	-86.076200	van der Schalie & H.H.; 22/Aug/1949	Dry 1.0	

Appendix A.2. Historical unionid mussel occurrence records from The Ohio State University Museum of Biological Diversity located within Huron-Manistee National Forest ownership.

Catalog #	Genus	Species	County	Waterbody	Locality	Latitude	Longitude	Collector	Collection Date
34453	Anodontoides	ferussacianus	Iosco	Au Sable River	600 yards above Foote Dam, 6.0 mi. W of Osceola	44.433100	-83.375000	Lynwood A. MacLean	11 June 1973
34459	Lampsilis	cardium	Iosco	Au Sable River	6 mi. above Foote Dam, 12 mi. WNW of Oscoda	44.435300	-83.373200	Lynwood A. MacLean	12 June 1973
34456	Lampsilis	cardium	Iosco	Au Sable River	600 yards above Foote Dam, 6.0 mi. W of Osceola	44.433100	-83.375000	Lynwood A. MacLean	11 June 1973
34458	Lampsilis	radiata (=siliquoidea)	Iosco	Au Sable River	6 mi. above Foote Dam, 12 mi. WNW of Oscoda	44.435300	-83.373200	Lynwood A. MacLean	12 June 1973
34455	Lampsilis	radiata (=siliquoidea)	Iosco	Au Sable River	600 yards above Foote Dam, 6.0 mi. W of Osceola	44.433100	-83.375000	Lynwood A. MacLean	11 June 1973
34457	Ligumia	nasuta	Iosco	Au Sable River	6 mi. above Foote Dam, 12 mi. WNW of Oscoda	44.435300	-83.373200	Lynwood A. MacLean	12 June 1973
34454	Ligumia	nasuta	Iosco	Au Sable River	600 yards above Foote Dam, 6.0 mi. W of Osceola	44.433100	-83.375000	Lynwood A. MacLean	11 June 1973
34452	Pyganodon	grandis	Iosco	Au Sable River	600 yards above Foote Dam, 6.0 mi. W of Osceola	44.433100	-83.375000	Lynwood A. MacLean	11 June 1973

Appendix A.3. Recent unionid mussel occurrence records from field surveys done by Michigan Natural Features Inventory and Huron-Manistee National Forest (HMNF) located within HMNF ownership. Surveys consisted of visual and tactile search techniques, typically with a 128m^2 search area at each site. Number of live individuals found is provided under # of Individuals (S= only shells found; 0= no individuals of any species found; *= found outside measured search area)

ID #	MNFI ID #	Species	# of Individuals	Latitude	Longitude	Project/Year	Site Name	Surveyors
56	738	Actinonaias ligamentina	S	44.432768	-83.394554	DEQ 2003	Au Sable River A3	Badra et al.
67	583	Actinonaias ligamentina	S	44.427577	-83.406772	DEQ 2005	Au Sable River A6	Badra et al.
1298	A86	Actinonaias ligamentina	S	43.522690	-86.118460	HMNF White R 2012	S. Branch White River 7	Badra et al.
765	A65	Alasmidonta marginata	S	44.267100	-85.945540	HMNF Pine R Manistee 2011	Manistee River 2011_14	Badra et al.
4	A107	Alasmidonta viridis	2	44.642440	-83.937700	HMNF 09/16/2013	Au Sable River 1	Chambers
7	A139	Alasmidonta viridis	2	44.660980	-84.123220	HMNF 09/19/2013	Au Sable River 10	Chambers
12	A110	Alasmidonta viridis	3	44.634940	-83.923220	HMNF 09/16/2013	Au Sable River 2	Chambers
16	A114	Alasmidonta viridis	2	44.639900	-83.909370	HMNF 09/16/2013	Au Sable River 3	Chambers
19	A117	Alasmidonta viridis	S	44.662180	-84.123010	HMNF 09/17/2013	Au Sable River 4	Chambers
24	A122	Alasmidonta viridis	2	44.664650	-84.116570	HMNF 09/17/2013	Au Sable River 5	Chambers
28	A126	Alasmidonta viridis	S	44.650180	-84.104480	HMNF 09/17/2013	Au Sable River 6	Chambers
31	A129	Alasmidonta viridis	3	44.653840	-84.079380	HMNF 09/17/2013	Au Sable River 7	Chambers
766	A66	Alasmidonta viridis	S	44.267100	-85.945540	HMNF Pine R Manistee 2011	Manistee River 2011_14	Badra et al.
1301	A89	Alasmidonta viridis	S	43.504750	-86.125350	HMNF White R 2012	S. Branch White River 8	Badra et al.
5	A108	Anodontoides ferussacianus	S	44.642440	-83.937700	HMNF 09/16/2013	Au Sable River 1	Chambers
8	A140	Anodontoides ferussacianus	5	44.660980	-84.123220	HMNF 09/19/2013	Au Sable River 10	Chambers
13	A111	Anodontoides ferussacianus	S	44.634940	-83.923220	HMNF 09/16/2013	Au Sable River 2	Chambers
17	A115	Anodontoides ferussacianus	1	44.639900	-83.909370	HMNF 09/16/2013	Au Sable River 3	Chambers
20	A118	Anodontoides ferussacianus	2	44.662180	-84.123010	HMNF 09/17/2013	Au Sable River 4	Chambers
25	A123	Anodontoides ferussacianus	1	44.664650	-84.116570	HMNF 09/17/2013	Au Sable River 5	Chambers
32	A130	Anodontoides ferussacianus	1	44.653840	-84.079380	HMNF 09/17/2013	Au Sable River 7	Chambers
68	583	Elliptio dilatata	1	44.427577	-83.406772	DEQ 2005	Au Sable River A6	Badra et al.
773	A73	Elliptio dilatata	146	44.267620	-86.012720	HMNF Pine R Manistee 2011	Manistee River 2011_19	Badra et al.
780	A22	Elliptio dilatata	111	44.267520	-86.012850	HMNF 2014	Manistee River 5	Badra et al.
783	A27	Elliptio dilatata	47	44.262310	-86.031900	HMNF 2014	Manistee River 7	Badra et al.
808	999	Elliptio dilatata	2	44.269161	-86.002771	DEQ 2005	Manistee River M6b	Badra et al.
1080	615	Elliptio dilatata	S	43.875834	-86.113612	DEQ 2004	Pere Marquette River Big South Branch PM20	Badra et al.
1146	A39	Elliptio dilatata	S	44.259861	-86.079957	HMNF Pine Cr Hinton 2011	Pine Creek 7	Badra et al.
1147	A40	Elliptio dilatata	S	44.261159	-86.079125	HMNF Pine Cr Hinton 2011	Pine Creek 8	Badra et al.
1148	A41	Elliptio dilatata	S	44.261357	-86.078433	HMNF Pine Cr Hinton 2011	Pine Creek 9	Badra et al.
1520	A30	Elliptio dilatata	111	43.742630	-85.938130	HMNF 2014	Triple Lakes Creek 8	Badra et al.
6	A109	Fusconaia flava	S	44.642440	-83.937700	HMNF 09/16/2013	Au Sable River 1	Chambers
60	737	Fusconaia flava	S	44.431187	-83.400251	DEQ 2003	Au Sable River A4	Badra et al.
63	582	Fusconaia flava	S	44.432517	-83.404002	DEQ 2005	Au Sable River A5	Badra et al.
69	583	Fusconaia flava	S	44.427577	-83.406772	DEQ 2005	Au Sable River A6	Badra et al.
738	A97	Fusconaia flava	32	44.161970	-86.004050	HMNF 08/12/2013	Little Manistee River Cool Creek	Chambers
785	A28	Fusconaia flava	1	44.262310	-86.031900	HMNF 2014	Manistee River 8	Badra et al.
809	999	Fusconaia flava	L*	44.269161	-86.002771	DEQ 2005	Manistee River M6b	Badra et al.
1521	A31	Fusconaia flava	15	43.742630	-85.938130	HMNF 2014	Triple Lakes Creek 8	Badra et al.
57	738	Lampsilis cardium	S	44.432768	-83.394554	DEQ 2003	Au Sable River A3	Badra et al.
61	737	Lampsilis cardium	S	44.431187	-83.400251	DEQ 2003	Au Sable River A4	Badra et al.
64	582	Lampsilis cardium	S	44.432517	-83.404002	DEQ 2005	Au Sable River A5	Badra et al.
70	583	Lampsilis cardium	S	44.427577	-83.406772	DEQ 2005	Au Sable River A6	Badra et al.
769	A69	Lampsilis cardium	S	44.271710	-85.975060	HMNF Pine R Manistee 2011	Manistee River 2011_16	Badra et al.
775	A75	Lampsilis cardium	2	44.267620	-86.012720	HMNF Pine R Manistee 2011	Manistee River 2011_19	Badra et al.
786	A25	Lampsilis cardium	3	44.267520	-86.012850	HMNF 2014	Manistee River 8	Badra et al.

Appendix A.3. (Continued)

787	A29	Lampsilis cardium	4	44.262310	-86.031900	HMNF 2014	Manistee River 9	Badra et al.
805	578	Lampsilis cardium	7	44.269161	-86.002771	DEQ 2003	Manistee River M6a	Badra et al.
811	999	Lampsilis cardium	9	44.269161	-86.002771	DEQ 2005	Manistee River M6b	Badra et al.
781	A23	Lampsilis fasciola	1	44.267520	-86.012850	HMNF 2014	Manistee River 6	Badra et al.
9	A141	Lampsilis siliquoidea	1	44.660980	-84.123220	HMNF 09/19/2013	Au Sable River 10	Chambers
14	A112	Lampsilis siliquoidea	1	44.634940	-83.923220	HMNF 09/16/2013	Au Sable River 2	Chambers
18	A116	Lampsilis siliquoidea	S	44.639900	-83.909370	HMNF 09/16/2013	Au Sable River 3	Chambers
21	A119	Lampsilis siliquoidea	S	44.662180	-84.123010	HMNF 09/17/2013	Au Sable River 4	Chambers
26	A124	Lampsilis siliquoidea	1	44.664650	-84.116570	HMNF 09/17/2013	Au Sable River 5	Chambers
29	A127	Lampsilis siliquoidea	S	44.650180	-84.104480	HMNF 09/17/2013	Au Sable River 6	Chambers
33	A131	Lampsilis siliquoidea	S	44.653840	-84.079380	HMNF 09/17/2013	Au Sable River 7	Chambers
739	A98	Lampsilis siliquoidea	15	44.161970	-86.004050	HMNF 08/12/2013	Little Manistee River Cool Creek	Chambers
768	A68	Lampsilis siliquoidea	S	44.271710	-85.975060	HMNF Pine R Manistee 2011	Manistee River 2011_16	Badra et al.
774	A74	Lampsilis siliquoidea	1	44.267620	-86.012720	HMNF Pine R Manistee 2011	Manistee River 2011_19	Badra et al.
784	A24	Lampsilis siliquoidea	S	44.267520	-86.012850	HMNF 2014	Manistee River 7	Badra et al.
810	999	Lampsilis siliquoidea	2	44.269161	-86.002771	DEQ 2005	Manistee River M6b	Badra et al.
1083	616	Lampsilis siliquoidea	1	43.870556	-86.079168	DEQ 2004	Pere Marquette River Big South Branch PM21	Badra et al.
1149	A42	Lampsilis siliquoidea	S	44.261357	-86.078433	HMNF Pine Cr Hinton 2011	Pine Creek 9	Badra et al.
1296	A84	Lampsilis siliquoidea	S	43.526960	-86.114350	HMNF White R 2012	S. Branch White River 6	Badra et al.
1522	A32	Lampsilis siliquoidea	S	43.742630	-85.938130	HMNF 2014	Triple Lakes Creek 8	Badra et al.
806	578	Lasmigona complanata	1	44.269161	-86.002771	DEQ 2003	Manistee River M6a	Badra et al.
10	A142	Lasmigona compressa	3	44.660980	-84.123220	HMNF 09/19/2013	Au Sable River 10	Chambers
22	A120	Lasmigona compressa	S	44.662180	-84.123010	HMNF 09/17/2013	Au Sable River 4	Chambers
1081	615	Lasmigona compressa	1	43.875834	-86.113612	DEQ 2004	Pere Marquette River Big South Branch PM20	Badra et al.
1299	A87	Lasmigona costata	S	43.522690	-86.118460	HMNF White R 2012	S. Branch White River 7	Badra et al.
58	738	Leptodea fragilis	S	44.432768	-83.394554	DEQ 2003	Au Sable River A3	Badra et al.
65	582	Leptodea fragilis	S	44.432517	-83.404002	DEQ 2005	Au Sable River A5	Badra et al.
71	583	Leptodea fragilis	S	44.427577	-83.406772	DEQ 2005	Au Sable River A6	Badra et al.
15	A113	Ligumia nasuta	L	44.634940	-83.923220	HMNF 09/16/2013	Au Sable River 2	Chambers
66	582	Ligumia recta	S	44.432517	-83.404002	DEQ 2005	Au Sable River A5	Badra et al.
72	583	Ligumia recta	S	44.427577	-83.406772	DEQ 2005	Au Sable River A6	Badra et al.
812	999	Ligumia recta	3	44.269161	-86.002771	DEQ 2005	Manistee River M6b	Badra et al.
59	738	Potamilus alatus	S	44.432768	-83.394554	DEQ 2003	Au Sable River A3	Badra et al.
11	A143	Pyganodon grandis	16	44.660980	-84.123220	HMNF 09/19/2013	Au Sable River 10	Chambers
23	A121	Pyganodon grandis	S	44.662180	-84.123010	HMNF 09/17/2013	Au Sable River 4	Chambers
27	A125	Pyganodon grandis	S	44.664650	-84.116570	HMNF 09/17/2013	Au Sable River 5	Chambers
30	A128	Pyganodon grandis	1	44.650180	-84.104480	HMNF 09/17/2013	Au Sable River 6	Chambers
34	A132	Pyganodon grandis	S	44.653840	-84.079380	HMNF 09/17/2013	Au Sable River 7	Chambers
813	999	Pyganodon grandis	1	44.269161	-86.002771	DEQ 2005	Manistee River M6b	Badra et al.
62	737	Strophitus undulatus	S	44.431187	-83.400251	DEQ 2003	Au Sable River A4	Badra et al.
740	A99	Strophitus undulatus	S	44.161970	-86.004050	HMNF 08/12/2013	Little Manistee River Cool Creek	Chambers
776	A76	Strophitus undulatus	2	44.267620	-86.012720	HMNF Pine R Manistee 2011	Manistee River 2011_19	Badra et al.
807	578	Strophitus undulatus	1	44.269161	-86.002771	DEQ 2003	Manistee River M6a	Badra et al.
814	999	Strophitus undulatus	7	44.269161	-86.002771	DEQ 2005	Manistee River M6b	Badra et al.
819	579	Strophitus undulatus	S	44.268151	-85.980151	DEQ 2005	Manistee River M9	Badra et al.
1082	615	Strophitus undulatus	1	43.875834	-86.113612	DEQ 2004	Pere Marquette River Big South Branch PM20	Badra et al.
1297	A85	Strophitus undulatus	S	43.526960	-86.114350	HMNF White R 2012	S. Branch White River 6	Badra et al.
1300	A88	Strophitus undulatus	S	43.522690	-86.118460	HMNF White R 2012	S. Branch White River 7	Badra et al.
815	999	Utterbackia imbecillis	1	44.269161	-86.002771	DEQ 2005	Manistee River M6b	Badra et al.

Appendix A.3. (Continued)

228	A20	zero	0	44.317660	-85.984940	HMNF 2014	Boswell Creek 3	Badra et al.
281	A19	zero	0	44.334220	-86.020540	HMNF 2014	Chicken Creek 2	Badra et al.
508	A33	zero	0	44.277650	-85.831600	HMNF Pine Cr Hinton 2011	Hinton Creek 1	Badra et al.
509	A34	zero	0	44.277760	-85.830940	HMNF Pine Cr Hinton 2011	Hinton Creek 2	Badra et al.
510	A35	zero	0	44.276590	-85.816130	HMNF Pine Cr Hinton 2011	Hinton Creek 3	Badra et al.
511	A36	zero	0	44.281292	-85.854470	HMNF Pine Cr Hinton 2011	Hinton Creek 4	Badra et al.
741	A100	zero	0	44.147220	-85.983760	HMNF 08/12/2013	Little Manistee River Stronach Creek 1	Chambers
742	A101	zero	0	44.149810	-85.943180	HMNF 08/13/2013	Little Manistee River Stronach Creek 2	Chambers
751	A91	zero	0	43.475820	-86.189770	HMNF White R 2012	Main Stem White River 10	Badra et al.
752	A92	zero	0	43.475810	-86.212020	HMNF White R 2012	Main Stem White River 11	Badra et al.
760	A60	zero	0	44.312900	-85.855590	HMNF Pine R Manistee 2011	Manistee River 2011_10	Badra et al.
767	A67	zero	0	44.267670	-85.954060	HMNF Pine R Manistee 2011	Manistee River 2011_15	Badra et al.
770	A70	zero	0	44.268110	-85.980300	HMNF Pine R Manistee 2011	Manistee River 2011_17	Badra et al.
778	A58	zero	0	44.302530	-85.849190	HMNF Pine R Manistee 2011	Manistee River 2011_8	Badra et al.
779	A59	zero	0	44.307630	-85.849120	HMNF Pine R Manistee 2011	Manistee River 2011_9	Badra et al.
782	A26	zero	0	44.268040	-86.023080	HMNF 2014	Manistee River 6	Badra et al.
816	733	zero	0	44.284422	-85.860145	DEQ 2003	Manistee River M7	Badra et al.
1016	A102	zero	0	43.480460	-85.759580	HMNF 08/19/2013	Muskegon River Bigelow Creek 1	Chambers
1017	A103	zero	0	43.481160	-85.754580	HMNF 08/19/2013	Muskegon River Bigelow Creek 2	Chambers
1018	A104	zero	0	43.448450	-85.743450	HMNF 08/20/2013	Muskegon River Bigelow Creek 3	Chambers
1019	A105	zero	0	43.435550	-85.766750	HMNF 08/20/2013	Muskegon River Bigelow Creek 4	Chambers
1020	A106	zero	0	43.437780	-85.765880	HMNF 08/20/2013	Muskegon River Penoyer Creek	Chambers
1062	A80	zero	0	43.642370	-86.180280	HMNF White R 2012	Osborn Creek 2	Badra et al.
1084	617	zero	0	43.844723	-86.075835	DEQ 2004	Pere Marquette River Big South Branch PM22	Badra et al.
1086	619	zero	0	43.742222	-85.959724	DEQ 2004	Pere Marquette River Big South Branch PM24	Badra et al.
1092	610	zero	0	43.935751	-86.077081	DEQ 2004	Pere Marquette River PM15	Badra et al.
1095	613	zero	0	43.871666	-85.762501	DEQ 2004	Pere Marquette River PM18	Badra et al.
1137	A43	zero	0	44.208287	-85.970657	HMNF Pine Cr Hinton 2011	Pine Creek 10	Badra et al.
1138	A44	zero	0	44.209349	-85.973178	HMNF Pine Cr Hinton 2011	Pine Creek 11	Badra et al.
1139	A45	zero	0	44.212257	-85.972749	HMNF Pine Cr Hinton 2011	Pine Creek 12	Badra et al.
1140	A46	zero	0	44.212916	-85.970668	HMNF Pine Cr Hinton 2011	Pine Creek 13	Badra et al.
1141	A47	zero	0	44.211450	-86.016420	HMNF Pine Cr Hinton 2011	Pine Creek 14	Badra et al.
1142	A48	zero	0	44.224847	-86.024296	HMNF Pine Cr Hinton 2011	Pine Creek 15	Badra et al.
1145	A38	zero	0	44.259600	-86.080390	HMNF Pine Cr Hinton 2011	Pine Creek 6	Badra et al.
1154	A52	zero	0	44.140690	-85.695210	HMNF Pine R Manistee 2011	Pine River 2011_2	Badra et al.
1155	A53	zero	0	44.143290	-85.702420	HMNF Pine R Manistee 2011	Pine River 2011_3	Badra et al.
1158	A56	zero	0	44.198920	-85.837110	HMNF Pine R Manistee 2011	Pine River 2011_6	Badra et al.
1302	A90	zero	0	43.485980	-86.157080	HMNF White R 2012	S. Branch White River 9	Badra et al.

Appendix B.1. Historical unionid mussel occurrence records from the University of Michigan, Museum of Zoology Mollusk Collection located within the Huron-Manistee National Forest boundary.

ID #	Catalog #	Species	County	Location	Latitude	Longitude	Collector and Collection Date	# of Specimens	Collection Note
3828	50136	Actinonaias ligamentina	Newaygo	Muskegon River, near Croton approx. 43.4386┬ N, 85.6669┬ W	43.438600	-85.666900	Hinsdale, W.; 00/___/1930	Dry 4.0	
3817	60661	Alasmidonta marginata	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬ N, 85.6719┬ W	43.436400	-85.671900	van der Schalie, Henry; 09/Aug/1934	Dry 4.0	
4111	61264	Alasmidonta viridis	Oceana	[South Branch] White River, 4.0 mi. SW of Hesperia approx. 43┬ 32'01"N, 86┬ 06'23"W	43.533611	-86.106389	van der Schalie & Stoll; 00/___/1934	Dry 1.0	
2107	128519	Alasmidonta viridis	Iosco	AuSable River, 11 mi. above Oscoda approx. 44┬ 28'20"N, 83┬ 34'13"W	44.472222	-83.570278	Thompson, Miss; 00/Jul/1937	Dry 1.0	
708	39560	Alasmidonta viridis	Alcona	AuSable River, below Alcona Dam approx. 44┬ 33'40"N, 83┬ 48'06"W	44.561111	-83.801667	Metzelaar & Langlois; 21/Apr/1925	Dry ~ 6.0	Fish Department & Department of Conservation
2662	43770	Alasmidonta viridis	Lake	Baldwin Creek, Branch of Pere Marquette River approx. 43.896617┬ N, 85.843733┬ W	43.896617	-85.843733	unknown;	Dry 1.0	
5775	170022	Alasmidonta viridis	Newaygo	branch White River, Sec 21 and 22, Denver Twp. approx. 43.5828┬ N, 85.9796┬ W	43.582800	-85.979600	Harry & van der Schalie; 23/Aug/1949	Dry 2.0	
2106	39569	Alasmidonta viridis	Iosco	pond above Loud Dam approx. 44┬ 27'39"N, 83┬ 45'20"W	44.460833	-83.755556	Hubbs & Langlois; 09/Aug/1924	Dry 1.0	Fish Department & Department of Conservation
3839	39585	Alasmidonta viridis	Newaygo	Robinson Lake approx. 43┬ 31'56"N, 85┬ 51'18"W	43.532222	-85.855000	Langlois & Moody; 10/Sep/1926	Dry 1.0	Fish Department & Department of Conservation
5767	169970	Alasmidonta viridis	Newaygo	White River, E of Aetna, Sec 31, Lincoln Twp approx. 43.5649┬ N, 85.9019┬ W	43.564900	-85.901900	Harry & van der Schalie; 23/Aug/1949	Dry 8.0	
402	39608	Alasmidonta viridis	Newaygo	Winnepesaug Creek USGS 43.6891806┬ N, 85.9517285┬ W	43.689181	-85.951729	Langlois & Moody; 20/Jul/1926	Dry 1.0	Fish Department & Department of Conservation
5776	170023	Anodontoides ferussacianus	Newaygo	branch White River, Sec 21 and 22, Denver Twp. approx. 43.5828┬ N, 85.9796┬ W	43.582800	-85.979600	Harry & van der Schalie; 23/Aug/1949	Dry 2.0	
3819	60663	Anodontoides ferussacianus	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬ N, 85.6719┬ W	43.436400	-85.671900	van der Schalie, Henry; 09/Aug/1934	Dry 2.0	
5686	169997	Anodontoides ferussacianus	Mason	N branch Lincoln Creek, Sec 8 Sherman Twp approx. 44.0548┬ N, 86.2413┬ W	44.054800	-86.241300	H.H & van de Schalie; 24/Aug/1949	Dry 1.0	
3287	16997	Anodontoides ferussacianus	Mason	N branch Lincoln Creek, Sec 8, Sherman Twp. approx. 44.0562┬ N, 86.2507┬ W	44.056200	-86.250700	Harry & van der Schalie; 24/Aug/1949	Dry 1.0	
5765	169935	Anodontoides ferussacianus	Muskegon	Sand Creek, Sec 6, Manistee Twp. approx. 43.4604┬ N, 86.2594┬ W	43.460400	-86.259400	H.H & van de Schalie; 22/Aug/1949	Dry 4.0	
4106	61263	Anodontoides ferussacianus	Oceana	White River, 4.0 mi. SW of Hesperia approx. 43.5305┬ N, 86.1145┬ W	43.530500	-86.114500	van der Schalie & Stoll; 00/___/1934	Dry 19.0	
5769	169972	Anodontoides ferussacianus	Newaygo	White River, E of Aetna, Sec 31, Lincoln Twp approx. 43.5649┬ N, 85.9019┬ W	43.564900	-85.901900	Harry & van der Schalie; 23/Aug/1949	Dry 2.0	
3821	60665	Elliptio dilatata	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬ N, 85.6719┬ W	43.436400	-85.671900	van der Schalie, Henry; 09/Aug/1934	Dry 2.0	
3820	60664	Fusconaia flava	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬ N, 85.6719┬ W	43.436400	-85.671900	van der Schalie, Henry; 09/Aug/1934	Dry 1.0	
399	44996	Fusconaia flava	Muskegon	Muskegon River, Brooks Twp approx. 43.4068┬ N, 85.7178┬ W	43.406800	-85.717800	Hinsdale, W.; 00/Aug/1928	Dry 1.0	
5770	169973	Fusconaia flava	Newaygo	White River, E of Aetna, Sec 31, Lincoln Twp approx. 43.5649┬ N, 85.9019┬ W	43.564900	-85.901900	Harry & van der Schalie; 23/Aug/1949	Dry 8.0	

Appendix B.1. (Continued)

642	63876	Lampsilis cardium		Little Muskegon River, near bridge on Montcalm/Newaygo Co. line approx. 43.4265┬ N, 85.5624┬ W	43.426500	-85.562400	Stoll, C. E.; 00/Jun/1935	Dry	1.0	
3823	60667	Lampsilis cardium	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬ N, 85.6719┬ W	43.436400	-85.671900	van der Schalie, Henry; 09/Aug/1934	Dry	19.0	
3829	50137	Lampsilis cardium	Newaygo	Muskegon River, near Croton approx. 43.4386┬ N, 85.6669┬ W	43.438600	-85.666900	Hinsdale, W.; 00/___/1930	Dry	2.0	
4107	61265	Lampsilis cardium	Oceana	White River, 4.0 mi. SW of Hesperia approx. 43.5305┬ N, 86.1145┬ W	43.530500	-86.114500	van der Schalie & Stoll; 00/___/1934	Dry	1.0	
3810	39579	Lampsilis siliquoidea	Newaygo	Bills Lake approx. 43.3956┬ N, 85.6675┬ W	43.395600	-85.667500	Langlois & Moody; 19/Sep/1926	Dry	1.0	Fish Dept. and Dept. of Conservation
3840	39575	Lampsilis siliquoidea	Newaygo	Brookings Lake [Woodland Lake] approx. 43.7073┬ N, 85.8638┬ W	43.707300	-85.863800	Langlois & Moody; 00/___/1926	Dry	1.0	Fish Dept. and Dept. of Conservation
2660	87739	Lampsilis siliquoidea	Lake	Long Lake, Idlewild approx. 43.8914┬ N, 85.8017┬ W	43.891400	-85.801700	Walker, Bryant;	Dry	1.0	Bryant Walker Collection
3822	60666	Lampsilis siliquoidea	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬ N, 85.6719┬ W	43.436400	-85.671900	van der Schalie, Henry; 09/Aug/1934	Dry	15.0	
6119	171463	Lampsilis siliquoidea	Wexford	N shore Lake Mitchell, Sec 26, Selma Twp. approx. 44.2684┬ N, 85.4812┬ W	44.268400	-85.481200	van der Schalie & H.H.; 25/Aug/1949	Dry	3.0	
3837	39578	Lampsilis siliquoidea	Newaygo	Robinson Lake approx. 43.5322┬ N, 85.8550┬ W	43.532200	-85.855000	Langlois & Moody; 09/Sep/1926	Dry	1.0	Fish Dept. and Dept. of Conservation
2667	89308	Lampsilis siliquoidea	Lake	Sauble Lake approx. 44.06806┬ N, 85.95361┬ W	44.068060	-85.953610	Goodrich, Calvin; 07/Aug/1915	Dry	5.5	Bryant Walker Collection
5771	169974	Lampsilis siliquoidea	Newaygo	White River, E of Aetna, Sec 31, Lincoln Twp approx. 43.5649┬ N, 85.9019┬ W	43.564900	-85.901900	Harry & van der Schalie; 23/Aug/1949	Dry	7.0	
401	39596	Lampsilis siliquoidea	Newaygo	Winnepesaug Creek USGS 43.6891806┬ N, 85.9517285┬ W	43.689181	-85.951729	Langlois & Moody; 20/Jul/1926	Dry	1.0	Fish Dept. and Dept. of Conservation
5777	170024	Lasmigona compressa	Newaygo	branch White River, Sec 21 and 22, Denver Twp. approx. 43.5828┬ N, 85.9796┬ W	43.582800	-85.979600	Harry & van der Schalie; 23/Aug/1949	Dry	1.0	
4108	61266	Lasmigona compressa	Oceana	White River, 4.0 mi. SW of Hesperia approx. 43.5305┬ N, 86.1145┬ W	43.530500	-86.114500	van der Schalie & Stoll; 00/___/1934	Dry	1.0	
5772	169975	Lasmigona compressa	Newaygo	White River, E of Aetna, Sec 31, Lincoln Twp approx. 43.5649┬ N, 85.9019┬ W	43.564900	-85.901900	Harry & van der Schalie; 23/Aug/1949	Dry	4.0	
4167	104127	Lasmigona compressa	Oscoda	Wolf Creek USGS 44.6605694┬ N, 84.1247274┬ W	44.660569	-84.124727	Streator, Geo. J.;	Dry	1.0	Bryant Walker Collection
2663	105378	Lasmigona costata	Lake	Kinney Creek approx. 43.9064┬ N, 85.9413┬ W	43.906400	-85.941300	Walker, Bryant;	Dry	1.0	Bryant Walker Collection
3824	60668	Lasmigona costata	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬ N, 85.6719┬ W	43.436400	-85.671900	van der Schalie, Henry; 09/Aug/1934	Dry	1.0	
4109	61267	Lasmigona costata	Oceana	White River, 4.0 mi. SW of Hesperia approx. 43.5305┬ N, 86.1145┬ W	43.530500	-86.114500	van der Schalie & Stoll; 00/___/1934	Dry	2.0	
5773	169976	Lasmigona costata	Newaygo	White River, E of Aetna, Sec 31, Lincoln Twp approx. 43.5649┬ N, 85.9019┬ W	43.564900	-85.901900	Harry & van der Schalie; 23/Aug/1949	Dry	4.0	
3825	60669	Ligumia recta	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬ N, 85.6719┬ W	43.436400	-85.671900	van der Schalie, Henry; 09/Aug/1934	Dry	4.0	
398	44995	Ligumia recta	Muskegon	Muskegon River, Brooks Twp approx. 43.4068┬ N, 85.7178┬ W	43.406800	-85.717800	Hinsdale, W.; 00/Aug/1928	Dry	1.5	
3830	50138	Ligumia recta	Newaygo	Muskegon River, near Croton approx. 43.4386┬ N, 85.6669┬ W	43.438600	-85.666900	Hinsdale, W.; 00/___/1930	Dry	2.0	

Appendix B.1. (Continued)

3826	60670	Pleurobema sintoxia	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬ N, 85.6719┬ W	43.436400	-85.671900	van der Schalie, Henry; 09/Aug/1934	Dry	1.0	
2670	103338	Pyganodon grandis	Lake	Bass Lake approx. 44.0832┬ N, 85.9759┬ W	44.083200	-85.975900	orig. Goodrich, C.;	Dry	5.0	Bryant Walker Collection
403	39621	Pyganodon grandis	Newaygo	Beaver Creek approx. 43.698347┬ N, 85.953223┬ W	43.698347	-85.953223	Langlois & Moody; 22/Jul/1926	Dry	1.0	From Fish Dept. and Dept. of Conservation
3813	103298	Pyganodon grandis	Newaygo	Brooks Lake approx. 43.400165┬ N, 85.751034┬ W	43.400165	-85.751034	orig. DeCamp Collection;	Dry	4.0	Bryant Walker Collection
5310	103254	Pyganodon grandis	Wexford	Clam [Mitchell] Lake USGS 44.2478┬ N, 85.4931┬ W	44.247800	-85.493100	Walker, Bryant;	Dry	2.0	Bryant Walker Collection
5311	103322	Pyganodon grandis	Wexford	Clam [Mitchell] Lake USGS 44.2478┬ N, 85.4931┬ W	44.247800	-85.493100	Davis, C. A.;	Dry	3.0	Bryant Walker Collection
5685	169938	Pyganodon grandis	Mason	Emerson Lake, along US 10 approx. 43.9460┬ N, 86.0863┬ W	43.946000	-86.086300	van der Schalie & H.H.; 24/Aug/1949	Dry	1.0	
3799	103307	Pyganodon grandis	Newaygo	Hess Lake approx. 43.3845┬ N, 85.7711┬ W	43.384500	-85.771100	orig. DeCamp Collection;	Dry	5.0	Bryant Walker Collection
2661	103257	Pyganodon grandis	Lake	Long Lake, Idlewild approx. 43.8914┬ N, 85.8017┬ W	43.891400	-85.801700	Walker, Bryant;	Dry	10.0	Bryant Walker Collection
318	60561	Pyganodon grandis	Mecosta	Muskegon River, 2.0 mi below Roger's dam approx. 43.585045┬ N, 85.512709┬ W	43.585045	-85.512709	van der Schalie, Henry; 08/Aug/1934	Dry	0.5	
3818	60662	Pyganodon grandis	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬ N, 85.6719┬ W	43.436400	-85.671900	van der Schalie, Henry; 09/Aug/1934	Dry	1.0	
6118	171462	Pyganodon grandis	Wexford	N shore Lake Mitchell, Sec 26, Selma Twp. approx. 44.2684┬ N, 85.4812┬ W	44.268400	-85.481200	van der Schalie & H.H.; 25/Aug/1949	Dry	5.0	
3841	39567	Pyganodon grandis	Newaygo	Nichols Lake, north shore approx. 43.729878┬ N, 85.906805┬ W	43.729878	-85.906805	Langlois & Moody; 19/Aug/1926	Dry	2.0	Collected by the Fish Dept. and the Dept. of Conservation
3838	39584	Pyganodon grandis	Newaygo	Robinson Lake approx. 43.5322┬ N, 85.8550┬ W	43.532200	-85.855000	Langlois & Moody; 10/Sep/1926	Dry	1.0	Collected by the Fish Dept. and the Dept. of Conservation
5764	169934	Pyganodon grandis	Muskegon	Sand Creek, Sec 6, Manistee Twp. approx. 43.4604┬ N, 86.2594┬ W	43.460400	-86.259400	van der Schalie & H.H.; 22/Aug/1949	Dry	3.0	
2668	103339	Pyganodon grandis	Lake	Sauble Lake approx. 44.06806┬ N, 85.95361┬ W	44.068060	-85.953610	orig. Goodrich, C.;	Dry	2.0	Bryant Walker Collection
314	54683	Pyganodon grandis	Mason	Small Lake W of Baldwin approx. 43.900947┬ N, 85.880903┬ W	43.900947	-85.880903	Nelson, C. D.;	Dry	3.0	
5768	169971	Pyganodon grandis	Newaygo	White River, E of Aetna, Sec 31, Lincoln Twp approx. 43.5649┬ N, 85.9019┬ W	43.564900	-85.901900	Harry & van der Schalie; 23/Aug/1949	Dry	3.0	
2669	103589	Strophitus undulatus	Lake	Big Bass Lake approx. 44.082107┬ N, 85.976295┬ W	44.082107	-85.976295	Goodrich, Calvin;	Dry	6.0	Bryant Walker Collection
404	39613	Strophitus undulatus	Newaygo	Big South Branch of Pere Marquette River approx. 43.7550┬ N, 85.9746┬ W	43.755000	-85.974600	Langlois & Moody; 22/Jul/1926	Dry	1.0	Fish Depart. and Depart. of Conservation
3811	39587	Strophitus undulatus	Newaygo	Bills Lake approx. 43.3956┬ N, 85.6675┬ W	43.395600	-85.667500	Langlois & Moody; 17/Sep/1926	Dry	1.0	Fish Depart. and Depart. of Conservation
3812	74976	Strophitus undulatus	Newaygo	Brooks Lake approx. 43.400165┬ N, 85.751034┬ W	43.400165	-85.751034	orig. DeCamp Collection;	Dry	1.0	Bryant Walker Collection
3814	103563	Strophitus undulatus	Newaygo	Brooks Lake approx. 43.400165┬ N, 85.751034┬ W	43.400165	-85.751034	orig. DeCamp Collection;	Dry	5.0	Bryant Walker Collection
3815	103633	Strophitus undulatus	Newaygo	Brooks Lake approx. 43.400165┬ N, 85.751034┬ W	43.400165	-85.751034	orig. DeCamp Collection;	Dry	1.0	Bryant Walker Collection

Appendix B.1. (Continued)

2666	103590	Strophitus undulatus	Lake	Loon Lake approx. 44.066545┬ N, 85.975813┬ W	44.066545	-85.975813	Goodrich, Calvin;	Dry 2.0	Bryant Walker Collection
5309	130316	Strophitus undulatus	Wexford	Mitchell Lake approx. 44.2470┬ N, 85.4987┬ W	44.247000	-85.498700	Bureau of Fisheries;	Dry 8.0	
3827	60671	Strophitus undulatus	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬ N, 85.6719┬ W	43.436400	-85.671900	unknown; 09/Aug/1934	Dry 47.0	
2665	103591	Strophitus undulatus	Lake	Sable Lake approx. 44.018074┬ N, 86.033908┬ W	44.018074	-86.033908	Goodrich, Calvin;	Dry 1.0	Bryant Walker Collection
4110	61268	Strophitus undulatus	Oceana	White River, 4.0 mi. SW of Hesperia approx. 43.5305┬ N, 86.1145┬ W	43.530500	-86.114500	van der Schalie & Stoll; 00/___/1934	Dry 15.0	
5774	169977	Strophitus undulatus	Newaygo	White River, E of Aetna, Sec 31, Lincoln Twp approx. 43.5649┬ N, 85.9019┬ W	43.564900	-85.901900	Harry & van der Schalie; 23/Aug/1949	Dry 6.0	
5833	171956	Strophitus undulatus	Oceana	White River, Sec 2, Greenwood Twp approx. 43.5501┬ N, 86.0762┬ W	43.550100	-86.076200	van der Schalie & H.H.; 22/Aug/1949	Dry 1.0	
2664	201242	Strophitus undulatus	Lake	Wolf Lake USGS 44.0025098┬ N, 85.8528418┬ W	44.002510	-85.852842	Taube, C. M.; 09/Sep/1959	Dry 1.0	

Appendix B.2. Historical unionid mussel occurrence records from The Ohio State University Museum of Biological Diversity located within the Huron-Manistee National Forest boundary.

Catalog #	Genus	Species	County	Waterbody	Locality	Latitude	Longitude	Collector	Collection Date
34453	Anodontoides	ferussacianus	Iosco	Au Sable River	600 yards above Foote Dam, 6.0 mi. W of Osceola	44.43310	-83.37500	Lynwood A. MacLean	11 June 1973
34456	Lampsilis	cardium	Iosco	Au Sable River	600 yards above Foote Dam, 6.0 mi. W of Osceola	44.43310	-83.37500	Lynwood A. MacLean	11 June 1973
34459	Lampsilis	cardium	Iosco	Au Sable River	6 mi. above Foote Dam, 12 mi. WNW of Oscoda	44.43530	-83.37320	Lynwood A. MacLean	12 June 1973
34455	Lampsilis	radiata (=siliquoidea)	Iosco	Au Sable River	600 yards above Foote Dam, 6.0 mi. W of Osceola	44.43310	-83.37500	Lynwood A. MacLean	11 June 1973
34458	Lampsilis	radiata (=siliquoidea)	Iosco	Au Sable River	6 mi. above Foote Dam, 12 mi. WNW of Oscoda	44.43530	-83.37320	Lynwood A. MacLean	12 June 1973
37982	Lampsilis	radiata (=siliquoidea)	Crawford	Au Sable River	[1.9 mi. NE of Five Corners, 3.8 mi. WSW of Conners Flat]	44.65590	-84.50110	Raymond F. Jezerinac, Roger F. Thoma, Mark E. Shrader, David M. Caldwell, John Prince, Neena Giallombardo	1 June 1974
33036	Lampsilis	radiata (=siliquoidea)	Newaygo	Brooks Lake	[3.8 mi. SE of Newaygo, 5.3 mi. SW of Croton]	43.39791	-85.75383	Charles D. Nelson (ex the Field Museum of Nat. Hist., Chicago, IL)	[prior to 1969]
34454	Ligumia	nasuta	Iosco	Au Sable River	600 yards above Foote Dam, 6.0 mi. W of Osceola	44.43310	-83.37500	Lynwood A. MacLean	11 June 1973
34457	Ligumia	nasuta	Iosco	Au Sable River	6 mi. above Foote Dam, 12 mi. WNW of Oscoda	44.43530	-83.37320	Lynwood A. MacLean	12 June 1973
34452	Pyganodon	grandis	Iosco	Au Sable River	600 yards above Foote Dam, 6.0 mi. W of Osceola	44.43310	-83.37500	Lynwood A. MacLean	11 June 1973

Appendix B.3. Recent unionid mussel occurrence records from field surveys done by Michigan Natural Features Inventory and Huron-Manistee National Forest (HMNF) located within the HMNF boundary. Surveys consisted of visual and tactile search techniques, typically with a 128m^2 search area at each site. Number of live individuals found is provided under # of Individuals (S= only shells found; 0= no individuals of any species found; *= found outside measured search area)

ID #	MNFI ID #	Species	# of Individuals	Latitude	Longitude	Project/Year	Site Name	Surveyors	HUC10 Watershed Name
56	738	Actinonaias ligamentina	S	44.43277	-83.39455	DEQ 2003	Au Sable River A3	Badra et al.	Au Sable River
67	583	Actinonaias ligamentina	S	44.42758	-83.40677	DEQ 2005	Au Sable River A6	Badra et al.	Au Sable River
1298	A86	Actinonaias ligamentina	S	43.52269	-86.11846	HMNF White R 2012	S. Branch White River 7	Badra et al.	South Branch White River
765	A65	Alasmidonta marginata	S	44.26710	-85.94554	HMNF Pine R Manistee 2011	Manistee River 2011_14	Badra et al.	Manistee River
4	A107	Alasmidonta viridis	2	44.64244	-83.93770	HMNF 09/16/2013	Au Sable River 1	Chambers	Au Sable River
7	A139	Alasmidonta viridis	2	44.66098	-84.12322	HMNF 09/19/2013	Au Sable River 10	Chambers	Perry Creek-Au Sable River
12	A110	Alasmidonta viridis	3	44.63494	-83.92322	HMNF 09/16/2013	Au Sable River 2	Chambers	Au Sable River
16	A114	Alasmidonta viridis	2	44.63990	-83.90937	HMNF 09/16/2013	Au Sable River 3	Chambers	Au Sable River
19	A117	Alasmidonta viridis	S	44.66218	-84.12301	HMNF 09/17/2013	Au Sable River 4	Chambers	Perry Creek-Au Sable River
24	A122	Alasmidonta viridis	2	44.66465	-84.11657	HMNF 09/17/2013	Au Sable River 5	Chambers	Perry Creek-Au Sable River
28	A126	Alasmidonta viridis	S	44.65018	-84.10448	HMNF 09/17/2013	Au Sable River 6	Chambers	Perry Creek-Au Sable River
31	A129	Alasmidonta viridis	3	44.65384	-84.07938	HMNF 09/17/2013	Au Sable River 7	Chambers	Perry Creek-Au Sable River
35	A133	Alasmidonta viridis	S	44.65693	-84.03757	HMNF 09/18/2013	Au Sable River 8	Chambers	Perry Creek-Au Sable River
39	A137	Alasmidonta viridis	S	44.65988	-84.01477	HMNF 09/18/2013	Au Sable River 9	Chambers	Perry Creek-Au Sable River
766	A66	Alasmidonta viridis	S	44.26710	-85.94554	HMNF Pine R Manistee 2011	Manistee River 2011_14	Badra et al.	Manistee River
1301	A89	Alasmidonta viridis	S	43.50475	-86.12535	HMNF White R 2012	S. Branch White River 8	Badra et al.	South Branch White River
5	A108	Anodontoides ferussacianus	S	44.64244	-83.93770	HMNF 09/16/2013	Au Sable River 1	Chambers	Au Sable River
8	A140	Anodontoides ferussacianus	5	44.66098	-84.12322	HMNF 09/19/2013	Au Sable River 10	Chambers	Perry Creek-Au Sable River
13	A111	Anodontoides ferussacianus	S	44.63494	-83.92322	HMNF 09/16/2013	Au Sable River 2	Chambers	Au Sable River
17	A115	Anodontoides ferussacianus	1	44.63990	-83.90937	HMNF 09/16/2013	Au Sable River 3	Chambers	Au Sable River
20	A118	Anodontoides ferussacianus	2	44.66218	-84.12301	HMNF 09/17/2013	Au Sable River 4	Chambers	Perry Creek-Au Sable River
25	A123	Anodontoides ferussacianus	1	44.66465	-84.11657	HMNF 09/17/2013	Au Sable River 5	Chambers	Perry Creek-Au Sable River
32	A130	Anodontoides ferussacianus	1	44.65384	-84.07938	HMNF 09/17/2013	Au Sable River 7	Chambers	Perry Creek-Au Sable River
36	A134	Anodontoides ferussacianus	S	44.65693	-84.03757	HMNF 09/18/2013	Au Sable River 8	Chambers	Perry Creek-Au Sable River
797	732	Anodontoides ferussacianus	S	44.26869	-86.00998	DEQ 2003	Manistee River M5	Badra et al.	Manistee River
1059	A77	Anodontoides ferussacianus	21	43.65641	-86.18965	HMNF White R 2012	Osborn Creek 1	Badra et al.	North Branch White River
68	583	Elliptio dilatata	1	44.42758	-83.40677	DEQ 2005	Au Sable River A6	Badra et al.	Au Sable River
761	A61	Elliptio dilatata	87	44.29511	-86.13416	HMNF Pine R Manistee 2011	Manistee River 2011_11	Badra et al.	Manistee River
763	A63	Elliptio dilatata	S	44.28296	-86.16966	HMNF Pine R Manistee 2011	Manistee River 2011_12	Badra et al.	Manistee River
771	A71	Elliptio dilatata	3	44.26872	-86.00368	HMNF Pine R Manistee 2011	Manistee River 2011_18_M6c	Badra et al.	Manistee River
773	A73	Elliptio dilatata	146	44.26762	-86.01272	HMNF Pine R Manistee 2011	Manistee River 2011_19_site5_2014	Badra et al.	Manistee River
780	A22	Elliptio dilatata	111	44.26752	-86.01285	HMNF 2014	Manistee River 5_site19_2011	Badra et al.	Manistee River
783	A27	Elliptio dilatata	47	44.26231	-86.03190	HMNF 2014	Manistee River 7	Badra et al.	Manistee River
789	A95	Elliptio dilatata	S	44.26420	-86.04940	HMNF 09/01/2015	Manistee River Browns Bayou 2	Ania Corner Riley	Manistee River
796	731	Elliptio dilatata	1	44.28720	-86.15141	DEQ 2003	Manistee River M4	Badra et al.	Manistee River
808	999	Elliptio dilatata	2	44.26916	-86.00277	DEQ 2003	Manistee River M6a	Badra et al.	Manistee River
1060	A78	Elliptio dilatata	32	43.65641	-86.18965	HMNF White R 2012	Osborn Creek 1	Badra et al.	North Branch White River
1080	615	Elliptio dilatata	S	43.87583	-86.11361	DEQ 2004	Pere Marquette River Big South Branch PM20	Badra et al.	Big South Branch Pere Marquette River
1146	A39	Elliptio dilatata	S	44.25986	-86.07996	HMNF Pine Cr Hinton 2011	Pine Creek 7	Badra et al.	Manistee River
1147	A40	Elliptio dilatata	S	44.26116	-86.07913	HMNF Pine Cr Hinton 2011	Pine Creek 8	Badra et al.	Manistee River
1148	A41	Elliptio dilatata	S	44.26136	-86.07843	HMNF Pine Cr Hinton 2011	Pine Creek 9	Badra et al.	Manistee River
1520	A30	Elliptio dilatata	111	43.74263	-85.93813	HMNF 2014	Triple Lakes Creek 8	Badra et al.	Big South Branch Pere Marquette River
6	A109	Fusconaia flava	S	44.64244	-83.93770	HMNF 09/16/2013	Au Sable River 1	Chambers	Au Sable River

Appendix B.3. (Continued)

60	737	Fusconaia flava	S	44.43119	-83.40025	DEQ 2003	Au Sable River A4	Badra et al.	Au Sable River
63	582	Fusconaia flava	S	44.43252	-83.40400	DEQ 2005	Au Sable River A5	Badra et al.	Au Sable River
69	583	Fusconaia flava	S	44.42758	-83.40677	DEQ 2005	Au Sable River A6	Badra et al.	Au Sable River
738	A97	Fusconaia flava	32	44.16197	-86.00405	HMNF 08/12/2013	Little Manistee River Cool Creek	Chambers	Little Manistee River
785	A28	Fusconaia flava	1	44.26231	-86.03190	HMNF 2014	Manistee River 7	Badra et al.	Manistee River
798	732	Fusconaia flava	1	44.26869	-86.00998	DEQ 2003	Manistee River M5	Badra et al.	Manistee River
809	999	Fusconaia flava	L*	44.26916	-86.00277	DEQ 2003	Manistee River M6a	Badra et al.	Manistee River
1061	A79	Fusconaia flava	3	43.65641	-86.18965	HMNF White R 2012	Osborn Creek 1	Badra et al.	North Branch White River
1521	A31	Fusconaia flava	15	43.74263	-85.93813	HMNF 2014	Triple Lakes Creek 8	Badra et al.	Big South Branch Pere Marquette River
1540	643	Fusconaia flava	7	43.43222	-86.31361	DEQ 2004	White Lake W10	Badra et al.	White River
57	738	Lampsilis cardium	S	44.43277	-83.39455	DEQ 2003	Au Sable River A3	Badra et al.	Au Sable River
61	737	Lampsilis cardium	S	44.43119	-83.40025	DEQ 2003	Au Sable River A4	Badra et al.	Au Sable River
64	582	Lampsilis cardium	S	44.43252	-83.40400	DEQ 2005	Au Sable River A5	Badra et al.	Au Sable River
70	583	Lampsilis cardium	S	44.42758	-83.40677	DEQ 2005	Au Sable River A6	Badra et al.	Au Sable River
762	A62	Lampsilis cardium	1	44.29511	-86.13416	HMNF Pine R Manistee 2011	Manistee River 2011_11	Badra et al.	Manistee River
769	A69	Lampsilis cardium	S	44.27171	-85.97506	HMNF Pine R Manistee 2011	Manistee River 2011_16	Badra et al.	Manistee River
772	A72	Lampsilis cardium	3	44.26872	-86.00368	HMNF Pine R Manistee 2011	Manistee River 2011_18_M6c	Badra et al.	Manistee River
775	A75	Lampsilis cardium	2	44.26762	-86.01272	HMNF Pine R Manistee 2011	Manistee River 2011_19_site5_2014	Badra et al.	Manistee River
786	A25	Lampsilis cardium	3	44.26752	-86.01285	HMNF 2014	Manistee River 5_site19_2011	Badra et al.	Manistee River
787	A29	Lampsilis cardium	4	44.26231	-86.03190	HMNF 2014	Manistee River 7	Badra et al.	Manistee River
790	A94	Lampsilis cardium	S	44.26420	-86.04940	HMNF 09/01/2015	Manistee River Browns Bayou 2	Ania Corner Riley	Manistee River
800	732	Lampsilis cardium	11	44.26869	-86.00998	DEQ 2003	Manistee River M5	Badra et al.	Manistee River
805	578	Lampsilis cardium	7	44.26916	-86.00277	DEQ 2003	Manistee River M6a	Badra et al.	Manistee River
811	999	Lampsilis cardium	9	44.26916	-86.00277	DEQ 2003	Manistee River M6a	Badra et al.	Manistee River
820	A96	Lampsilis cardium	2	44.26870	-86.00340	HMNF 09/01/2015	Manistee River M6d	Ania Corner Riley	Manistee River
1542	643	Lampsilis cardium	2	43.43222	-86.31361	DEQ 2004	White Lake W10	Badra et al.	White River
781	A23	Lampsilis fasciola	1	44.26752	-86.01285	HMNF 2014	Manistee River 5_site19_2011	Badra et al.	Manistee River
9	A141	Lampsilis siliquoidea	1	44.66098	-84.12322	HMNF 09/19/2013	Au Sable River 10	Chambers	Perry Creek-Au Sable River
14	A112	Lampsilis siliquoidea	1	44.63494	-83.92322	HMNF 09/16/2013	Au Sable River 2	Chambers	Au Sable River
18	A116	Lampsilis siliquoidea	S	44.63990	-83.90937	HMNF 09/16/2013	Au Sable River 3	Chambers	Au Sable River
21	A119	Lampsilis siliquoidea	S	44.66218	-84.12301	HMNF 09/17/2013	Au Sable River 4	Chambers	Perry Creek-Au Sable River
26	A124	Lampsilis siliquoidea	1	44.66465	-84.11657	HMNF 09/17/2013	Au Sable River 5	Chambers	Perry Creek-Au Sable River
29	A127	Lampsilis siliquoidea	S	44.65018	-84.10448	HMNF 09/17/2013	Au Sable River 6	Chambers	Perry Creek-Au Sable River
33	A131	Lampsilis siliquoidea	S	44.65384	-84.07938	HMNF 09/17/2013	Au Sable River 7	Chambers	Perry Creek-Au Sable River
37	A135	Lampsilis siliquoidea	S	44.65693	-84.03757	HMNF 09/18/2013	Au Sable River 8	Chambers	Perry Creek-Au Sable River
40	A138	Lampsilis siliquoidea	S	44.65988	-84.01477	HMNF 09/18/2013	Au Sable River 9	Chambers	Perry Creek-Au Sable River
739	A98	Lampsilis siliquoidea	15	44.16197	-86.00405	HMNF 08/12/2013	Little Manistee River Cool Creek	Chambers	Little Manistee River
768	A68	Lampsilis siliquoidea	S	44.27171	-85.97506	HMNF Pine R Manistee 2011	Manistee River 2011_16	Badra et al.	Manistee River
774	A74	Lampsilis siliquoidea	1	44.26762	-86.01272	HMNF Pine R Manistee 2011	Manistee River 2011_19_site5_2014	Badra et al.	Manistee River
784	A24	Lampsilis siliquoidea	S	44.26752	-86.01285	HMNF 2014	Manistee River 5_site19_2011	Badra et al.	Manistee River
799	732	Lampsilis siliquoidea	4	44.26869	-86.00998	DEQ 2003	Manistee River M5	Badra et al.	Manistee River
810	999	Lampsilis siliquoidea	2	44.26916	-86.00277	DEQ 2003	Manistee River M6a	Badra et al.	Manistee River
817	734	Lampsilis siliquoidea	S	44.28732	-85.85728	DEQ 2003	Manistee River M8	Badra et al.	Peterson Creek-Manistee River
1083	616	Lampsilis siliquoidea	1	43.87056	-86.07917	DEQ 2004	Pere Marquette River Big South Branch PM21	Badra et al.	Big South Branch Pere Marquette River
1149	A42	Lampsilis siliquoidea	S	44.26136	-86.07843	HMNF Pine Cr Hinton 2011	Pine Creek 9	Badra et al.	Manistee River
1296	A84	Lampsilis siliquoidea	S	43.52696	-86.11435	HMNF White R 2012	S. Branch White River 6	Badra et al.	South Branch White River

Appendix B.3. (Continued)

1522	A32	Lampsilis siliquoidea	S	43.74263	-85.93813	HMNF 2014	Triple Lakes Creek 8	Badra et al.	Big South Branch Pere Marquette River
1541	643	Lampsilis siliquoidea	1	43.43222	-86.31361	DEQ 2004	White Lake W10	Badra et al.	White River
801	732	Lasmigona complanata	1	44.26869	-86.00998	DEQ 2003	Manistee River M5	Badra et al.	Manistee River
806	578	Lasmigona complanata	1	44.26916	-86.00277	DEQ 2003	Manistee River M6a	Badra et al.	Manistee River
818	734	Lasmigona complanata	L*	44.28732	-85.85728	DEQ 2003	Manistee River M8	Badra et al.	Peterson Creek-Manistee River
1543	643	Lasmigona complanata	1*	43.43222	-86.31361	DEQ 2004	White Lake W10	Badra et al.	White River
10	A142	Lasmigona compressa	3	44.66098	-84.12322	HMNF 09/19/2013	Au Sable River 10	Chambers	Perry Creek-Au Sable River
22	A120	Lasmigona compressa	S	44.66218	-84.12301	HMNF 09/17/2013	Au Sable River 4	Chambers	Perry Creek-Au Sable River
1081	615	Lasmigona compressa	1	43.87583	-86.11361	DEQ 2004	Pere Marquette River Big South Branch PM20	Badra et al.	Big South Branch Pere Marquette River
1299	A87	Lasmigona costata	S	43.52269	-86.11846	HMNF White R 2012	S. Branch White River 7	Badra et al.	South Branch White River
58	738	Leptodea fragilis	S	44.43277	-83.39455	DEQ 2003	Au Sable River A3	Badra et al.	Au Sable River
65	582	Leptodea fragilis	S	44.43252	-83.40400	DEQ 2005	Au Sable River A5	Badra et al.	Au Sable River
71	583	Leptodea fragilis	S	44.42758	-83.40677	DEQ 2005	Au Sable River A6	Badra et al.	Au Sable River
15	A113	Ligumia nasuta	L	44.63494	-83.92322	HMNF 09/16/2013	Au Sable River 2	Chambers	Au Sable River
66	582	Ligumia recta	S	44.43252	-83.40400	DEQ 2005	Au Sable River A5	Badra et al.	Au Sable River
72	583	Ligumia recta	S	44.42758	-83.40677	DEQ 2005	Au Sable River A6	Badra et al.	Au Sable River
802	732	Ligumia recta	9	44.26869	-86.00998	DEQ 2003	Manistee River M5	Badra et al.	Manistee River
812	999	Ligumia recta	3	44.26916	-86.00277	DEQ 2003	Manistee River M6a	Badra et al.	Manistee River
59	738	Potamilus alatus	S	44.43277	-83.39455	DEQ 2003	Au Sable River A3	Badra et al.	Au Sable River
11	A143	Pyganodon grandis	16	44.66098	-84.12322	HMNF 09/19/2013	Au Sable River 10	Chambers	Perry Creek-Au Sable River
23	A121	Pyganodon grandis	S	44.66218	-84.12301	HMNF 09/17/2013	Au Sable River 4	Chambers	Perry Creek-Au Sable River
27	A125	Pyganodon grandis	S	44.66465	-84.11657	HMNF 09/17/2013	Au Sable River 5	Chambers	Perry Creek-Au Sable River
30	A128	Pyganodon grandis	1	44.65018	-84.10448	HMNF 09/17/2013	Au Sable River 6	Chambers	Perry Creek-Au Sable River
34	A132	Pyganodon grandis	S	44.65384	-84.07938	HMNF 09/17/2013	Au Sable River 7	Chambers	Perry Creek-Au Sable River
38	A136	Pyganodon grandis	S	44.65693	-84.03757	HMNF 09/18/2013	Au Sable River 8	Chambers	Perry Creek-Au Sable River
299	A21	Pyganodon grandis	1	44.30815	-86.00094	HMNF 2014	Dickson Lake 4	Badra et al.	Bear Creek
803	732	Pyganodon grandis	1	44.26869	-86.00998	DEQ 2003	Manistee River M5	Badra et al.	Manistee River
813	999	Pyganodon grandis	1	44.26916	-86.00277	DEQ 2005	Manistee River M6b	Badra et al.	Manistee River
1003	683	Pyganodon grandis	S	43.57050	-85.53143	MUSK	Muskegon River 66	Carmen and Badra	Hardy Dam Pond-Muskegon River
1150	A50	Pyganodon grandis	S	44.19550	-86.00829	HMNF Pine Cr Hinton 2011	Pine Lake 17	Badra et al.	Manistee River
1544	643	Pyganodon grandis	1	43.43222	-86.31361	DEQ 2004	White Lake W10	Badra et al.	White River
62	737	Strophitus undulatus	S	44.43119	-83.40025	DEQ 2003	Au Sable River A4	Badra et al.	Au Sable River
740	A99	Strophitus undulatus	S	44.16197	-86.00405	HMNF 08/12/2013	Little Manistee River Cool Creek	Chambers	Little Manistee River
776	A76	Strophitus undulatus	2	44.26762	-86.01272	HMNF Pine R Manistee 2011	Manistee River 2011_19_site5_2014	Badra et al.	Manistee River
795	730	Strophitus undulatus	S	44.28138	-86.16400	DEQ 2003	Manistee River M3	Badra et al.	Manistee River
804	732	Strophitus undulatus	5	44.26869	-86.00998	DEQ 2003	Manistee River M5	Badra et al.	Manistee River
807	578	Strophitus undulatus	1	44.26916	-86.00277	DEQ 2003	Manistee River M6a	Badra et al.	Manistee River
814	999	Strophitus undulatus	7	44.26916	-86.00277	DEQ 2005	Manistee River M6b	Badra et al.	Manistee River
819	579	Strophitus undulatus	S	44.26815	-85.98015	DEQ 2005	Manistee River M9	Badra et al.	Manistee River
1082	615	Strophitus undulatus	1	43.87583	-86.11361	DEQ 2004	Pere Marquette River Big South Branch PM20	Badra et al.	Big South Branch Pere Marquette River
1297	A85	Strophitus undulatus	S	43.52696	-86.11435	HMNF White R 2012	S. Branch White River 6	Badra et al.	South Branch White River
1300	A88	Strophitus undulatus	S	43.52269	-86.11846	HMNF White R 2012	S. Branch White River 7	Badra et al.	South Branch White River
815	999	Utterbackia imbecillis	1	44.26916	-86.00277	DEQ 2005	Manistee River M6b	Badra et al.	Manistee River
228	A20	zero	0	44.31766	-85.98494	HMNF 2014	Boswell Creek 3	Badra et al.	Bear Creek
281	A19	zero	0	44.33422	-86.02054	HMNF 2014	Chicken Creek 2	Badra et al.	Bear Creek
508	A33	zero	0	44.27765	-85.83160	HMNF Pine Cr Hinton 2011	Hinton Creek 1	Badra et al.	Peterson Creek-Manistee River

Appendix B.3. (Continued)

509	A34	zero	0	44.27776	-85.83094	HMNF Pine Cr Hinton 2011	Hinton Creek 2	Badra et al.	Peterson Creek-Manistee River
510	A35	zero	0	44.27659	-85.81613	HMNF Pine Cr Hinton 2011	Hinton Creek 3	Badra et al.	Peterson Creek-Manistee River
511	A36	zero	0	44.28129	-85.85447	HMNF Pine Cr Hinton 2011	Hinton Creek 4	Badra et al.	Peterson Creek-Manistee River
741	A100	zero	0	44.14722	-85.98376	HMNF 08/12/2013	Little Manistee River Stronach Creek 1	Chambers	Little Manistee River
742	A101	zero	0	44.14981	-85.94318	HMNF 08/13/2013	Little Manistee River Stronach Creek 2	Chambers	Little Manistee River
751	A91	zero	0	43.47582	-86.18977	HMNF White R 2012	Main Stem White River 10	Badra et al.	White River
752	A92	zero	0	43.47581	-86.21202	HMNF White R 2012	Main Stem White River 11	Badra et al.	White River
760	A60	zero	0	44.31290	-85.85559	HMNF Pine R Manistee 2011	Manistee River 2011_10	Badra et al.	Peterson Creek-Manistee River
767	A67	zero	0	44.26767	-85.95406	HMNF Pine R Manistee 2011	Manistee River 2011_15	Badra et al.	Manistee River
770	A70	zero	0	44.26811	-85.98030	HMNF Pine R Manistee 2011	Manistee River 2011_17	Badra et al.	Manistee River
777	A57	zero	0	44.30039	-85.85435	HMNF Pine R Manistee 2011	Manistee River 2011_7	Badra et al.	Peterson Creek-Manistee River
778	A58	zero	0	44.30253	-85.84919	HMNF Pine R Manistee 2011	Manistee River 2011_8	Badra et al.	Peterson Creek-Manistee River
779	A59	zero	0	44.30763	-85.84912	HMNF Pine R Manistee 2011	Manistee River 2011_9	Badra et al.	Peterson Creek-Manistee River
782	A26	zero	0	44.26804	-86.02308	HMNF 2014	Manistee River 6	Badra et al.	Manistee River
788	A93	zero	0	44.26380	-86.05160	HMNF 09/01/2015	Manistee River Browns Bayou 1	Ania Corner Riley	Manistee River
816	733	zero	0	44.28442	-85.86015	DEQ 2003	Manistee River M7	Badra et al.	Peterson Creek-Manistee River
888	663	zero	0	43.43835	-85.48698	MUSK	Muskegon River 13	Carmen and Badra	Little Muskegon River
955	685	zero	0	43.43435	-85.66695	MUSK	Muskegon River 49	Carmen and Badra	Brooks Creek-Muskegon River
1002	684	zero	0	43.47994	-85.65048	MUSK	Muskegon River 65	Carmen and Badra	Brooks Creek-Muskegon River
1016	A102	zero	0	43.48046	-85.75958	HMNF 08/19/2013	Muskegon River Bigelow Creek 1	Chambers	Brooks Creek-Muskegon River
1017	A103	zero	0	43.48116	-85.75458	HMNF 08/19/2013	Muskegon River Bigelow Creek 2	Chambers	Brooks Creek-Muskegon River
1018	A104	zero	0	43.44845	-85.74345	HMNF 08/20/2013	Muskegon River Bigelow Creek 3	Chambers	Brooks Creek-Muskegon River
1019	A105	zero	0	43.43555	-85.76675	HMNF 08/20/2013	Muskegon River Bigelow Creek 4	Chambers	Brooks Creek-Muskegon River
1020	A106	zero	0	43.43778	-85.76588	HMNF 08/20/2013	Muskegon River Penoyer Creek	Chambers	Brooks Creek-Muskegon River
1040	A83	zero	0	43.54820	-86.20643	HMNF White R 2012	N. Branch White River 5	Badra et al.	North Branch White River
1062	A80	zero	0	43.64237	-86.18028	HMNF White R 2012	Osborn Creek 2	Badra et al.	North Branch White River
1063	A81	zero	0	43.62766	-86.18425	HMNF White R 2012	Osborn Creek 3	Badra et al.	North Branch White River
1079	614	zero	0	43.91833	-86.17889	DEQ 2004	Pere Marquette River Big South Branch PM19	Badra et al.	Big South Branch Pere Marquette River
1084	617	zero	0	43.84472	-86.07584	DEQ 2004	Pere Marquette River Big South Branch PM22	Badra et al.	Big South Branch Pere Marquette River
1085	618	zero	0	43.81556	-86.08472	DEQ 2004	Pere Marquette River Big South Branch PM23	Badra et al.	Big South Branch Pere Marquette River
1086	619	zero	0	43.74222	-85.95972	DEQ 2004	Pere Marquette River Big South Branch PM24	Badra et al.	Big South Branch Pere Marquette River
1087	605	zero	0	43.93545	-86.12176	DEQ 2004	Pere Marquette River PM10	Badra et al.	Pere Marquette River
1088	606	zero	0	43.93545	-86.12176	DEQ 2004	Pere Marquette River PM11	Badra et al.	Pere Marquette River
1089	607	zero	0	43.93493	-86.12079	DEQ 2004	Pere Marquette River PM12	Badra et al.	Pere Marquette River
1090	608	zero	0	43.93357	-86.11775	DEQ 2004	Pere Marquette River PM13	Badra et al.	Pere Marquette River
1091	609	zero	0	43.93096	-86.07950	DEQ 2004	Pere Marquette River PM14	Badra et al.	Pere Marquette River
1092	610	zero	0	43.93575	-86.07708	DEQ 2004	Pere Marquette River PM15	Badra et al.	Pere Marquette River
1093	611	zero	0	43.93704	-86.06211	DEQ 2004	Pere Marquette River PM16	Badra et al.	Pere Marquette River
1094	612	zero	0	43.93569	-86.05201	DEQ 2004	Pere Marquette River PM17	Badra et al.	Pere Marquette River
1095	613	zero	0	43.87167	-85.76250	DEQ 2004	Pere Marquette River PM18	Badra et al.	Little South Branch Pere Marquette River
1096	620	zero	0	43.85750	-85.85222	DEQ 2004	Pere Marquette River PM25	Badra et al.	Pere Marquette River
1097	621	zero	0	43.81667	-85.80000	DEQ 2004	Pere Marquette River PM26	Badra et al.	Little South Branch Pere Marquette River
1101	603	zero	0	43.93479	-86.19181	DEQ 2004	Pere Marquette River PM8	Badra et al.	Pere Marquette River

Appendix B.3. (Continued)

1102	604	zero	0	43.93349	-86.13351	DEQ 2004	Pere Marquette River PM9	Badra et al.	Pere Marquette River
1137	A43	zero	0	44.20829	-85.97066	HMNF Pine Cr Hinton 2011	Pine Creek 10	Badra et al.	Manistee River
1138	A44	zero	0	44.20935	-85.97318	HMNF Pine Cr Hinton 2011	Pine Creek 11	Badra et al.	Manistee River
1139	A45	zero	0	44.21226	-85.97275	HMNF Pine Cr Hinton 2011	Pine Creek 12	Badra et al.	Manistee River
1140	A46	zero	0	44.21292	-85.97067	HMNF Pine Cr Hinton 2011	Pine Creek 13	Badra et al.	Manistee River
1141	A47	zero	0	44.21145	-86.01642	HMNF Pine Cr Hinton 2011	Pine Creek 14	Badra et al.	Manistee River
1142	A48	zero	0	44.22485	-86.02430	HMNF Pine Cr Hinton 2011	Pine Creek 15	Badra et al.	Manistee River
1143	A49	zero	0	44.21245	-85.95764	HMNF Pine Cr Hinton 2011	Pine Creek 16	Badra et al.	Manistee River
1144	A37	zero	0	44.24364	-86.05781	HMNF Pine Cr Hinton 2011	Pine Creek 5	Badra et al.	Manistee River
1145	A38	zero	0	44.25960	-86.08039	HMNF Pine Cr Hinton 2011	Pine Creek 6	Badra et al.	Manistee River
1154	A52	zero	0	44.14069	-85.69521	HMNF Pine R Manistee 2011	Pine River 2011_2	Badra et al.	Pine River
1155	A53	zero	0	44.14329	-85.70242	HMNF Pine R Manistee 2011	Pine River 2011_3	Badra et al.	Pine River
1156	A54	zero	0	44.20428	-85.80787	HMNF Pine R Manistee 2011	Pine River 2011_4	Badra et al.	Pine River
1157	A55	zero	0	44.20193	-85.81820	HMNF Pine R Manistee 2011	Pine River 2011_5	Badra et al.	Pine River
1158	A56	zero	0	44.19892	-85.83711	HMNF Pine R Manistee 2011	Pine River 2011_6	Badra et al.	Pine River
1302	A90	zero	0	43.48598	-86.15708	HMNF White R 2012	S. Branch White River 9	Badra et al.	South Branch White River
1467	A82	zero	0	43.59858	-86.18104	HMNF White R 2012	Swinton Creek 4	Badra et al.	North Branch White River

Appendix C.1. Historical unionid mussel occurrence records from the University of Michigan, Museum of Zoology Mollusk Collection located within HUC10 watersheds intersecting or contained within the Huron-Manistee National Forest boundary.

ID #	Catalog #	Species	County	Location	Latitude	Longitude	Collector and Collection Date	# of Specimens	Collection Note	HUC10 watershed name
3802	60526	Actinonaias ligamentina	Newaygo	Muskegon River, 3.0 mi. W of Newaygo, 2.0 mi. S of St. Rte. 82 approx. 43.3883┬N, 85.8633┬W	43.38830	-85.86330	van der Schalie, Henry; 09/Aug/1934	Dry 23.0		Brooks Creek-Muskegon River
3828	50136	Actinonaias ligamentina	Newaygo	Muskegon River, near Croton approx. 43.4386┬N, 85.6669┬W	43.43860	-85.66690	Hinsdale, W.; 00/___/1930	Dry 4.0		Brooks Creek-Muskegon River
3295	60559	Actinonaias ligamentina	Mecosta	Muskegon River, 2.0 mi. below Rodgers dam approx. 43.6119┬N, 85.5031┬W	43.61190	-85.50310	van der Schalie, Henry; 08/Aug/1934	Dry 5.0		Hardy Dam Pond-Muskegon River
3311	60600	Actinonaias ligamentina	Mecosta	Muskegon River, at Big Rapids approx. 43.6978┬N, 85.4761┬W	43.69780	-85.47610	van der Schalie, Henry; 09/Apr/1934	Dry 2.0		Hardy Dam Pond-Muskegon River
3315	60570	Actinonaias ligamentina	Mecosta	Muskegon River, at fish hatchery above Paris approx. 43.7775┬N, 85.4953┬W	43.77750	-85.49530	van der Schalie, Henry; 08/Aug/1934	Dry 11.0		Hardy Dam Pond-Muskegon River
3786	60633	Actinonaias ligamentina	Muskegon	Muskegon River, ca. 10 mi. NE of Muskegon, county line road approx. 43.3150┬N, 86.0478┬W	43.31500	-86.04780	van der Schalie, Henry; 09/Aug/1934	Dry 1.0		Muskegon River
3793	60588	Alasmidonta marginata	Newaygo	Muskegon River, at Bridgeton approx. 43┬20'56"N, 85┬56'32"W	43.34889	-85.94222	van der Schalie, Henry; 09/Aug/1934	Dry 2.0		Brooks Creek-Muskegon River
3817	60661	Alasmidonta marginata	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬N, 85.6719┬W	43.43640	-85.67190	van der Schalie, Henry; 09/Aug/1934	Dry 4.0		Brooks Creek-Muskegon River
3304	60560	Alasmidonta marginata	Mecosta	Muskegon River, 2.0 mi. below Rodgers dam approx. 43┬36'43"N, 85┬30'11"W	43.61194	-85.50306	van der Schalie, Henry; 08/Aug/1934	Dry 5.0		Hardy Dam Pond-Muskegon River
708	39560	Alasmidonta viridis	Alcona	AuSable River, below Alcona Dam approx. 44┬33'40"N, 83┬48'06"W	44.56111	-83.80167	Metzelaar & Langlois; 21/Apr/1925	Dry ~ 6.0	Fish Department & Department of Conservation	Au Sable River
2106	39569	Alasmidonta viridis	Iosco	pond above Loud Dam approx. 44┬27'39"N, 83┬45'20"W	44.46083	-83.75556	Hubbs & Langlois; 09/Aug/1924	Dry 1.0	Fish Department & Department of Conservation	Au Sable River
2107	128519	Alasmidonta viridis	Iosco	AuSable River, 11 mi. above Oscoda approx. 44┬28'20"N, 83┬34'13"W	44.47222	-83.57028	Thompson, Miss; 00/Jul/1937	Dry 1.0		Au Sable River
402	39608	Alasmidonta viridis	Newaygo	Winnepesaug Creek USGS 43.6891806┬N, 85.9517285┬W	43.68918	-85.95173	Langlois & Moody; 20/Jul/1926	Dry 1.0	Fish Department & Department of Conservation	Big South Branch Pere Marquette River
718	101246	Alasmidonta viridis	Alcona	Lake Huron, S of Black River approx. 44.8156┬N, 83.2997┬W	44.81560	-83.29970	Goodrich, Calvin;	Dry 0.5	Bryant Walker Collection	Black River-Frontal Lake Huron
332	41995	Alasmidonta viridis	Missaukee	Clam River approx. 44┬15'15"N, 85┬08'33"W	44.25417	-85.14250	Wood, F. E.; 00/___/1926	Dry 6.0		Clam River
336	39611	Alasmidonta viridis	Missaukee	Clam Creek, Lake Twp approx. 44.3075┬N, 85.2086┬W	44.30750	-85.20860	Metzelaar; 13/May/1926	Dry 1.0	Fish Department & Department of Conservation	Clam River
1200	60604	Alasmidonta viridis	Clare	Clam River, ca. 10 mi. E of Marion approx. 44.1006┬N, 85.0133┬W	44.10060	-85.01330	van der Schalie, Henry; 07/Aug/1934	Dry 3.0		Clam River
1205	60678	Alasmidonta viridis	Clare	West Branch of Clam River, ca. 8.0 mi. E of Marion approx. 44.1219┬N, 85.0261┬W	44.12190	-85.02610	van der Schalie, Henry; 07/Aug/1934	Dry 4.0		Clam River
42	205754	Alasmidonta viridis		East Branch Au Sable River, Station 1075 approx. 44.66528┬N, 84.70361┬W	44.66528	-84.70361	unknown; 19/Sep/1934	Dry 3.0	leg: Marshall	East Branch Au Sable River-Au Sable River

Appendix C.1. (Continued)

114	101211	Alasmidonta viridis	Crawford	School Section Lake, Grayling [questionable] approx. 44┬ 39'41"N, 84┬ 42'53"W	44.66139	-84.71472	Leach, M. L.;	Dry	5.0	Bryant Walker Collection	East Branch Au Sable River-Au Sable River
1288	39570	Alasmidonta viridis	Crawford	AuSable River, below Grayling approx. 44┬ 40'09"N, 84┬ 41'52"W	44.66917	-84.69778	Hubbs & Langlois; 04/Aug/1924	Dry	1.0	Fish Department & Department of Conservation	East Branch Au Sable River-Au Sable River
1290	54960	Alasmidonta viridis	Crawford	Jones Lake approx. 44.7842┬ N, 84.5933┬ W	44.78420	-84.59330	Wood, Norman A.; 29/May/1932	Dry	1.0		East Branch Au Sable River-Au Sable River
1291	60877	Alasmidonta viridis	Crawford	East Branch AuSable River, 6.0 mi. W of Lovells approx. 44.8022┬ N, 84.5886┬ W	44.80220	-84.58860	Trautman, Marion; 19/Sep/1934	Dry	4.0		East Branch Au Sable River-Au Sable River
5687	60636	Alasmidonta viridis	Mecosta	Ryan Creek, ca. 2.0 mi. SE of Big Rapids, on M20 approx. 43.6917┬ N, 85.4567┬ W	43.69170	-85.45670	van der Schalie, Henry; 09/Aug/1934	Dry	6.0		Hardy Dam Pond-Muskegon River
3294	60645	Alasmidonta viridis	Mecosta	creek, 1.5 mi. E of Altona approx. 43┬ 32'23"N, 85┬ 17'01"W	43.53972	-85.28361	van der Schalie, Henry; 09/Aug/1934	Dry	1.0		Little Muskegon River
3696	60630	Alasmidonta viridis	Montcalm	Tanarack Creek, Howard City approx. 43┬ 23'31"N, 85┬ 27'53"W	43.39194	-85.46472	van der Schalie, Henry; 09/Aug/1934	Dry	2.5		Little Muskegon River
784	38959	Alasmidonta viridis	Alpena	Kings Creek, Paxton approx. 45.0527┬ N, 83.6141┬ W	45.05270	-83.61410	Hubbs & Jones; 14/Sep/1925	Dry	1.0	Fish Department & Department of Conservation	Lower South Branch Thunder Bay River
397	101224	Alasmidonta viridis	Muskegon	Cedar Creek approx. 43.2731┬ N, 86.1786┬ W	43.27310	-86.17860	Mather, J.;	Dry	1.0	Bryant Walker Collection	Muskegon River
3778	101226	Alasmidonta viridis	Muskegon	Bear Lake approx. 43┬ 15'27"N, 76┬ 16'53"W	43.25750	-86.28140	Mather, J.;	Dry	1.0	Bryant Walker Collection	Muskegon River
4132	53255	Alasmidonta viridis	Ogemaw	Rifle River, Churchill Twp approx. 44.2900┬ N, 84.0781┬ W	44.29000	-84.07810	Dustin, Fred; 00/___/1931	Dry	2.0		Rifle River
4142	41123	Alasmidonta viridis	Ogemaw	Devoe Lake approx. 44.3994┬ N, 84.0183┬ W	44.39940	-84.01830	M. L. W. & C. J.; 00/___/1926	Dry	1.0		Rifle River
3839	39585	Alasmidonta viridis	Newaygo	Robinson Lake approx. 43┬ 31'56"N, 85┬ 51'18"W	43.53222	-85.85500	Langlois & Moody; 10/Sep/1926	Dry	1.0	Fish Department & Department of Conservation	South Branch White River
4111	61264	Alasmidonta viridis	Oceana	[South Branch] White River, 4.0 mi. SW of Hesperia approx. 43┬ 32'01"N, 86┬ 06'23"W	43.53361	-86.10639	van der Schalie & Stoll; 00/___/1934	Dry	1.0		South Branch White River
5767	169970	Alasmidonta viridis	Newaygo	White River, E of Aetna, Sec 31, Lincoln Twp approx. 43.5649┬ N, 85.9019┬ W	43.56490	-85.90190	Harry & van der Schalie; 23/Aug/1949	Dry	8.0		South Branch White River
5775	170022	Alasmidonta viridis	Newaygo	branch White River, Sec 21 and 22, Denver Twp. approx. 43.5828┬ N, 85.9796┬ W	43.58280	-85.97960	Harry & van der Schalie; 23/Aug/1949	Dry	2.0		South Branch White River
3772	7738	Amblema plicata	Muskegon	Bear Lake approx. 43┬ 15'27"N, 76┬ 16'53"W	43.25750	-86.28140	Mathers, J.L.;	Dry	3.0		Muskegon River
3777	100943	Amblema plicata	Muskegon	Bear Lake approx. 43┬ 15'27"N, 76┬ 16'53"W	43.25750	-86.28140	Leach, M. L.;	Dry	8.0	Bryant Walker Collection	Muskegon River
720	105967	Anodontoides ferussacianus	Alcona	Lake Huron, S of Black River approx. 44.8156┬ N, 83.2997┬ W	44.81560	-83.29970	Goodrich, Calvin;	Dry	0.5	Bryant Walker Collection	Black River-Frontal Lake Huron
3792	39580	Anodontoides ferussacianus	Newaygo	Sand Creek, Muskegeon River drainage USGS 43.3469632┬ N, 85.9392200┬ W	43.34696	-85.93922	Langlois & Moody; 14/Sep/1926	Dry	1.0	from Fish Dept. and Dept. of Conservation	Brooks Creek-Muskegon River
3819	60663	Anodontoides ferussacianus	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬ N, 85.6719┬ W	43.43640	-85.67190	van der Schalie, Henry; 09/Aug/1934	Dry	2.0		Brooks Creek-Muskegon River

Appendix C.1. (Continued)

334	41994	Anodontoides ferussacianus	Missaukee	Clam River approx. 44.2640┬ N, 85.2572┬ W	44.26400	-85.25720	Wood, F. E.; 00/___/1926	Dry	1.0		Clam River
335	39591	Anodontoides ferussacianus	Missaukee	Clam Creek, Lake Twp approx. 44.3075┬ N, 85.2086┬ W	44.30750	-85.20860	Metzelaar; 13/May/1926	Dry	2.0	from Fish Dept. and Dept. of Conservation	Clam River
1201	60605	Anodontoides ferussacianus	Clare	Clam River, ca. 10 mi. E of Marion approx. 44.1006┬ N, 85.0133┬ W	44.10060	-85.01330	van der Schalie, Henry; 07/Aug/1934	Dry	30.0		Clam River
1206	60679	Anodontoides ferussacianus	Clare	West Branch of Clam River, ca. 8.0 mi. E of Marion approx. 44.1219┬ N, 85.0261┬ W	44.12190	-85.02610	van der Schalie, Henry; 07/Aug/1934	Dry	14.0		Clam River
1281	133518	Anodontoides ferussacianus	Crawford	Au Sable River, 1.0 mi. W of Grayling approx. 44.6600┬ N, 84.7365┬ W	44.66000	-84.73650	Marsh, Phil; 31/May/1939	Dry	4.0		East Branch Au Sable River-Au Sable River
1292	60878	Anodontoides ferussacianus	Crawford	East Branch AuSable River, 6.0 mi. W of Lovells approx. 44.8022┬ N, 84.5886┬ W	44.80220	-84.58860	Trautman, Marion; 19/Sep/1934	Dry	6.0		East Branch Au Sable River-Au Sable River
5688	60637	Anodontoides ferussacianus	Mecosta	Ryan Creek, ca. 2.0 mi. SE of Big Rapids, on M20 approx. 43.6917┬ N, 85.4567┬ W	43.69170	-85.45670	van der Schalie, Henry; 09/Aug/1934	Dry	1.0		Hardy Dam Pond-Muskegon River
3287	16997	Anodontoides ferussacianus	Mason	N branch Lincoln Creek, Sec 8, Sherman Twp. approx. 44.0562┬ N, 86.2507┬ W	44.05620	-86.25070	Harry & van der Schalie; 24/Aug/1949	Dry	1.0		Lincoln River
5686	169997	Anodontoides ferussacianus	Mason	N branch Lincoln Creek, Sec 8 Sherman Twp approx. 44.0548┬ N, 86.2413┬ W	44.05480	-86.24130	H.H & van de Schalie; 24/Aug/1949	Dry	1.0		Lincoln River
3288	60594	Anodontoides ferussacianus	Mecosta	Little Muskegon River, 3.0 mi. SW of Altona approx. 43.5012┬ N, 85.3631┬ W	43.50120	-85.36310	van der Schalie, Henry; 09/Aug/1934	Dry	2.0		Little Muskegon River
3305	60628	Anodontoides ferussacianus	Mecosta	East branch of Little Muskegon River at Mecosta approx. 43.6220┬ N, 85.2306┬ W	43.62200	-85.23060	unknown; 09/Aug/1934	Dry	2.0		Little Muskegon River
3309	156649	Anodontoides ferussacianus	Mecosta	Horsehead Lake, Station # 6 approx. 43.6785┬ N, 85.2629┬ W	43.67850	-85.26290	Funk; 23/Aug/1941	Dry	1.0		Little Muskegon River
782	38949	Anodontoides ferussacianus	Alpena	King Creek, at head of permanent flow approx. 44.975003┬ N, 83.677352┬ W	44.97500	-83.67735	Hubbs; 13/Sep/1925	Dry	1.0	from Fish Dept. and Dept. of Conservation	Lower South Branch Thunder Bay River
3781	105973	Anodontoides ferussacianus	Muskegon	Bear Lake approx. 43.2575┬ N, 76.2814┬ W	43.25750	-86.28140	Mather, J.;	Dry	1.0	Bryant Walker Collection	Muskegon River
5834	171457	Anodontoides ferussacianus	Oceana	E shore Pentwater Lake, Sec 23, T16N, R10W, Pentwater Twp approx. 43.7726┬ N, 86.4179┬ W	43.77260	-86.41790	Harry & van der Schalie; 23/Aug/1949	Dry	3.0		Pentwater River
5580	201243	Anodontoides ferussacianus	Lake	Wolf Lake, T19N, R13W, Sec 26 and 27 approx. 44.0093┬ N, 85.8422┬ W	44.00930	-85.84220	Taube, C. M.; 09/Sep/1959	Dry	0.5		Pere Marquette River
4133	53256	Anodontoides ferussacianus	Ogemaw	Rifle River, Churchill Twp approx. 44.2900┬ N, 84.0781┬ W	44.29000	-84.07810	Dustin, Fred; 00/___/1931	Dry	1.0		Rifle River
5402	170018	Anodontoides ferussacianus	Grand Traverse	Fife Lake, at village of Fife Lake approx. 44.5754┬ N, 85.3487┬ W	44.57540	-85.34870	Harry & van der Schalie; 30/Aug/1949	Dry	1.0		Silver Creek-Manistee River
4106	61263	Anodontoides ferussacianus	Oceana	White River, 4.0 mi. SW of Hesperia approx. 43.5305┬ N, 86.1145┬ W	43.53050	-86.11450	van der Schalie & Stoll; 00/___/1934	Dry	19.0		South Branch White River
5769	169972	Anodontoides ferussacianus	Newaygo	White River, E of Aetna, Sec 31, Lincoln Twp approx. 43.5649┬ N, 85.9019┬ W	43.56490	-85.90190	Harry & van der Schalie; 23/Aug/1949	Dry	2.0		South Branch White River
5776	170023	Anodontoides ferussacianus	Newaygo	branch White River, Sec 21 and 22, Denver Twp. approx. 43.5828┬ N, 85.9796┬ W	43.58280	-85.97960	Harry & van der Schalie; 23/Aug/1949	Dry	2.0		South Branch White River
4116	7694	Anodontoides ferussacianus	Oceana	Sable Lake, Shelby USGS 43.6086┬ N, 86.3640┬ W	43.60860	-86.36400	Johnson, R. H.; 00/Jul/1903	Dry	1.0		Stony Creek-Frontal Lake Michigan

Appendix C.1. (Continued)

4117	7706	Anodontoides ferussacianus	Oceana	Sable Lake, Shelby USGS 43.6086┬N, 86.3640┬W	43.60860	-86.36400	unknown; 00/Jul/1903	Dry	4.0		Stony Creek-Frontal Lake Michigan
5765	169935	Anodontoides ferussacianus	Muskegon	Sand Creek, Sec 6, Manistee Twp. approx. 43.4604┬N, 86.2594┬W	43.46040	-86.25940	H.H & van de Schalie; 22/Aug/1949	Dry	4.0		White River
3803	60529	Elliptio dilatata	Newaygo	Muskegon River, 3.0 mi. W of Newaygo, 2.0 mi. S of St. Rte. 82 approx. 43.3883┬N, 85.8633┬W	43.38830	-85.86330	van der Schalie, Henry; 09/Aug/1934	Dry	7.0		Brooks Creek-Muskegon River
3821	60665	Elliptio dilatata	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬N, 85.6719┬W	43.43640	-85.67190	van der Schalie, Henry; 09/Aug/1934	Dry	2.0		Brooks Creek-Muskegon River
3296	60562	Elliptio dilatata	Mecosta	Muskegon River, 2.0 mi. below Rodgers dam approx. 43.6119┬N, 85.5031┬W	43.61190	-85.50310	van der Schalie, Henry; 08/Aug/1934	Dry	3.0		Hardy Dam Pond-Muskegon River
3316	60571	Elliptio dilatata	Mecosta	Muskegon River, at fish hatchery above Paris approx. 43.7775┬N, 85.4953┬W	43.77750	-85.49530	van der Schalie, Henry; 08/Aug/1934	Dry	33.0		Hardy Dam Pond-Muskegon River
5689	60638	Elliptio dilatata	Mecosta	Ryan Creek, ca. 2.0 mi. SE of Big Rapids, on M20 approx. 43.6917┬N, 85.4567┬W	43.69170	-85.45670	van der Schalie, Henry; 09/Aug/1934	Dry	30.0		Hardy Dam Pond-Muskegon River
3289	60595	Elliptio dilatata	Mecosta	Little Muskegon River, 3.0 mi. SW of Altona approx. 43.5012┬N, 85.3631┬W	43.50120	-85.36310	van der Schalie, Henry; 09/Aug/1934	Dry	13.0		Little Muskegon River
395	7728	Elliptio dilatata	Muskegon	Cedar Creek approx. 43.2731┬N, 86.1786┬W	43.27310	-86.17860	Mathers, J.L.;	Dry	2.0		Muskegon River
396	96434	Elliptio dilatata	Muskegon	Cedar Creek approx. 43.2731┬N, 86.1786┬W	43.27310	-86.17860	Mather, J.;	Dry	2.0	Bryant Walker Collection	Muskegon River
3759	66234	Elliptio dilatata	Muskegon	Muskegon Lake, NW end, at Hartmans Landing approx. 43.2475┬N, 86.3185┬W	43.24750	-86.31850	Woodberry & Cheatum; 00/___/1936	Dry	3.0	Institute of Fisheries Research	Muskegon River
3783	7725	Elliptio dilatata	Muskegon	Muskegon River approx. 43.2717┬N, 86.2035┬W	43.27170	-86.20350	Mathers, J.L.;	Dry	1.0		Muskegon River
3784	7726	Elliptio dilatata	Muskegon	Muskegon River approx. 43.2717┬N, 86.2035┬W	43.27170	-86.20350	Mathers, J.L.;	Dry	3.0		Muskegon River
3785	96436	Elliptio dilatata	Muskegon	Muskegon River approx. 43.2717┬N, 86.2035┬W	43.27170	-86.20350	Mather, J.;	Dry	2.0	Bryant Walker Collection	Muskegon River
3787	60634	Elliptio dilatata	Muskegon	Muskegon River, ca. 10 mi. NE of Muskegon, county line road approx. 43.3150┬N, 86.0478┬W	43.31500	-86.04780	van der Schalie, Henry; 09/Aug/1934	Dry	1.0		Muskegon River
4131	53254	Elliptio dilatata	Ogemaw	Rifle River, Churchill Twp approx. 44.2900┬N, 84.0781┬W	44.29000	-84.07810	Dustin, Fred; 00/___/1931	Dry	9.0		Rifle River
4147	166301	Elliptio dilatata	Ogemaw	Rifle River, below dam at De Voe Lake approx. 44.399671┬N, 84.033154┬W	44.39967	-84.03315	van der Schalie, Henry; 07/Oct/1946	Dry	7.0		Rifle River
3739	163068	Elliptio dilatata	Muskegon	Mona Lake approx. 43.1806┬N, 86.2508┬W	43.18060	-86.25080	Kirkland, R. J.;	Dry	1.0		Stony Creek-Frontal Lake Michigan
399	44996	Fusconaia flava	Muskegon	Muskegon River, Brooks Twp approx. 43.4068┬N, 85.7178┬W	43.40680	-85.71780	Hinsdale, W.; 00/Aug/1928	Dry	1.0		Brooks Creek-Muskegon River
3795	60590	Fusconaia flava	Newaygo	Muskegon River, at Bridgeton approx. 43.3489┬N, 85.9422┬W	43.34890	-85.94220	van der Schalie, Henry; 09/Aug/1934	Dry	1.0		Brooks Creek-Muskegon River
3801	60530	Fusconaia flava	Newaygo	Muskegon River, 3.0 mi W of Newaygo, 2.0 mi S of M 82 approx. 43.385226┬N, 85.85928┬W	43.38523	-85.85928	van der Schalie, Henry; 09/Aug/1934	Dry	20.0		Brooks Creek-Muskegon River
3820	60664	Fusconaia flava	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬N, 85.6719┬W	43.43640	-85.67190	van der Schalie, Henry; 09/Aug/1934	Dry	1.0		Brooks Creek-Muskegon River

Appendix C.1. (Continued)

3832	39617	Fusconaia flava	Newaygo	Pickerel Lake outlet approx. 43.454879°N, 85.820258°W	43.45488	-85.82026	Langlois & Moody; 20/Jul/1926	Dry	3.0	Fish Dept. & Dept. of Conservation	Brooks Creek-Muskegon River
3297	60563	Fusconaia flava	Mecosta	Muskegon River, 2.0 mi. below Rodgers dam approx. 43.6119°N, 85.5031°W	43.61190	-85.50310	van der Schalie, Henry; 08/Aug/1934	Dry	1.0		Hardy Dam Pond-Muskegon River
3317	60572	Fusconaia flava	Mecosta	Muskegon River, at fish hatchery above Paris approx. 43.7775°N, 85.4953°W	43.77750	-85.49530	van der Schalie, Henry; 08/Aug/1934	Dry	9.0		Hardy Dam Pond-Muskegon River
5690	60639	Fusconaia flava	Mecosta	Ryan Creek, ca. 2.0 mi. SE of Big Rapids, on M20 approx. 43.6917°N, 85.4567°W	43.69170	-85.45670	van der Schalie, Henry; 09/Aug/1934	Dry	24.0		Hardy Dam Pond-Muskegon River
3290	60596	Fusconaia flava	Mecosta	Little Muskegon River, 3.0 mi. SW of Altona approx. 43.5012°N, 85.3631°W	43.50120	-85.36310	van der Schalie, Henry; 09/Aug/1934	Dry	1.0		Little Muskegon River
3750	183401	Fusconaia flava	Muskegon	Muskegon Lake approx. 43.2313°N, 86.2679°W	43.23130	-86.26790	Hayden, E.P.; 29/Jun/1950	Dry	1.0		Muskegon River
3751	151451	Fusconaia flava	Muskegon	Muskegon USGS 43.2341813°N, 86.2483921°W	43.23418	-86.24839	Kent Scientific Museum;	Dry	3.0		Muskegon River
5770	169973	Fusconaia flava	Newaygo	White River, E of Aetna, Sec 31, Lincoln Twp approx. 43.5649°N, 85.9019°W	43.56490	-85.90190	Harry & van der Schalie; 23/Aug/1949	Dry	8.0		South Branch White River
5757	7756	Fusconaia flava	Muskegon	Little Black Lake approx. 43.1221°N, 86.2525°W	43.12210	-86.25250	Mather, J.;	Dry	1.0		Stony Creek-Frontal Lake Michigan
5760	92243	Fusconaia flava	Muskegon	Little Black Lake approx. 43.1221°N, 86.2525°W	43.12210	-86.25250	Mathers, J.L.;	Dry	1.0	Bryant Walker Collection	Stony Creek-Frontal Lake Michigan
5761	94006	Fusconaia flava	Muskegon	Little Black Lake approx. 43.1221°N, 86.2525°W	43.12210	-86.25250	Mathers, J.L.;	Dry	3.0	Bryant Walker Collection	Stony Creek-Frontal Lake Michigan
5763	151454	Fusconaia flava	Muskegon	Little Black Lake approx. 43.1221°N, 86.2525°W	43.12210	-86.25250	Kent Scientific Museum;	Dry	5.0	orig. Velie Collection	Stony Creek-Frontal Lake Michigan
5951	92691	Fusconaia flava	Ottawa	Black Lake [Little Black Lake] approx. 43.1201°N, 86.2447°W	43.12010	-86.24470	orig. DeCamp Collection;	Dry	3.0	Bryant Walker Collection	Stony Creek-Frontal Lake Michigan
819	45030	Lampsilis cardium	Arenac	Lake Huron, Saginaw Bay, Point Aug Gres USGS 43.9900181°N, 83.6783148°W	43.99002	-83.67832	Wood, Norman A.; 00/___/1928	Dry	1.0		Big Creek-Frontal Lake Huron
316	55340	Lampsilis cardium	Mason	Hamlin Lake USGS 44.0677817°N, 86.4592518°W	44.06778	-86.45925	Ashley, L.; 00/___/1932	Dry	1.0		Big Sable River
317	55873	Lampsilis cardium	Mason	Hamlin Lake USGS 44.0677817°N, 86.4592518°W	44.06778	-86.45925	Inst. Fish Research; 04/Jul/1932	Dry	1.0		Big Sable River
400	39789	Lampsilis cardium	Newaygo	Muskegon River approx. 43.3228°N, 86.0190°W	43.32280	-86.01900	Langlois, T. H.; 12/Nov/1926	Dry	1.0	Fish Dept. and Dept. of Conservation	Brooks Creek-Muskegon River
3805	60532	Lampsilis cardium	Newaygo	Muskegon River, 3.0 mi. W of Newaygo, 2.0 mi. S of St. Rte. 82 approx. 43.3883°N, 85.8633°W	43.38830	-85.86330	van der Schalie, Henry; 09/Aug/1934	Dry	3.0		Brooks Creek-Muskegon River
3823	60667	Lampsilis cardium	Newaygo	Muskegon River, below Croton dam approx. 43.4364°N, 85.6719°W	43.43640	-85.67190	van der Schalie, Henry; 09/Aug/1934	Dry	19.0		Brooks Creek-Muskegon River
3829	50137	Lampsilis cardium	Newaygo	Muskegon River, near Croton approx. 43.4386°N, 85.6669°W	43.43860	-85.66690	Hinsdale, W.; 00/___/1930	Dry	2.0		Brooks Creek-Muskegon River
3299	60565	Lampsilis cardium	Mecosta	Muskegon River, 2.0 mi. below Rodgers dam approx. 43.6119°N, 85.5031°W	43.61190	-85.50310	van der Schalie, Henry; 08/Aug/1934	Dry	3.0		Hardy Dam Pond-Muskegon River
3319	60574	Lampsilis cardium	Mecosta	Muskegon River, at fish hatchery above Paris approx. 43.7775°N, 85.4953°W	43.77750	-85.49530	van der Schalie, Henry; 08/Aug/1934	Dry	1.0		Hardy Dam Pond-Muskegon River
642	63876	Lampsilis cardium		Little Muskegon River, near bridge on Montcalm/Newaygo Co. line approx. 43.4265°N, 85.5624°W	43.42650	-85.56240	Stoll, C. E.; 00/Jun/1935	Dry	1.0		Little Muskegon River

Appendix C.1. (Continued)

4343	89513	Lampsilis cardium	Saginaw	Saginaw approx. 43.41944°N, 85.3527°W	43.41944	-85.35270	unknown;	Dry	1.0	Bryant Walker Collection	Little Muskegon River
641	40755	Lampsilis cardium		Muskegon Lake approx. 43.2417°N, 86.2874°W	43.24170	-86.28740	Clench, W. J.; 00/Sep/1925	Dry	2.0		Muskegon River
3747	89570	Lampsilis cardium	Muskegon	Muskegon Lake approx. 43.2313°N, 86.2679°W	43.23130	-86.26790	Kirkland, R. J.;	Dry	2.0	Bryant Walker Collection	Muskegon River
3753	66228	Lampsilis cardium	Muskegon	Muskegon Lake, NW end, at Hartmans Landing approx. 43.2475°N, 86.3185°W	43.24750	-86.31850	Woodberry & Cheatum; 00/___/1936	Dry	3.0	from Institute of Fisheries Research	Muskegon River
3776	89508	Lampsilis cardium	Muskegon	Bear Lake approx. 43.2575°N, 76.2814°W	43.25750	-86.28140	Mather, J.;	Dry	2.0	Bryant Walker Collection	Muskegon River
5837	171455	Lampsilis cardium	Oceana	E shore Pentwater Lake, Sec 23, Pentwater Twp approx. 43.7738°N, 86.4203°W	43.77380	-86.42030	van der Schalie & H.H.; 23/Aug/1949	Dry	1.0		Pentwater River
4107	61265	Lampsilis cardium	Oceana	White River, 4.0 mi. SW of Hesperia approx. 43.5305°N, 86.1145°W	43.53050	-86.11450	van der Schalie & Stoll; 00/___/1934	Dry	1.0		South Branch White River
3736	89572	Lampsilis cardium	Muskegon	Mona Lake, Muskegon approx. 43.1806°N, 86.2508°W	43.18060	-86.25080	orig. DeCamp Collection;	Dry	1.0	Bryant Walker Collection	Stony Creek-Frontal Lake Michigan
4122	55870	Lampsilis cardium	Oceana	Morris Lake approx. 43.659689°N, 86.437913°W	43.65969	-86.43791	Inst. Fish Research; 00/___/1932	Dry	2.0		Stony Creek-Frontal Lake Michigan
5758	85222	Lampsilis radiata	Muskegon	Little Black Lake approx. 43.1221°N, 86.2525°W	43.12210	-86.25250	Mather, J.;	Dry	1.0	Bryant Walker Collection	Stony Creek-Frontal Lake Michigan
2667	89308	Lampsilis siliquoidea	Lake	Sauble Lake approx. 44.06806°N, 85.95361°W	44.06806	-85.95361	Goodrich, Calvin; 07/Aug/1915	Dry	5.5	Bryant Walker Collection	Big Sable River
401	39596	Lampsilis siliquoidea	Newaygo	Winnepesaug Creek USGS 43.6891806°N, 85.9517285°W	43.68918	-85.95173	Langlois & Moody; 20/Jul/1926	Dry	1.0	Fish Dept. and Dept. of Conservation	Big South Branch Pere Marquette River
3840	39575	Lampsilis siliquoidea	Newaygo	Brookings Lake [Woodland Lake] approx. 43.7073°N, 85.8638°W	43.70730	-85.86380	Langlois & Moody; 00/___/1926	Dry	1.0	Fish Dept. and Dept. of Conservation	Big South Branch Pere Marquette River
717	89373	Lampsilis siliquoidea	Alcona	Lake Huron, S of Black River approx. 44.8156°N, 83.2997°W	44.81560	-83.29970	Goodrich, Calvin; 00/___/1921	Dry	4.0	Bryant Walker Collection	Black River-Frontal Lake Huron
783	87740	Lampsilis siliquoidea	Alpena	Lake Huron, Thunder Bay, Alpena approx. 45.0485°N, 83.4442°W	45.04850	-83.44420	Cassius, S. E.;	Dry	1.0	Bryant Walker Collection	Black River-Frontal Lake Huron
2109	89372	Lampsilis siliquoidea	Iosco	Cedar Lake, 15.0 mi. N of Oscoda approx. 44.504121°N, 83.335482°W	44.50412	-83.33548	Goodrich, Calvin;	Dry	2.0	Bryant Walker Collection	Black River-Frontal Lake Huron
3804	60531	Lampsilis siliquoidea	Newaygo	Muskegon River, 3.0 mi. W of Newaygo, 2.0 mi. S of St. Rte. 82 approx. 43.3883°N, 85.8633°W	43.38830	-85.86330	van der Schalie, Henry; 09/Aug/1934	Dry	5.0		Brooks Creek-Muskegon River
3822	60666	Lampsilis siliquoidea	Newaygo	Muskegon River, below Croton dam approx. 43.4364°N, 85.6719°W	43.43640	-85.67190	van der Schalie, Henry; 09/Aug/1934	Dry	15.0		Brooks Creek-Muskegon River
3835	66659	Lampsilis siliquoidea	Newaygo	Fremont Lake, near Fremont approx. 43.4567°N, 85.9620°W	43.45670	-85.96200	Cooper, G. P.; 00/___/1934	Dry	1.0		Brooks Creek-Muskegon River
3836	39583	Lampsilis siliquoidea	Newaygo	Fremont Lake approx. 43.4576°N, 85.9628°W	43.45760	-85.96280	Langlois & Moody; 13/Sep/1926	Dry	2.5	Fish Dept. and Dept. of Conservation	Brooks Creek-Muskegon River
1202	60606	Lampsilis siliquoidea	Clare	Clam River, ca. 10 mi. E of Marion approx. 44.1006°N, 85.0133°W	44.10060	-85.01330	van der Schalie, Henry; 07/Aug/1934	Dry	20.0		Clam River
1207	60680	Lampsilis siliquoidea	Clare	West Branch of Clam River, ca. 8.0 mi. E of Marion approx. 44.1219°N, 85.0261°W	44.12190	-85.02610	van der Schalie, Henry; 07/Aug/1934	Dry	6.0		Clam River
5712	197983	Lampsilis siliquoidea	Missaukee	Clam River, at M66 Bridge approx. 44.2429°N, 85.2148°W	44.24290	-85.21480	unknown; 02/Aug/1940	Dry	1.0		Clam River

Appendix C.1. (Continued)

6119	171463	Lampsilis siliquoidea	Wexford	N shore Lake Mitchell, Sec 26, Selma Twp. approx. 44.2684┬N, 85.4812┬W	44.26840	-85.48120	van der Schalie & H.H.; 25/Aug/1949	Dry	3.0		Clam River
115	87761	Lampsilis siliquoidea	Crawford	School Section Lake, Grayling approx. 44.6614┬N, 84.7147┬W	44.66140	-84.71470	Leach, M. L.;	Dry	3.0	Bryant Walker Collection	East Branch Au Sable River-Au Sable River
1282	205622	Lampsilis siliquoidea	Crawford	Au Sable River, 1.0 mi. W of Grayling approx. 44.6600┬N, 84.7365┬W	44.66000	-84.73650	orig. Marsh Collection; 31/May/1939	Dry	1.0		East Branch Au Sable River-Au Sable River
1284	4297	Lampsilis siliquoidea	Crawford	Grayling USGS 44.6614┬N, 84.7145┬W	44.66140	-84.71450	unknown;	Dry	9.0	De Camp	East Branch Au Sable River-Au Sable River
1285	89262	Lampsilis siliquoidea	Crawford	Grayling USGS 44.6614┬N, 84.7145┬W	44.66140	-84.71450	orig. DeCamp Collection;	Dry	4.0	Bryant Walker Collection	East Branch Au Sable River-Au Sable River
1293	60879	Lampsilis siliquoidea	Crawford	East Branch AuSable River, 6.0 mi. W of Lovells approx. 44.8022┬N, 84.5886┬W	44.80220	-84.58860	Trautman, Marion; 19/Sep/1934	Dry	1.0		East Branch Au Sable River-Au Sable River
3298	60564	Lampsilis siliquoidea	Mecosta	Muskegon River, 2.0 mi. below Rodgers dam approx. 43.6119┬N, 85.5031┬W	43.61190	-85.50310	van der Schalie, Henry; 08/Aug/1934	Dry	3.0		Hardy Dam Pond-Muskegon River
3312	60601	Lampsilis siliquoidea	Mecosta	Muskegon River, at Big Rapids approx. 43.6978┬N, 85.4761┬W	43.69780	-85.47610	van der Schalie, Henry; 09/Apr/1934	Dry	11.0		Hardy Dam Pond-Muskegon River
3318	60573	Lampsilis siliquoidea	Mecosta	Muskegon River, at fish hatchery above Paris approx. 43.7775┬N, 85.4953┬W	43.77750	-85.49530	van der Schalie, Henry; 08/Aug/1934	Dry	18.0		Hardy Dam Pond-Muskegon River
5691	60640	Lampsilis siliquoidea	Mecosta	Ryan Creek, ca. 2.0 mi. SE of Big Rapids, on M20 approx. 43.6917┬N, 85.4567┬W	43.69170	-85.45670	van der Schalie, Henry; 09/Aug/1934	Dry	3.0		Hardy Dam Pond-Muskegon River
3291	60597	Lampsilis siliquoidea	Mecosta	Little Muskegon River, 3.0 mi. SW of Altona approx. 43.5012┬N, 85.3631┬W	43.50120	-85.36310	van der Schalie, Henry; 09/Aug/1934	Dry	2.0		Little Muskegon River
3307	156645	Lampsilis siliquoidea	Mecosta	Horsehead Lake, Station # 6 approx. 43.6785┬N, 85.2629┬W	43.67850	-85.26290	Funk; 28/Aug/1941	Dry	1.0		Little Muskegon River
3310	156650	Lampsilis siliquoidea	Mecosta	Horsehead Lake, Station # 4 approx. 43.6785┬N, 85.2629┬W	43.67850	-85.26290	Funk; 23/Aug/1941	Dry	1.0		Little Muskegon River
710	63144	Lampsilis siliquoidea	Alcona	Hubbard Lake approx. 44.8082┬N, 83.5884┬W	44.80820	-83.58840	Link, G. A.; 00/Aug/1926	Dry	2.0	Carnegie Museum, gift, 1935	Lower South Branch Thunder Bay River
711	66656	Lampsilis siliquoidea	Alcona	Hubbard Lake approx. 44.8082┬N, 83.5884┬W	44.80820	-83.58840	Cooper, G. P.; 00/___/1934	Dry	6.0		Lower South Branch Thunder Bay River
715	89319	Lampsilis siliquoidea	Alcona	Hubbard Lake approx. 44.8082┬N, 83.5884┬W	44.80820	-83.58840	Goodrich, Calvin; 00/___/1921	Dry	3.0	Bryant Walker Collection	Lower South Branch Thunder Bay River
3740	7604	Lampsilis siliquoidea	Muskegon	Muskegon Lake approx. 43.2313┬N, 86.2679┬W	43.23130	-86.26790	Mather, J.;	Dry	1.0		Muskegon River
3758	66233	Lampsilis siliquoidea	Muskegon	Muskegon Lake, NW end, at Hartmans Landing approx. 43.2475┬N, 86.3185┬W	43.24750	-86.31850	Woodberry & Cheatum; 00/___/1936	Dry	6.0	Institute of Fisheries Research	Muskegon River
3762	183394	Lampsilis siliquoidea	Muskegon	Muskegon Lake, north shore approx. 43.2568┬N, 86.2650┬W	43.25680	-86.26500	Hayden, E.P.; 07/Jul/1950	Dry	1.0		Muskegon River
3764	7603	Lampsilis siliquoidea	Muskegon	Bear Lake approx. 43.2575┬N, 76.2814┬W	43.25750	-86.28140	Mather, J.;	Dry	4.0		Muskegon River
3765	7606	Lampsilis siliquoidea	Muskegon	Bear Lake approx. 43.2575┬N, 76.2814┬W	43.25750	-86.28140	Mather, J.;	Dry	2.0		Muskegon River
3775	89277	Lampsilis siliquoidea	Muskegon	Bear Lake approx. 43.2575┬N, 76.2814┬W	43.25750	-86.28140	Mather, J.;	Dry	8.0	Bryant Walker Collection	Muskegon River
4124	55410	Lampsilis siliquoidea	Oceana	lake at Pentwater approx. 43.7752┬N, 86.4298┬W	43.77520	-86.42980	Goodrich, Calvin; 00/___/1932	Dry	6.0		Pentwater River

Appendix C.1. (Continued)

5836	171454	Lampsilis siliquoidea	Oceana	E shore Pentwater Lake, Sec 23, Pentwater Twp approx. 43.7738°N, 86.4203°W	43.77380	-86.42030	van der Schalie & H.H.; 23/Aug/1949	Dry	6.0		Pentwater River
2660	87739	Lampsilis siliquoidea	Lake	Long Lake, Idlewild approx. 43.8914°N, 85.8017°W	43.89140	-85.80170	Walker, Bryant;	Dry	1.0	Bryant Walker Collection	Pere Marquette River
2096	89314	Lampsilis siliquoidea	Iosco	Van Etten Lake, Oscoda approx. 44.4498°N, 83.3371°W	44.44980	-83.33710	Goodrich, Calvin;	Dry	1.0	Bryant Walker Collection	Pine River
2097	89374	Lampsilis siliquoidea	Iosco	Van Etten Lake, Oscoda approx. 44.4498°N, 83.3371°W	44.44980	-83.33710	Goodrich, Calvin;	Dry	12.0	Bryant Walker Collection	Pine River
2103	63836	Lampsilis siliquoidea	Iosco	Van Etten Lake approx. 44.457896°N, 83.349916°W	44.45790	-83.34992	Goodrich, Calvin; 00/Aug/1935	Dry	2.0		Pine River
2105	195472	Lampsilis siliquoidea	Iosco	Van Etten Lake approx. 44.457896°N, 83.349916°W	44.45790	-83.34992	Peterson, H.L.; 00/Jul/1957	Dry	1.0		Pine River
5307	87735	Lampsilis siliquoidea	Wexford	Clam Lake approx. 44.2100°N, 85.3925°W	44.21000	-85.39250	Walker, Bryant;	Dry	1.0	Bryant Walker Collection	Pine River
4135	41054	Lampsilis siliquoidea	Ogemaw	Peach Lake approx. 44.2917°N, 84.1653°W	44.29170	-84.16530	M. L. W. & C. J.; 00/___/1926	Dry	1.0		Rifle River
3810	39579	Lampsilis siliquoidea	Newaygo	Bills Lake approx. 43.3956°N, 85.6675°W	43.39560	-85.66750	Langlois & Moody; 19/Sep/1926	Dry	1.0	Fish Dept. and Dept. of Conservation	Rogue River
1445	89338	Lampsilis siliquoidea	Grand Traverse	Fife Lake approx. 44.5715°N, 85.3364°W	44.57150	-85.33640	Lowe, J. N.; 12/Sep/1925	Dry	1.0	Bryant Walker Collection	Silver Creek-Manistee River
5403	170019	Lampsilis siliquoidea	Grand Traverse	Fife Lake, at village of Fife Lake approx. 44.5754°N, 85.3487°W	44.57540	-85.34870	van der Schalie & H.H.; 30/Aug/1949	Dry	9.0		Silver Creek-Manistee River
3837	39578	Lampsilis siliquoidea	Newaygo	Robinson Lake approx. 43.5322°N, 85.8550°W	43.53220	-85.85500	Langlois & Moody; 09/Sep/1926	Dry	1.0	Fish Dept. and Dept. of Conservation	South Branch White River
5771	169974	Lampsilis siliquoidea	Newaygo	White River, E of Aetna, Sec 31, Lincoln Twp approx. 43.5649°N, 85.9019°W	43.56490	-85.90190	Harry & van der Schalie; 23/Aug/1949	Dry	7.0		South Branch White River
3734	89256	Lampsilis siliquoidea	Muskegon	Mona Lake, Muskegon approx. 43.1806°N, 86.2508°W	43.18060	-86.25080	orig. DeCamp Collection;	Dry	2.0	Bryant Walker Collection	Stony Creek-Frontal Lake Michigan
3735	89354	Lampsilis siliquoidea	Muskegon	Mona Lake, Muskegon approx. 43.1806°N, 86.2508°W	43.18060	-86.25080	orig. Frierson Collection;	Dry	1.0	Bryant Walker Collection	Stony Creek-Frontal Lake Michigan
4114	7612	Lampsilis siliquoidea	Oceana	Stony Lake, Shelby approx. 43.5634°N, 86.4687°W	43.56340	-86.46870	Johnson, R. H.; 00/Jul/1903	Dry	3.0		Stony Creek-Frontal Lake Michigan
5754	7602	Lampsilis siliquoidea	Muskegon	Little Black Lake approx. 43.1221°N, 86.2525°W	43.12210	-86.25250	Mather, J.;	Dry	19.0		Stony Creek-Frontal Lake Michigan
5759	89356	Lampsilis siliquoidea	Muskegon	Little Black Lake approx. 43.1221°N, 86.2525°W	43.12210	-86.25250	Kirkland, R. J.;	Dry	4.0	Bryant Walker Collection	Stony Creek-Frontal Lake Michigan
3789	148598	Lampsilis siliquoidea	Muskegon	White Lake approx. 43.3870°N, 86.3770°W	43.38700	-86.37700	Gibbs, L. R.; 00/___/1937	Dry	1.0		White River
3790	87746	Lampsilis siliquoidea	Muskegon	White Lake, Muskegon approx. 43.3917°N, 86.3537°W	43.39170	-86.35370	Streng, L. H.;	Dry	2.0	Bryant Walker Collection	White River
3745	7715	Lasmigona complanata	Muskegon	Muskegon Lake approx. 43.2313°N, 86.2679°W	43.23130	-86.26790	Mather, J.;	Dry	1.0		Muskegon River
3748	105459	Lasmigona complanata	Muskegon	Muskegon Lake approx. 43.2313°N, 86.2679°W	43.23130	-86.26790	Mather, J.;	Dry	2.0	Bryant Walker Collection	Muskegon River
3757	66232	Lasmigona complanata	Muskegon	Muskegon Lake, NW end, at Hartmans Landing approx. 43.2475°N, 86.3185°W	43.24750	-86.31850	Woodberry & Cheatum; 00/___/1936	Dry	1.0	From Institute of Fisheries	Muskegon River
4115	7717	Lasmigona complanata	Oceana	Stony Lake, Shelby approx. 43.5634°N, 86.4687°W	43.56340	-86.46870	Johnson, R. H.; 00/Jul/1903	Dry	1.0		Stony Creek-Frontal Lake Michigan

Appendix C.1. (Continued)

5756	7720	Lasmigona complanata	Muskegon	Little Black Lake approx. 43.1221┬N, 86.2525┬W	43.12210	-86.25250	Adams, C. C.; 21/Aug/1903	Dry	1.0		Stony Creek-Frontal Lake Michigan
5762	105458	Lasmigona complanata	Muskegon	Little Black Lake approx. 43.1221┬N, 86.2525┬W	43.12210	-86.25250	Mather, J.;	Dry	1.0	Bryant Walker Collection	Stony Creek-Frontal Lake Michigan
3791	105454	Lasmigona complanata	Muskegon	White Lake, Muskegon approx. 43.3917┬N, 86.3537┬W	43.39170	-86.35370	Streng, L. H.;	Dry	1.0	Bryant Walker Collection	White River
3816	39571	Lasmigona compressa	Newaygo	Williams Creek approx. 43.4102┬N, 85.9196┬W	43.41020	-85.91960	Langlois & Moody; 03/Sep/1926	Dry	1.0	Fish Dept. and Dept. of Conservation	Brooks Creek-Muskegon River
3831	39607	Lasmigona compressa	Newaygo	Pickerel Lake outlet approx. 43.454879┬N, 85.820258┬W	43.45488	-85.82026	Metzelaar & Langlois; 20/Jul/1926	Dry	1.0	Fish Dept. and Dept. of Conservation	Brooks Creek-Muskegon River
333	41991	Lasmigona compressa	Missaukee	Clam River approx. 44.2640┬N, 85.2572┬W	44.26400	-85.25720	Wood, F. E.; 00/___/1926	Dry	6.0		Clam River
1204	60607	Lasmigona compressa	Clare	Clam River, about 10.0 mi. E of Marion approx. 44.1080┬N, 85.0145┬W	44.10800	-85.01450	van der Schalie, Henry; 07/Aug/1934	Dry	3.0		Clam River
1208	60681	Lasmigona compressa	Clare	West Branch of Clam River, ca. 8.0 mi. E of Marion approx. 44.1219┬N, 85.0261┬W	44.12190	-85.02610	van der Schalie, Henry; 07/Aug/1934	Dry	1.0		Clam River
1283	205745	Lasmigona compressa	Crawford	Au Sable River, 1.0 mi. W of Grayling approx. 44.6600┬N, 84.7365┬W	44.66000	-84.73650	Marsh, Phil; 31/May/1939	Dry	1.0	orig. Marsh Collection	East Branch Au Sable River-Au Sable River
1294	60880	Lasmigona compressa	Crawford	East Branch AuSable River, 6.0 mi. W of Lovells approx. 44.8022┬N, 84.5886┬W	44.80220	-84.58860	Trautman, Marion; 19/Sep/1934	Dry	2.0		East Branch Au Sable River-Au Sable River
3306	60629	Lasmigona compressa	Mecosta	East branch of Little Muskegon River at Mecosta approx. 43.6220┬N, 85.2306┬W	43.62200	-85.23060	van der Schalie, Henry; 09/Aug/1934	Dry	4.0		Little Muskegon River
3697	60631	Lasmigona compressa	Montcalm	Tamarack Creek, at Howard City approx. 43.3971┬N, 85.4623┬W	43.39710	-85.46230	van der Schalie, Henry; 09/Aug/1934	Dry	1.0		Little Muskegon River
4167	104127	Lasmigona compressa	Oscoda	Wolf Creek USGS 44.6605694┬N, 84.1247274┬W	44.66057	-84.12473	Streator, Geo. J.;	Dry	1.0	Bryant Walker Collection	Perry Creek-Au Sable River
4134	53257	Lasmigona compressa	Ogemaw	Rifle River, Churchill Twp approx. 44.2900┬N, 84.0781┬W	44.29000	-84.07810	Dustin, Fred; 00/___/1931	Dry	5.0		Rifle River
4139	41067	Lasmigona compressa	Ogemaw	Devoe Lake approx. 44.3994┬N, 84.0183┬W	44.39940	-84.01830	M. L. W. & C. J.; 00/___/1926	Dry	2.0		Rifle River
4144	166291	Lasmigona compressa	Ogemaw	Rifle River, below dam at De Voe Lake approx. 44.399671┬N, 84.033154┬W	44.39967	-84.03315	van der Schalie, Henry; 07/Oct/1941	Dry	1.0		Rifle River
1444	104112	Lasmigona compressa	Grand Traverse	brook, Walton approx. 44.5208┬N, 85.3994┬W	44.52080	-85.39940	Leach, M. L.;	Dry	2.0	Bryant Walker Collection	Silver Creek-Manistee River
4108	61266	Lasmigona compressa	Oceana	White River, 4.0 mi. SW of Hesperia approx. 43.5305┬N, 86.1145┬W	43.53050	-86.11450	van der Schalie & Stoll; 00/___/1934	Dry	1.0		South Branch White River
5772	169975	Lasmigona compressa	Newaygo	White River, E of Aetna, Sec 31, Lincoln Twp approx. 43.5649┬N, 85.9019┬W	43.56490	-85.90190	Harry & van der Schalie; 23/Aug/1949	Dry	4.0		South Branch White River
5777	170024	Lasmigona compressa	Newaygo	branch White River, Sec 21 and 22, Denver Twp. approx. 43.5828┬N, 85.9796┬W	43.58280	-85.97960	Harry & van der Schalie; 23/Aug/1949	Dry	1.0		South Branch White River
3824	60668	Lasmigona costata	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬N, 85.6719┬W	43.43640	-85.67190	van der Schalie, Henry; 09/Aug/1934	Dry	1.0		Brooks Creek-Muskegon River
1295	60881	Lasmigona costata	Crawford	East Branch AuSable River, 6.0 mi. W of Lovells approx. 44.8022┬N, 84.5886┬W	44.80220	-84.58860	Trautman, Marion; 19/Sep/1934	Dry	3.0		East Branch Au Sable River-Au Sable River

Appendix C.1. (Continued)

3300	60566	Lasmigona costata	Mecosta	Muskegon River, 2.0 mi. below Rodgers dam approx. 43.6119┬ N, 85.5031┬ W	43.61190	-85.50310	van der Schalie, Henry; 08/Aug/1934	Dry	2.0		Hardy Dam Pond-Muskegon River
3314	60602	Lasmigona costata	Mecosta	Muskegon River, at Big Rapids approx. 43.6987┬ N, 85.4768┬ W	43.69870	-85.47680	van der Schalie, Henry; 09/Aug/1934	Dry	2.0		Hardy Dam Pond-Muskegon River
3320	60575	Lasmigona costata	Mecosta	Muskegon River, at fish hatchery above Paris approx. 43.7775┬ N, 85.4953┬ W	43.77750	-85.49530	van der Schalie, Henry; 08/Aug/1934	Dry	3.0		Hardy Dam Pond-Muskegon River
5692	60641	Lasmigona costata	Mecosta	Ryan Creek, ca. 2.0 mi. SE of Big Rapids, on M20 approx. 43.6917┬ N, 85.4567┬ W	43.69170	-85.45670	van der Schalie, Henry; 09/Aug/1934	Dry	1.0		Hardy Dam Pond-Muskegon River
3292	60598	Lasmigona costata	Mecosta	Little Muskegon River, 3.0 mi. SW of Altona approx. 43.5012┬ N, 85.3631┬ W	43.50120	-85.36310	van der Schalie, Henry; 09/Aug/1934	Dry	4.0		Little Muskegon River
3698	60632	Lasmigona costata	Montcalm	Tamarack Creek, at Howard City approx. 43.3971┬ N, 85.4623┬ W	43.39710	-85.46230	van der Schalie, Henry; 09/Aug/1934	Dry	1.0		Little Muskegon River
2663	105378	Lasmigona costata	Lake	Kinney Creek approx. 43.9064┬ N, 85.9413┬ W	43.90640	-85.94130	Walker, Bryant;	Dry	1.0	Bryant Walker Collection	Pere Marquette River
4109	61267	Lasmigona costata	Oceana	White River, 4.0 mi. SW of Hesperia approx. 43.5305┬ N, 86.1145┬ W	43.53050	-86.11450	van der Schalie & Stoll; 00/___/1934	Dry	2.0		South Branch White River
5773	169976	Lasmigona costata	Newaygo	White River, E of Aetna, Sec 31, Lincoln Twp approx. 43.5649┬ N, 85.9019┬ W	43.56490	-85.90190	Harry & van der Schalie; 23/Aug/1949	Dry	4.0		South Branch White River
3746	82964	Leptodea fragilis	Muskegon	Muskegon Lake approx. 43.2313┬ N, 86.2679┬ W	43.23130	-86.26790	Leach, M. L.;	Dry	3.0	Bryant Walker Collection	Muskegon River
3755	66230	Leptodea fragilis	Muskegon	Muskegon Lake, NW end, at Hartmans Landing approx. 43.2475┬ N, 86.3185┬ W	43.24750	-86.31850	Woodberry & Cheatum; 00/___/1936	Dry	2.0	Institute of Fisheries Research	Muskegon River
3763	183398	Leptodea fragilis	Muskegon	Muskegon Lake, north shore approx. 43.2568┬ N, 86.2650┬ W	43.25680	-86.26500	Hayden, E.P. Jr.; 07/Jul/1950	Dry	1.0		Muskegon River
3774	82975	Leptodea fragilis	Muskegon	Bear Lake approx. 43.2575┬ N, 76.2814┬ W	43.25750	-86.28140	Mather, J.;	Dry	1.0	Bryant Walker Collection	Muskegon River
2095	82983	Leptodea fragilis	Iosco	Van Etten Lake, Oscoda approx. 44.4498┬ N, 83.3371┬ W	44.44980	-83.33710	Goodrich, Calvin;	Dry	5.0	Bryant Walker Collection	Pine River
4123	55871	Leptodea fragilis	Oceana	Morris Lake approx. 43.659689┬ N, 86.437913┬ W	43.65969	-86.43791	Inst. Fish Research; 00/___/1932	Dry	1.0		Stony Creek-Frontal Lake Michigan
2108	247173	Ligumia nasuta	Iosco	Cedar Lake, near Oscoda approx. 44.4834┬ N, 83.3355┬ W	44.48340	-83.33550	King, C. B.; 00/Jun/1953	Dry	1.0		Black River-Frontal Lake Huron
2104	86153	Ligumia nasuta	Iosco	Van Etten Lake approx. 44.457896┬ N, 83.349916┬ W	44.45790	-83.34992	Goodrich, Calvin;	Dry	2.0	Bryant Walker Collection	Pine River
398	44995	Ligumia recta	Muskegon	Muskegon River, Brooks Twp approx. 43.4068┬ N, 85.7178┬ W	43.40680	-85.71780	Hinsdale, W.; 00/Aug/1928	Dry	1.5		Brooks Creek-Muskegon River
3806	60533	Ligumia recta	Newaygo	Muskegon River, 3.0 mi. W of Newaygo, 2.0 mi. S of M82 approx. 43.3883┬ N, 85.8633┬ W	43.38830	-85.86330	van der Schalie, Henry; 09/Aug/1934	Dry	2.0		Brooks Creek-Muskegon River
3825	60669	Ligumia recta	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬ N, 85.6719┬ W	43.43640	-85.67190	van der Schalie, Henry; 09/Aug/1934	Dry	4.0		Brooks Creek-Muskegon River
3830	50138	Ligumia recta	Newaygo	Muskegon River, near Croton approx. 43.4386┬ N, 85.6669┬ W	43.43860	-85.66690	Hinsdale, W.; 00/___/1930	Dry	2.0		Brooks Creek-Muskegon River
3301	60567	Ligumia recta	Mecosta	Muskegon River, 2.0 mi. below Rodgers dam approx. 43.6119┬ N, 85.5031┬ W	43.61190	-85.50310	van der Schalie, Henry; 08/Aug/1934	Dry	7.0		Hardy Dam Pond-Muskegon River
3321	60576	Ligumia recta	Mecosta	Muskegon River, at fish hatchery above Paris approx. 43.7775┬ N, 85.4953┬ W	43.77750	-85.49530	van der Schalie, Henry; 08/Aug/1934	Dry	3.0		Hardy Dam Pond-Muskegon River

Appendix C.1. (Continued)

393	7634	Ligumia recta	Muskegon	Cedar Creek approx. 43.2731┬N, 86.1786┬W	43.27310	-86.17860	Mather, J.;	Dry	1.0		Muskegon River
3756	66231	Ligumia recta	Muskegon	Muskegon Lake, NW end, at Hartmans Landing approx. 43.2475┬N, 86.3185┬W	43.24750	-86.31850	Woodberry & Cheatum; 00/___/1936	Dry	1.0	from Institute of Fisheries Research	Muskegon River
3796	60591	Pleurobema sintoxia	Newaygo	Muskegon River, at Bridgeton approx. 43.3489┬N, 85.9422┬W	43.34890	-85.94220	van der Schalie, Henry; 09/Aug/1934	Dry	1.0		Brooks Creek-Muskegon River
3807	60534	Pleurobema sintoxia	Newaygo	Muskegon River, 3.0 mi. W of Newaygo, 2.0 mi. S of M82 approx. 43.3883┬N, 85.8633┬W	43.38830	-85.86330	van der Schalie, Henry; 09/Aug/1934	Dry	1.0		Brooks Creek-Muskegon River
3826	60670	Pleurobema sintoxia	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬N, 85.6719┬W	43.43640	-85.67190	van der Schalie, Henry; 09/Aug/1934	Dry	1.0		Brooks Creek-Muskegon River
3302	60568	Pleurobema sintoxia	Mecosta	Muskegon River, 2.0 mi. below Rodgers dam approx. 43.6119┬N, 85.5031┬W	43.61190	-85.50310	van der Schalie, Henry; 08/Aug/1934	Dry	1.0		Hardy Dam Pond-Muskegon River
5694	60643	Pleurobema sintoxia	Mecosta	Ryan Creek, ca. 2.0 mi. SE of Big Rapids, on M20 approx. 43.6917┬N, 85.4567┬W	43.69170	-85.45670	van der Schalie, Henry; 09/Aug/1934	Dry	6.0		Hardy Dam Pond-Muskegon River
3797	60592	Potamilus alatus	Newaygo	Muskegon River, at Bridgeton approx. 43.3489┬N, 85.9422┬W	43.34890	-85.94220	van der Schalie, Henry; 09/Aug/1934	Dry	1.0		Brooks Creek-Muskegon River
3741	7653	Potamilus alatus	Muskegon	Muskegon Lake approx. 43.2313┬N, 86.2679┬W	43.23130	-86.26790	Mather, J.;	Dry	2.0		Muskegon River
3742	7655	Potamilus alatus	Muskegon	Muskegon Lake approx. 43.2313┬N, 86.2679┬W	43.23130	-86.26790	Mather, J.;	Dry	2.0		Muskegon River
3749	107916	Potamilus alatus	Muskegon	Muskegon Lake approx. 43.2313┬N, 86.2679┬W	43.23130	-86.26790	Leach, M. L.;	Dry	3.0	Bryant Walker Collection	Muskegon River
3754	66229	Potamilus alatus	Muskegon	Muskegon Lake, NW end, at Hartmans Landing approx. 43.2475┬N, 86.3185┬W	43.24750	-86.31850	Woodberry & Cheatum; 00/___/1936	Dry	1.0	From Institute of Fisheries Research	Muskegon River
3766	7652	Potamilus alatus	Muskegon	Bear Lake approx. 43.2575┬N, 76.2814┬W	43.25750	-86.28140	Mather, J.;	Dry	2.0		Muskegon River
3767	7654	Potamilus alatus	Muskegon	Bear Lake approx. 43.2575┬N, 76.2814┬W	43.25750	-86.28140	Mather, J.;	Dry	2.0		Muskegon River
3782	107921	Potamilus alatus	Muskegon	Bear Lake approx. 43.2575┬N, 76.2814┬W	43.25750	-86.28140	Mather, J.;	Dry	1.0	Bryant Walker Collection	Muskegon River
4248	107922	Potamilus alatus	Ottawa	Black Lake [Lake Macatawa] approx. 43.1259┬N, 86.2529┬W	43.12590	-86.25290	orig. DeCamp Collection;	Dry	2.0	Bryant Walker Collection	Stony Creek-Frontal Lake Michigan
5838	171456	Potamilus ohiensis	Oceana	E shore Pentwater Lake, Sec 23, Pentwater Twp approx. 43.7738┬N, 86.4203┬W	43.77380	-86.42030	van der Schalie & H.H.; 23/Aug/1949	Dry	1.0		Pentwater River
2094	128520	Pyganodon grandis	Iosco	Au Sable River, 11.0 mi above Oscoda approx. 44.432841┬N, 83.346504┬W	44.43284	-83.34650	Miss Thompson; 00/Jul/1937	Dry	5.0		Au Sable River
3248	54684	Pyganodon grandis	Manistee	Bear Lake outlet approx. 44.44183┬N, 86.133376┬W	44.44183	-86.13338	Nelson, C. D.;	Dry	1.0		Bear Creek
315	55339	Pyganodon grandis	Mason	Hamlin Lake USGS 44.0677817┬N, 86.4592518┬W	44.06778	-86.45925	Ashley, L.; 00/___/1932	Dry	3.0		Big Sable River
2668	103339	Pyganodon grandis	Lake	Sauble Lake approx. 44.06806┬N, 85.95361┬W	44.06806	-85.95361	orig. Goodrich, C.;	Dry	2.0	Bryant Walker Collection	Big Sable River
2670	103338	Pyganodon grandis	Lake	Bass Lake approx. 44.0832┬N, 85.9759┬W	44.08320	-85.97590	orig. Goodrich, C.;	Dry	5.0	Bryant Walker Collection	Big Sable River
403	39621	Pyganodon grandis	Newaygo	Beaver Creek approx. 43.698347┬N, 85.953223┬W	43.69835	-85.95322	Langlois & Moody; 22/Jul/1926	Dry	1.0	From Fish Dept. and Dept. of Conservation	Big South Branch Pere Marquette River

Appendix C.1. (Continued)

3841	39567	Pyganodon grandis	Newaygo	Nichols Lake, north shore approx. 43.729878°N, 85.906805°W	43.72988	-85.90681	Langlois & Moody; 19/Aug/1926	Dry	2.0	Collected by the Fish Dept. and the Dept. of Conservation	Big South Branch Pere Marquette River
719	103349	Pyganodon grandis	Alcona	Lake Huron, S of Black River approx. 44.8156°N, 83.2997°W	44.81560	-83.29970	orig. Goodrich, C.;	Dry	3.0	Bryant Walker Collection	Black River-Frontal Lake Huron
2111	103348	Pyganodon grandis	Iosco	Cedar Lake, 15 mi. N of Oscoda approx. 44.563257°N, 83.324895°W	44.56326	-83.32490	orig. Goodrich, C.;	Dry	6.0	Bryant Walker Collection	Black River-Frontal Lake Huron
5324	38948	Pyganodon grandis		Zim Lake, near Alpena approx. 45.068705°N, 83.542674°W	45.06871	-83.54267	Hubbs & Jones; 09/Sep/1925	Dry	1.0	from the Fish Dept. & the Dept. of Conservation	Black River-Frontal Lake Huron
3794	60589	Pyganodon grandis	Newaygo	Muskegon River, at Bridgeton approx. 43.3489°N, 85.9422°W	43.34890	-85.94220	van der Schalie, Henry;	Dry	1.0		Brooks Creek-Muskegon River
3799	103307	Pyganodon grandis	Newaygo	Hess Lake approx. 43.3845°N, 85.7711°W	43.38450	-85.77110	orig. DeCamp Collection;	Dry	5.0	Bryant Walker Collection	Brooks Creek-Muskegon River
3800	60527	Pyganodon grandis	Newaygo	Muskegon River, 3.0 mi W of Newaygo, 2.0 mi S of M 82 approx. 43.385226°N, 85.85928°W	43.38523	-85.85928	van der Schalie, Henry; 09/Aug/1934	Dry	2.0		Brooks Creek-Muskegon River
3813	103298	Pyganodon grandis	Newaygo	Brooks Lake approx. 43.400165°N, 85.751034°W	43.40017	-85.75103	orig. DeCamp Collection;	Dry	4.0	Bryant Walker Collection	Brooks Creek-Muskegon River
3818	60662	Pyganodon grandis	Newaygo	Muskegon River, below Croton dam approx. 43.4364°N, 85.6719°W	43.43640	-85.67190	van der Schalie, Henry; 09/Aug/1934	Dry	1.0		Brooks Creek-Muskegon River
3833	39620	Pyganodon grandis	Newaygo	Pickerel Lake outlet approx. 43.454879°N, 85.820258°W	43.45488	-85.82026	Langlois & Moody; 20/Jul/1926	Dry	1.0	From Fish Dept. and Dept. of Conservation	Brooks Creek-Muskegon River
3834	39566	Pyganodon grandis	Newaygo	Pickerel Lake approx. 43.456201°N, 85.808597°W	43.45620	-85.80860	Langlois & Moody; 25/Aug/1926	Dry	1.0	Collected by the Fish Dept. and the Dept. of Conservation	Brooks Creek-Muskegon River
5766	39582	Pyganodon grandis	Newaygo	Blanch Lake approx. 43.3398°N, 85.8024°W	43.33980	-85.80240	Langlois & Moody; 16/Sep/1926	Dry	3.0	from the Fish Dept. & the Dept. of Conservation	Brooks Creek-Muskegon River
3416	170015	Pyganodon grandis	Missaukee	N shore Lake Missaukee, Sec 10, Lake Twp. approx. 44.3213°N, 85.2599°W	44.32130	-85.25990	Harry & van der Schalie; 29/Aug/1949	Dry	6.0		Clam River
3417	41140	Pyganodon grandis	Missaukee	Crooked Lake approx. 44.330848°N, 85.286555°W	44.33085	-85.28656	Wood, F. E.; 25/Jul/1926	Dry	6.0	Det. Goodrich	Clam River
3418	41992	Pyganodon grandis	Missaukee	Crooked Lake approx. 44.330848°N, 85.286555°W	44.33085	-85.28656	Wood, F. E.; 00/___/1926	Dry	1.0		Clam River
3419	41993	Pyganodon grandis	Missaukee	Crooked Lake approx. 44.330848°N, 85.286555°W	44.33085	-85.28656	Wood, F. E.; 00/___/1926	Dry	1.0		Clam River
5305	133132	Pyganodon grandis	Wex	canal between Mitchell and Cadillac Lakes approx. 44.2395°N, 85.4555°W	44.23950	-85.45550	unknown; 00/___/1938	Dry	3.0		Clam River
5308	170141	Pyganodon grandis	Wexford	south shore Lake Mitchell, Sec 12, Grove Twp approx. 44.230327°N, 85.471918°W	44.23033	-85.47192	Harry & van der Schalie; 24/Aug/1949	Dry	1.0		Clam River
5310	103254	Pyganodon grandis	Wexford	Clam [Mitchell] Lake USGS 44.2478°N, 85.4931°W	44.24780	-85.49310	Walker, Bryant;	Dry	2.0	Bryant Walker Collection	Clam River
5311	103322	Pyganodon grandis	Wexford	Clam [Mitchell] Lake USGS 44.2478°N, 85.4931°W	44.24780	-85.49310	Davis, C. A.;	Dry	3.0	Bryant Walker Collection	Clam River
6118	171462	Pyganodon grandis	Wexford	N shore Lake Mitchell, Sec 26, Selma Twp. approx. 44.2684°N, 85.4812°W	44.26840	-85.48120	van der Schalie & H.H.; 25/Aug/1949	Dry	5.0		Clam River

Appendix C.1. (Continued)

5867	39644	Pyganodon grandis	Otsego	Little Bradford Lake, Au Sable drainage approx. 44.8802┬N, 84.7017┬W	44.88020	-84.70170	Metzelaar & Langlois; 29/Sep/1925	Dry	3.0	from the Fish Dept. & the Dept. of Conservation	East Branch Au Sable River-Au Sable River
318	60561	Pyganodon grandis	Mecosta	Muskegon River, 2.0 mi below Roger's dam approx. 43.585045┬N, 85.512709┬W	43.58505	-85.51271	van der Schalie, Henry; 08/Aug/1934	Dry	0.5		Hardy Dam Pond-Muskegon River
320	39589	Pyganodon grandis	Mecosta	Paris Creek trib, Green Twp approx. 43.778945┬N, 85.530976┬W	43.77895	-85.53098	Metzelaar; 14/May/1926	Dry	1.0	From Fish Dept. and Dept. of Conservation	Hardy Dam Pond-Muskegon River
3284	103309	Pyganodon grandis	Mason	Lincoln Lake, Ludington approx. 43.977396┬N, 86.449923┬W	43.97740	-86.44992	orig. DeCamp Collection;	Dry	3.0	Bryant Walker Collection	Lincoln River
3285	103732	Pyganodon grandis	Mason	Lincoln Lake, Ludington approx. 43.977396┬N, 86.449923┬W	43.97740	-86.44992	orig. Andrews Collection;	Dry	1.0	Bryant Walker Collection	Lincoln River
3286	4344	Pyganodon grandis	Mason	Lincoln Lake, Ludington approx. 43.9780┬N, 86.4593┬W	43.97800	-86.45930	De Camp, W. H.;	Dry	2.0		Lincoln River
3699	103300	Pyganodon grandis	Montcalm	Howard City approx. 43.3972┬N, 85.4622┬W	43.39720	-85.46220	orig. DeCamp Collection;	Dry	4.0	Bryant Walker Collection	Little Muskegon River
5749	103306	Pyganodon grandis	Montcalm	Little Whitefish Lake approx. 43.3586┬N, 85.5405┬W	43.35860	-85.54050	orig. DeCamp Collection;	Dry	3.0	Bryant Walker Collection	Little Muskegon River
709	39625	Pyganodon grandis	Alcona	Hubbard Lake approx. 44.8082┬N, 83.5884┬W	44.80820	-83.58840	Langlois, T. H.; 20/Aug/1925	Dry	1.0	Fish Dept. and Dept. of Conservation	Lower South Branch Thunder Bay River
712	66657	Pyganodon grandis	Alcona	Hubbard Lake approx. 44.8082┬N, 83.5884┬W	44.80820	-83.58840	Cooper, G. P.; 00/___/1934	Dry	2.0		Lower South Branch Thunder Bay River
716	103352	Pyganodon grandis	Alcona	Hubbard Lake approx. 44.8082┬N, 83.5884┬W	44.80820	-83.58840	orig. Goodrich, C.;	Dry	1.5	Bryant Walker Collection	Lower South Branch Thunder Bay River
5329	39641	Pyganodon grandis	Alcona	Lost Lake, Sucker Creek drainage approx. 44.7956┬N, 83.4571┬W	44.79560	-83.45710	Hubbs & Jones; 25/Aug/1925	Dry	2.0	from the Fish Dept. & the Dept. of Conservation	Lower South Branch Thunder Bay River
3744	7689	Pyganodon grandis	Muskegon	Muskegon Lake approx. 43.2313┬N, 86.2679┬W	43.23130	-86.26790	Mather, J.;	Dry	2.0		Muskegon River
3752	103730	Pyganodon grandis	Muskegon	Muskegon Lake, Muskegon approx. 43.240118┬N, 86.257797┬W	43.24012	-86.25780	Mathers, J.L.;	Dry	3.0	Bryant Walker Collection	Muskegon River
3760	66235	Pyganodon grandis	Muskegon	Muskegon Lake, NW end, at Hartmans Landing approx. 43.2475┬N, 86.3185┬W	43.24750	-86.31850	Woodberry & Cheatum; 00/___/1936	Dry	1.0	from Institute of Fisheries research	Muskegon River
3770	7684	Pyganodon grandis	Muskegon	Bear Lake approx. 43.2575┬N, 76.2814┬W	43.25750	-86.28140	Mathers, J.L.;	Dry	1.0	Det. Walker	Muskegon River
3771	7690	Pyganodon grandis	Muskegon	Bear Lake approx. 43.2575┬N, 76.2814┬W	43.25750	-86.28140	Mather, J.;	Dry	3.0		Muskegon River
3779	103320	Pyganodon grandis	Muskegon	Bear Lake approx. 43.2575┬N, 76.2814┬W	43.25750	-86.28140	Mathers, J.L.;	Dry	1.0	Bryant Walker Collection	Muskegon River
3780	103809	Pyganodon grandis	Muskegon	Bear Lake approx. 43.2575┬N, 76.2814┬W	43.25750	-86.28140	Mather, J.;	Dry	5.0	Bryant Walker Collection	Muskegon River
5835	171453	Pyganodon grandis	Oceana	E shore Pentwater Lake, Sec 23, Pentwater Twp approx. 43.7738┬N, 86.4203┬W	43.77380	-86.42030	van der Schalie & H.H.; 23/Aug/1949	Dry	8.0		Pentwater River
314	54683	Pyganodon grandis	Mason	Small Lake W of Baldwin approx. 43.900947┬N, 85.880903┬W	43.90095	-85.88090	Nelson, C. D.;	Dry	3.0		Pere Marquette River
2661	103257	Pyganodon grandis	Lake	Long Lake, Idlewild approx. 43.8914┬N, 85.8017┬W	43.89140	-85.80170	Walker, Bryant;	Dry	10.0	Bryant Walker Collection	Pere Marquette River
3282	103755	Pyganodon grandis	Mason	Ludington USGS 43.9552826┬N, 86.4525831┬W	43.95528	-86.45258	Streng, L. H.;	Dry	1.0	Bryant Walker Collection	Pere Marquette River

Appendix C.1. (Continued)

5685	169938	Pyganodon grandis	Mason	Emerson Lake, along US 10 approx. 43.9460°N, 86.0863°W	43.94600	-86.08630	van der Schalie & H.H.; 24/Aug/1949	Dry	1.0		Pere Marquette River
2098	103350	Pyganodon grandis	Iosco	Van Etten Lake, Oscoda approx. 44.4498°N, 83.3371°W	44.44980	-83.33710	orig. Goodrich, C.;	Dry	8.0	Bryant Walker Collection	Pine River
4136	132818	Pyganodon grandis	Ogemaw	Peach Lake approx. 44.2917°N, 84.1653°W	44.29170	-84.16530	J. F. R.; 28/Jun/1938	Dry	1.0	Bryant Walker Collection	Rifle River
4141	41112	Pyganodon grandis	Ogemaw	Devoe Lake approx. 44.3994°N, 84.0183°W	44.39940	-84.01830	M. L. W. & C. J.; 00/___/1926	Dry	3.0		Rifle River
4143	166254	Pyganodon grandis	Ogemaw	De Voe Lake, headwaters Rifle River approx. 44.399669°N, 84.032995°W	44.39967	-84.03300	van der Schalie, Henry; 06/Oct/1946	Dry	6.0		Rifle River
4145	166299	Pyganodon grandis	Ogemaw	Rifle River, below dam at De Voe Lake approx. 44.399671°N, 84.033154°W	44.39967	-84.03315	van der Schalie, Henry; 07/Oct/1946	Dry	11.0		Rifle River
1442	103272	Pyganodon grandis	Grand Traverse	Norris Mill Pond, Traverse City USGS 44.4547°N, 85.3714°W	44.45470	-85.37140	Leach, M. L.;	Dry	5.0	Bryant Walker Collection	Silver Creek-Manistee River
1443	103696	Pyganodon grandis	Grand Traverse	Moore's Mill pond, near Traverse City USGS 44.4547°N, 85.3714°W	44.45470	-85.37140	Clench, W. J.;	Dry	2.0	Bryant Walker Collection	Silver Creek-Manistee River
5400	170016	Pyganodon grandis	Grand Traverse	Fife Lake, at village of Fife Lake approx. 44.5754°N, 85.3487°W	44.57540	-85.34870	Harry & van der Schalie; 30/Aug/1949	Dry	1.0		Silver Creek-Manistee River
3838	39584	Pyganodon grandis	Newaygo	Robinson Lake approx. 43.5322°N, 85.8550°W	43.53220	-85.85500	Langlois & Moody; 10/Sep/1926	Dry	1.0	Collected by the Fish Dept. and the Dept. of Conservation	South Branch White River
5768	169971	Pyganodon grandis	Newaygo	White River, E of Aetna, Sec 31, Lincoln Twp approx. 43.5649°N, 85.9019°W	43.56490	-85.90190	Harry & van der Schalie; 23/Aug/1949	Dry	3.0		South Branch White River
3737	103302	Pyganodon grandis	Muskegon	Mona Lake, Muskegon approx. 43.1806°N, 86.2508°W	43.18060	-86.25080	orig. DeCamp Collection;	Dry	8.5	Bryant Walker Collection	Stony Creek-Frontal Lake Michigan
3738	103812	Pyganodon grandis	Muskegon	Mona Lake, Muskegon approx. 43.1806°N, 86.2508°W	43.18060	-86.25080	Leach, M. L.;	Dry	7.0	Bryant Walker Collection	Stony Creek-Frontal Lake Michigan
4112	39623	Pyganodon grandis	Oceana	Stony Lake outlet approx. 43.559398°N, 86.496484°W	43.55940	-86.49648	Metzelaar; 14/Apr/1926	Dry	1.0	From Fish Dept. and Dept. of Conservation	Stony Creek-Frontal Lake Michigan
4113	7693	Pyganodon grandis	Oceana	Stony Lake approx. 43.5605°N, 86.4798°W	43.56050	-86.47980	Johnson, Richard; 00/Jul/1903	Dry	2.5		Stony Creek-Frontal Lake Michigan
4118	7697	Pyganodon grandis	Oceana	Sable Lake, Shelby approx. 43.6086194°N, 86.3639633°W	43.60862	-86.36396	Johnson, Richard;	Dry	1.0		Stony Creek-Frontal Lake Michigan
4119	55867	Pyganodon grandis	Oceana	Morris Lake approx. 43.659689°N, 86.437913°W	43.65969	-86.43791	I.F.R.; 00/___/1932	Dry	1.0		Stony Creek-Frontal Lake Michigan
4120	55868	Pyganodon grandis	Oceana	Morris Lake approx. 43.659689°N, 86.437913°W	43.65969	-86.43791	Inst. Fish Research; 00/___/1932	Dry	1.0		Stony Creek-Frontal Lake Michigan
5755	7691	Pyganodon grandis	Muskegon	Little Black Lake approx. 43.1221°N, 86.2525°W	43.12210	-86.25250	Mather, J.;	Dry	2.0		Stony Creek-Frontal Lake Michigan
5764	169934	Pyganodon grandis	Muskegon	Sand Creek, Sec 6, Manistee Twp. approx. 43.4604°N, 86.2594°W	43.46040	-86.25940	van der Schalie & H.H.; 22/Aug/1949	Dry	3.0		White River
3247	103595	Strophitus undulatus	Manistee	Bear Lake approx. 44.423438°N, 86.150536°W	44.42344	-86.15054	Bessey, E. A.;	Dry	11.0	Bryant Walker Collection	Bear Creek
5672	170031	Strophitus undulatus	Manistee	N shore Bear Lake, Pleasanton Twp., Sec 32 approx. 44.4417°N, 86.1528°W	44.44170	-86.15280	Harry & van der Schalie; 25/Aug/1949	Dry	1.0		Bear Creek
2665	103591	Strophitus undulatus	Lake	Sable Lake approx. 44.018074°N, 86.033908°W	44.01807	-86.03391	Goodrich, Calvin;	Dry	1.0	Bryant Walker Collection	Big Sable River
2666	103590	Strophitus undulatus	Lake	Loon Lake approx. 44.066545°N, 85.975813°W	44.06655	-85.97581	Goodrich, Calvin;	Dry	2.0	Bryant Walker Collection	Big Sable River

Appendix C.1. (Continued)

2669	103589	Strophitus undulatus	Lake	Big Bass Lake approx. 44.082107┬ N, 85.976295┬ W	44.08211	-85.97630	Goodrich, Calvin;	Dry	6.0	Bryant Walker Collection	Big Sable River
404	39613	Strophitus undulatus	Newaygo	Big South Branch of Pere Marquette River approx. 43.7550┬ N, 85.9746┬ W	43.75500	-85.97460	Langlois & Moody; 22/Jul/1926	Dry	1.0	Fish Depart. and Depart. of Conservation	Big South Branch Pere Marquette River
2110	103635	Strophitus undulatus	Iosco	Cedar Lake, 15.0 mi. N of Oscoda approx. 44.504121┬ N, 83.335482┬ W	44.50412	-83.33548	Goodrich, Calvin;	Dry	1.0	Bryant Walker Collection	Black River-Frontal Lake Huron
3798	60593	Strophitus undulatus	Newaygo	Muskegon River, at Bridgeton approx. 43.3489┬ N, 85.9422┬ W	43.34890	-85.94220	van der Schalie, Henry; 09/Aug/1934	Dry	1.0		Brooks Creek-Muskegon River
3808	60535	Strophitus undulatus	Newaygo	Muskegon River, 3.0 mi. W of Newaygo, 2.0 mi. S of M82 approx. 43.3883┬ N, 85.8633┬ W	43.38830	-85.86330	van der Schalie, Henry; 09/Aug/1934	Dry	17.0		Brooks Creek-Muskegon River
3812	74976	Strophitus undulatus	Newaygo	Brooks Lake approx. 43.400165┬ N, 85.751034┬ W	43.40017	-85.75103	orig. DeCamp Collection;	Dry	1.0	Bryant Walker Collection	Brooks Creek-Muskegon River
3814	103563	Strophitus undulatus	Newaygo	Brooks Lake approx. 43.400165┬ N, 85.751034┬ W	43.40017	-85.75103	orig. DeCamp Collection;	Dry	5.0	Bryant Walker Collection	Brooks Creek-Muskegon River
3815	103633	Strophitus undulatus	Newaygo	Brooks Lake approx. 43.400165┬ N, 85.751034┬ W	43.40017	-85.75103	orig. DeCamp Collection;	Dry	1.0	Bryant Walker Collection	Brooks Creek-Muskegon River
3827	60671	Strophitus undulatus	Newaygo	Muskegon River, below Croton dam approx. 43.4364┬ N, 85.6719┬ W	43.43640	-85.67190	unknown; 09/Aug/1934	Dry	47.0		Brooks Creek-Muskegon River
1203	60608	Strophitus undulatus	Clare	Clam River, ca. 10 mi. E of Marion approx. 44.1006┬ N, 85.0133┬ W	44.10060	-85.01330	van der Schalie, Henry; 07/Aug/1934	Dry	4.5		Clam River
5713	170014	Strophitus undulatus	Missaukee	S shore Lake Missaukee, Sec 10, Lake Twp. approx. 44.3210┬ N, 85.2597┬ W	44.32100	-85.25970	Harry & van der Schalie; 29/Aug/1949	Dry	8.0		Clam River
116	103550	Strophitus undulatus	Crawford	School Section Lake, Grayling approx. 44.6614┬ N, 84.7147┬ W	44.66140	-84.71470	Leach, M. L.;	Dry	3.0	Bryant Walker Collection	East Branch Au Sable River-Au Sable River
1286	103643	Strophitus undulatus	Crawford	Grayling USGS 44.6614┬ N, 84.7145┬ W	44.66140	-84.71450	orig. Frierson Collection;	Dry	1.0	Bryant Walker Collection	East Branch Au Sable River-Au Sable River
1289	54959	Strophitus undulatus	Crawford	Jones Lake approx. 44.7842┬ N, 84.5933┬ W	44.78420	-84.59330	Wood, Norman A.; 29/May/1932	Dry	3.0		East Branch Au Sable River-Au Sable River
1296	60882	Strophitus undulatus	Crawford	East Branch AuSable River, 6.0 mi. W of Lovells approx. 44.8022┬ N, 84.5886┬ W	44.80220	-84.58860	Trautman, Marion; 19/Aug/1934	Dry	2.0		East Branch Au Sable River-Au Sable River
3303	60569	Strophitus undulatus	Mecosta	Muskegon River, 2.0 mi. below Rodgers dam approx. 43.6119┬ N, 85.5031┬ W	43.61190	-85.50310	van der Schalie, Henry; 08/Aug/1934	Dry	5.0		Hardy Dam Pond-Muskegon River
3313	60603	Strophitus undulatus	Mecosta	Muskegon River, at Big Rapids approx. 43.6978┬ N, 85.4761┬ W	43.69780	-85.47610	unknown; 08/Aug/1934	Dry	1.0		Hardy Dam Pond-Muskegon River
3322	60577	Strophitus undulatus	Mecosta	Muskegon River, at fish hatchery above Paris approx. 43.7775┬ N, 85.4953┬ W	43.77750	-85.49530	van der Schalie, Henry; 08/Aug/1934	Dry	12.0		Hardy Dam Pond-Muskegon River
5695	60644	Strophitus undulatus	Mecosta	Ryan Creek, ca. 2.0 mi. SE of Big Rapids, on M20 approx. 43.6917┬ N, 85.4567┬ W	43.69170	-85.45670	van der Schalie, Henry; 09/Aug/1934	Dry	5.0		Hardy Dam Pond-Muskegon River
3293	60599	Strophitus undulatus	Mecosta	Little Muskegon River, 3.0 mi. SW of Altona approx. 43.5012┬ N, 85.3631┬ W	43.50120	-85.36310	van der Schalie, Henry; 09/Aug/1934	Dry	4.0		Little Muskegon River
3308	156646	Strophitus undulatus	Mecosta	Horsehead Lake, Station # 6 approx. 43.6785┬ N, 85.2629┬ W	43.67850	-85.26290	Fink; 23/Aug/1941	Dry	1.0		Little Muskegon River
713	66658	Strophitus undulatus	Alcona	Hubbard Lake approx. 44.8082┬ N, 83.5884┬ W	44.80820	-83.58840	Cooper, G. P.; 00/___/1934	Dry	1.0		Lower South Branch Thunder Bay River
714	75004	Strophitus undulatus	Alcona	Hubbard Lake approx. 44.8082┬ N, 83.5884┬ W	44.80820	-83.58840	Goodrich, Calvin;	Dry	1.0	Bryant Walker Collection	Lower South Branch Thunder Bay River

Appendix C.1. (Continued)

392	103642	Strophitus undulatus	Muskegon	Ruddiniano Creek approx. 43.2117┬N, 86.2784┬W	43.21170	-86.27840	orig. Frierson Collection;	Dry	1.0	Bryant Walker Collection	Muskegon River
3761	103561	Strophitus undulatus	Muskegon	Wolf Lake approx. 43.2561┬N, 86.1085┬W	43.25610	-86.10850	Kirkland, R. J.;	Dry	2.0	Bryant Walker Collection	Muskegon River
3788	60635	Strophitus undulatus	Muskegon	Muskegon River, ca. 10 mi. NE of Muskegon, county line road approx. 43.3150┬N, 86.0478┬W	43.31500	-86.04780	van der Schalie, Henry; 09/Aug/1934	Dry	1.0		Muskegon River
2664	201242	Strophitus undulatus	Lake	Wolf Lake USGS 44.0025098┬N, 85.8528418┬W	44.00251	-85.85284	Taube, C. M.; 09/Sep/1959	Dry	1.0		Pere Marquette River
3281	103631	Strophitus undulatus	Mason	Ludington USGS 43.9552826┬N, 86.4525831┬W	43.95528	-86.45258	orig. DeCamp Collection;	Dry	1.0	Bryant Walker Collection	Pere Marquette River
5306	74943	Strophitus undulatus	Wexford	Clam Lake approx. 44.2100┬N, 85.3925┬W	44.21000	-85.39250	Walker, Bryant;	Dry	3.0	Bryant Walker Collection	Pine River
4138	51996	Strophitus undulatus	Ogemaw	Rifle River, Cumming Twp approx. 44.3923┬N, 84.0378┬W	44.39230	-84.03780	Hubbs, Carl L.; 00/___/1931	Dry	2.0		Rifle River
4146	166300	Strophitus undulatus	Ogemaw	Rifle River, below dam at De Voe Lake approx. 44.399671┬N, 84.033154┬W	44.39967	-84.03315	van der Schalie, Henry; 07/Oct/1946	Dry	4.0		Rifle River
5839	132821	Strophitus undulatus	Ogemaw	Henderson Lake approx. 44.3395┬N, 84.0048┬W	44.33950	-84.00480	I.F.R.; 11/Jul/1938	Dry	1.0		Rifle River
5841	166289	Strophitus undulatus	Ogemaw	Spring Lake [Grebe Lake], headwaters Rifle River approx. 44.4040┬N, 84.0077┬W	44.40400	-84.00770	van der Schalie, Henry; 06/Oct/1946	Dry	6.0		Rifle River
3811	39587	Strophitus undulatus	Newaygo	Bills Lake approx. 43.3956┬N, 85.6675┬W	43.39560	-85.66750	Langlois & Moody; 17/Sep/1926	Dry	1.0	Fish Depart. and Depart. of Conservation	Rogue River
5401	170017	Strophitus undulatus	Grand Traverse	Fife Lake, at village of Fife Lake approx. 44.5754┬N, 85.3487┬W	44.57540	-85.34870	Harry & van der Schalie; 30/Aug/1949	Dry	1.0		Silver Creek-Manistee River
5404	170020	Strophitus undulatus	Grand Traverse	Fife Lake, at village of Fife Lake approx. 44.5754┬N, 85.3487┬W	44.57540	-85.34870	van der Schalie & H.H.; 30/Aug/1949	Dry	1.0		Silver Creek-Manistee River
4110	61268	Strophitus undulatus	Oceana	White River, 4.0 mi. SW of Hesperia approx. 43.5305┬N, 86.1145┬W	43.53050	-86.11450	van der Schalie & Stoll; 00/___/1934	Dry	15.0		South Branch White River
5774	169977	Strophitus undulatus	Newaygo	White River, E of Aetna, Sec 31, Lincoln Twp approx. 43.5649┬N, 85.9019┬W	43.56490	-85.90190	Harry & van der Schalie; 23/Aug/1949	Dry	6.0		South Branch White River
5833	171956	Strophitus undulatus	Oceana	White River, Sec 2, Greenwood Twp approx. 43.5501┬N, 86.0762┬W	43.55010	-86.07620	van der Schalie & H.H.; 22/Aug/1949	Dry	1.0		South Branch White River
4121	55869	Strophitus undulatus	Oceana	Morris Lake approx. 43.659689┬N, 86.437913┬W	43.65969	-86.43791	Inst. Fish Research; 00/___/1932	Dry	1.0		Stony Creek-Frontal Lake Michigan
3769	7667	Truncilla donaciformis	Muskegon	Bear Lake approx. 43.2575┬N, 76.2814┬W	43.25750	-86.28140	Mather, J.;	Dry	5.0		Muskegon River
3773	70925	Truncilla donaciformis	Muskegon	Bear Lake approx. 43.2575┬N, 76.2814┬W	43.25750	-86.28140	Mather, J.;	Dry	2.0	Bryant Walker Collection	Muskegon River
3283	103933	Utterbackia imbecillis	Mason	Ludington USGS 43.9552826┬N, 86.4525831┬W	43.95528	-86.45258	orig. DeCamp Collection;	Dry	2.0	Bryant Walker Collection	Pere Marquette River
5693	60642	Villosa iris	Mecosta	Ryan Creek, ca. 2.0 mi. SE of Big Rapids, on M20 approx. 43.6917┬N, 85.4567┬W	43.69170	-85.45670	unknown; 09/Aug/1934	Dry	4.0		Hardy Dam Pond-Muskegon River
394	7647	Villosa iris	Muskegon	Cedar Creek approx. 43.2731┬N, 86.1786┬W	43.27310	-86.17860	Mather, J.;	Dry	2.0		Muskegon River
4140	41070	Villosa iris	Ogemaw	Devoe Lake approx. 44.3994┬N, 84.0183┬W	44.39940	-84.01830	M. L. W. & C. J.; 00/___/1926	Dry	1.0		Rifle River

Appendix C.2. Historical unionid mussel occurrence records from The Ohio State University Museum of Biological Diversity located within HUC10 watersheds intersecting or contained within the Huron-Manistee National Forest boundary. (Note: Big Sable River watershed records are from year 1981 to 2000, and were considered recent records in the assessment.)

Catalog #	Genus	Species	County	Waterbody	Locality	Latitude	Longitude	Collector	Collection Date	HUC10 watershed name
43920	Alasmidonta	viridis	Missaukee	Clam River	unspecified	44.28610	-85.31220	collector unknown (ex Calvin Goodrich, Univ. Mich. Mus. Zool., via Harla Ray Eggleston coll., 1979)	[prior to 1954]	Clam River
25266	Alasmidonta	viridis	Missaukee	Clam River	11 mi. WNW of Falmouth	44.28420	-85.29030	[Calvin Goodrich] (ex Harla Ray Eggleston Collection via David Tracy Jones Collection)	19--	Clam River
34453	Anodontoides	ferussacianus	Iosco	Au Sable River	600 yards above Foote Dam, 6.0 mi. W of Osceola	44.43310	-83.37500	Lynwood A. MacLean	11 June 1973	Au Sable River
14642	Anodontoides	ferussacianus	Mason	Bass Lake Outlet	200 yards above its mouth, between Pentwater and Ludington	43.83170	-86.41250	Eugene P. Keferl	4 July 1965	Stony Creek-Frontal Lake Michigan
33093	Fusconaia	flava	Muskegon	Little Black Lake	[4.4 mi. W of Fruitport, 7.6 mi. S of Muskegon]	43.13190	-86.24210	Charles D. Nelson (ex the Field Museum of Nat. Hist., Chicago, IL)	[prior to 1969]	Stony Creek-Frontal Lake Michigan
34456	Lampsilis	cardium	Iosco	Au Sable River	600 yards above Foote Dam, 6.0 mi. W of Osceola	44.43310	-83.37500	Lynwood A. MacLean	11 June 1973	Au Sable River
34459	Lampsilis	cardium	Iosco	Au Sable River	6 mi. above Foote Dam, 12 mi. WNW of Oscoda	44.43530	-83.37320	Lynwood A. MacLean	12 June 1973	Au Sable River
68385	Lampsilis	cardium	Mason	Big Sable River	1/4 mi. above its mouth, 6.0 mi. NNW of Ludington, [17.0 mi. SSW of Manistee]	44.03550	-86.50010	Johnathon F. Tetzloff	19 June 2000	Big Sable River
52932	Lampsilis	cardium	Mason	Big Sable River	0.6 mi. N of town of Lake Hamlin, 15.8 mi. SW of Manistee	44.03060	-86.50700	Brian W. Wilcox, Mark Secrist	29 June 1983	Big Sable River
33045	Lampsilis	cardium	Newaygo	Muskegon River	unspecified	43.26140	-86.24810	Charles D. Nelson (ex the Field Museum of Nat. Hist., Chicago, IL)	[prior to 1969]	Muskegon River
34455	Lampsilis	radiata (=siliquoidea)	Iosco	Au Sable River	600 yards above Foote Dam, 6.0 mi. W of Osceola	44.43310	-83.37500	Lynwood A. MacLean	11 June 1973	Au Sable River
34458	Lampsilis	radiata (=siliquoidea)	Iosco	Au Sable River	6 mi. above Foote Dam, 12 mi. WNW of Oscoda	44.43530	-83.37320	Lynwood A. MacLean	12 June 1973	Au Sable River
37982	Lampsilis	radiata (=siliquoidea)	Crawford	Au Sable River	[1.9 mi. NE of Five Corners, 3.8 mi. WSW of Conners Flat]	44.65590	-84.50110	Raymond F. Jezerinac, Roger F. Thoma, Mark E. Shrader, David M. Caldwell, John Prince, Neena Giallombardo	1 June 1974	East Branch Au Sable River-Au Sable River
48757	Lampsilis	radiata (=siliquoidea)	Mason	Big Sable River	0.6 mi. below Hamlin Dam, 5.8 mi. NNW of Ludington	44.03550	-86.50010	Sam D. Fitton, Terri Thomas	16 Feb. 1981	Big Sable River
68384	Lampsilis	radiata (=siliquoidea)	Mason	Big Sable River	1/4 mi. above its mouth, 6.0 mi. NNW of Ludington, [17.0 mi. SSW of Manistee]	44.03550	-86.50010	Johnathon F. Tetzloff	19 June 2000	Big Sable River
52931	Lampsilis	radiata (=siliquoidea)	Mason	Big Sable River	0.6 mi. N of town of Lake Hamlin, 15.8 mi. SW of Manistee	44.03060	-86.50700	Brian W. Wilcox, Mark Secrist	29 June 1983	Big Sable River
33036	Lampsilis	radiata (=siliquoidea)	Newaygo	Brooks Lake	[3.8 mi. SE of Newaygo, 5.3 mi. SW of Croton]	43.39791	-85.75383	Charles D. Nelson (ex the Field Museum of Nat. Hist., Chicago, IL)	[prior to 1969]	Brooks Creek-Muskegon River
12475	Lampsilis	radiata (=siliquoidea)	Alcona	Hubbard Lake	near [8-15 mi. NW of] Lincoln	44.80717	-83.56378	Mary K. Brown	1959	Lower South Branch Thunder Bay River

Appendix C.2. (Continued)

33094	Lampsilis	radiata (=siliquoidea)	Muskegon	Little Black Lake	[4.4 mi. W of Fruitport, 7.6 mi. S of Muskegon]	43.13190	-86.24210	Charles D. Nelson (ex the Field Museum of Nat. Hist., Chicago, IL)	[prior to 1969]	Stony Creek-Frontal Lake Michigan
22589	Lampsilis	radiata (=siliquoidea)	Kalkaska	Manistee River	6.0 mi.SW of Westwood, 9.0 mi.NW of Kalkaska, at John Pollick summer camp, Rural Rt.101,Box 62B	44.24415	-86.30517	Kathy G. Borror	4 Aug. 1969	Manistee River
33044	Lampsilis	radiata (=siliquoidea)	Newaygo	Muskegon River	unspecified	43.26140	-86.24810	Charles D. Nelson (ex the Field Museum of Nat. Hist., Chicago, IL)	[prior to 1969]	Muskegon River
68382	Lasmigona	complanata	Mason	Big Sable River	1/4 mi. above its mouth, 6.0 mi. NNW of Ludington, [17.0 mi. SSW of Manistee]	44.03550	-86.50010	Johnathon F. Tetzloff	19 June 2000	Big Sable River
68383	Leptodea	fragilis	Mason	Big Sable River	1/4 mi. above its mouth, 6.0 mi. NNW of Ludington, [17.0 mi. SSW of Manistee]	44.03550	-86.50010	Johnathon F. Tetzloff	19 June 2000	Big Sable River
34454	Ligumia	nasuta	Iosco	Au Sable River	600 yards above Foote Dam, 6.0 mi. W of Osceola	44.43310	-83.37500	Lynwood A. MacLean	11 June 1973	Au Sable River
34457	Ligumia	nasuta	Iosco	Au Sable River	6 mi. above Foote Dam, 12 mi. WNW of Oscoda	44.43530	-83.37320	Lynwood A. MacLean	12 June 1973	Au Sable River
34452	Pyganodon	grandis	Iosco	Au Sable River	600 yards above Foote Dam, 6.0 mi. W of Osceola	44.43310	-83.37500	Lynwood A. MacLean	11 June 1973	Au Sable River
14641	Pyganodon	grandis	Mason	Bass Lake Outlet	200 yards above its mouth, between Pentwater and Ludington	43.83170	-86.41250	Eugene P. Keferl	4 July 1965	Stony Creek-Frontal Lake Michigan
48756	Pyganodon	grandis	Mason	Big Sable River	0.6 mi. below Hamlin Dam, 5.8 mi. NNW of Ludington	44.03550	-86.50010	Sam D. Fitton, Terri Thomas	16 Feb. 1981	Big Sable River
68381	Pyganodon	grandis	Mason	Big Sable River	1/4 mi. above its mouth, 6.0 mi. NNW of Ludington, [17.0 mi. SSW of Manistee]	44.03550	-86.50010	Johnathon F. Tetzloff	19 June 2000	Big Sable River
12474	Pyganodon	grandis	Alcona	Hubbard Lake	near [8-15 mi. NW of] Lincoln	44.80717	-83.56378	Mary K. Brown	1959	Lower South Branch Thunder Bay River
33092	Pyganodon	grandis	Muskegon	Little Black Lake	[4.4 mi. W of Fruitport, 7.6 mi. S of Muskegon]	43.13190	-86.24210	Charles D. Nelson (ex the Field Museum of Nat. Hist., Chicago, IL)	[prior to 1969]	Stony Creek-Frontal Lake Michigan

Appendix C.3. Recent unionid mussel occurrence records from field surveys done by Michigan Natural Features Inventory and Huron-Manistee National Forest (HMNF) located within HUC10 watersheds intersecting or contained within the HMNF boundary. Surveys consisted of visual and tactile search techniques, typically with a 128m^2 search area at each site. Number of live individuals found is provided under # of Individuals (S= only shells found; 0= no individuals of any species found; *= found outside measured search area)

ID #	MNFI ID #	Species	# of Individuals	Latitude	Longitude	Project/Year	Site Name	Surveyors	HUC10 Watershed Name
41	735	Actinonaias ligamentina	7	44.41891	-83.33379	DEQ 2003	Au Sable River A1	Badra et al.	Au Sable River
49	736	Actinonaias ligamentina	2	44.42654	-83.34163	DEQ 2003	Au Sable River A2	Badra et al.	Au Sable River
56	738	Actinonaias ligamentina	S	44.43277	-83.39455	DEQ 2003	Au Sable River A3	Badra et al.	Au Sable River
67	583	Actinonaias ligamentina	S	44.42758	-83.40677	DEQ 2005	Au Sable River A6	Badra et al.	Au Sable River
956	705	Actinonaias ligamentina	S	43.38785	-85.82888	DEQ 2002	Muskegon River 50	Carmen and Badra	Brooks Creek-Muskegon River
943	687	Actinonaias ligamentina	S	44.26649	-85.13473	DEQ 2002	Muskegon River 44	Carmen and Badra	Clam River
1298	A86	Actinonaias ligamentina	S	43.52269	-86.11846	HMNF White R 2012	S. Branch White River 7	Badra et al.	South Branch White River
864	353	Alasmidonta marginata	S	44.20401	-85.07354	DEQ 2002	Muskegon River 02	Carmen and Badra	Clam River
1008	259	Alasmidonta marginata	2	44.19267	-85.02739	DEQ 2002	Muskegon River 71	Carmen and Badra	Clam River
765	A65	Alasmidonta marginata	S	44.26710	-85.94554	HMNF Pine R Manistee 2011	Manistee River 2011_14	Badra et al.	Manistee River
4	A107	Alasmidonta viridis	2	44.64244	-83.93770	HMNF 09/16/2013	Au Sable River 1	Chambers	Au Sable River
12	A110	Alasmidonta viridis	3	44.63494	-83.92322	HMNF 09/16/2013	Au Sable River 2	Chambers	Au Sable River
16	A114	Alasmidonta viridis	2	44.63990	-83.90937	HMNF 09/16/2013	Au Sable River 3	Chambers	Au Sable River
865	353	Alasmidonta viridis	2	44.20401	-85.07354	DEQ 2002	Muskegon River 02	Carmen and Badra	Clam River
896	361	Alasmidonta viridis	1	44.14170	-85.09766	DEQ 2002	Muskegon River 18	Carmen and Badra	Clam River
937	123	Alasmidonta viridis	1	44.17230	-85.13352	DEQ 2002	Muskegon River 43	Carmen and Badra	Clam River
1009	259	Alasmidonta viridis	S	44.19267	-85.02739	DEQ 2002	Muskegon River 71	Carmen and Badra	Clam River
73	584	Alasmidonta viridis	S	44.75724	-84.76095	DEQ 2005	Au Sable River A7	Badra et al.	East Branch Au Sable River-Au Sable River
863	316	Alasmidonta viridis	S	43.39610	-85.50418	DEQ 2002	Muskegon River 01	Carmen and Badra	Little Muskegon River
766	A66	Alasmidonta viridis	S	44.26710	-85.94554	HMNF Pine R Manistee 2011	Manistee River 2011_14	Badra et al.	Manistee River
7	A139	Alasmidonta viridis	2	44.66098	-84.12322	HMNF 09/19/2013	Au Sable River 10	Chambers	Perry Creek-Au Sable River
19	A117	Alasmidonta viridis	S	44.66218	-84.12301	HMNF 09/17/2013	Au Sable River 4	Chambers	Perry Creek-Au Sable River
24	A122	Alasmidonta viridis	2	44.66465	-84.11657	HMNF 09/17/2013	Au Sable River 5	Chambers	Perry Creek-Au Sable River
28	A126	Alasmidonta viridis	S	44.65018	-84.10448	HMNF 09/17/2013	Au Sable River 6	Chambers	Perry Creek-Au Sable River
31	A129	Alasmidonta viridis	3	44.65384	-84.07938	HMNF 09/17/2013	Au Sable River 7	Chambers	Perry Creek-Au Sable River
35	A133	Alasmidonta viridis	S	44.65693	-84.03757	HMNF 09/18/2013	Au Sable River 8	Chambers	Perry Creek-Au Sable River
39	A137	Alasmidonta viridis	S	44.65988	-84.01477	HMNF 09/18/2013	Au Sable River 9	Chambers	Perry Creek-Au Sable River
1273	630	Alasmidonta viridis	S	44.34972	-84.05223	DEQ 2004	Rifle River Ri10	Badra et al.	Rifle River
1284	121	Alasmidonta viridis	S	44.33494	-84.06330	DEQ 2004	Rifle River Ri9	Badra et al.	Rifle River
1301	A89	Alasmidonta viridis	S	43.50475	-86.12535	HMNF White R 2012	S. Branch White River 8	Badra et al.	South Branch White River
5	A108	Anodontoides ferussacianus	S	44.64244	-83.93770	HMNF 09/16/2013	Au Sable River 1	Chambers	Au Sable River
13	A111	Anodontoides ferussacianus	S	44.63494	-83.92322	HMNF 09/16/2013	Au Sable River 2	Chambers	Au Sable River
17	A115	Anodontoides ferussacianus	1	44.63990	-83.90937	HMNF 09/16/2013	Au Sable River 3	Chambers	Au Sable River
899	690	Anodontoides ferussacianus	9	44.23096	-85.19446	DEQ 2002	Muskegon River 20	Carmen and Badra	Clam River
938	123	Anodontoides ferussacianus	2	44.17230	-85.13352	DEQ 2002	Muskegon River 43	Carmen and Badra	Clam River
1010	259	Anodontoides ferussacianus	S	44.19267	-85.02739	DEQ 2002	Muskegon River 71	Carmen and Badra	Clam River
919	696	Anodontoides ferussacianus	1	43.74169	-85.50364	DEQ 2002	Muskegon River 33	Carmen and Badra	Hardy Dam Pond-Muskegon River
797	732	Anodontoides ferussacianus	S	44.26869	-86.00998	DEQ 2003	Manistee River M5	Badra et al.	Manistee River
1059	A77	Anodontoides ferussacianus	21	43.65641	-86.18965	HMNF White R 2012	Osborn Creek 1	Badra et al.	North Branch White River
8	A140	Anodontoides ferussacianus	5	44.66098	-84.12322	HMNF 09/19/2013	Au Sable River 10	Chambers	Perry Creek-Au Sable River
20	A118	Anodontoides ferussacianus	2	44.66218	-84.12301	HMNF 09/17/2013	Au Sable River 4	Chambers	Perry Creek-Au Sable River
25	A123	Anodontoides ferussacianus	1	44.66465	-84.11657	HMNF 09/17/2013	Au Sable River 5	Chambers	Perry Creek-Au Sable River
32	A130	Anodontoides ferussacianus	1	44.65384	-84.07938	HMNF 09/17/2013	Au Sable River 7	Chambers	Perry Creek-Au Sable River
36	A134	Anodontoides ferussacianus	S	44.65693	-84.03757	HMNF 09/18/2013	Au Sable River 8	Chambers	Perry Creek-Au Sable River
1537	634	Anodontoides ferussacianus	S*	43.37842	-86.40395	DEQ 2004	White Lake W1	Badra et al.	White River

Appendix C.3. (Continued)

42	735	Elliptio dilatata	2	44.41891	-83.33379	DEQ 2003	Au Sable River A1	Badra et al.	Au Sable River
68	583	Elliptio dilatata	1	44.42758	-83.40677	DEQ 2005	Au Sable River A6	Badra et al.	Au Sable River
1080	615	Elliptio dilatata	S	43.87583	-86.11361	DEQ 2004	Pere Marquette River Big South Branch PM20	Badra et al.	Big South Branch Pere Marquette River
1520	A30	Elliptio dilatata	111	43.74263	-85.93813	HMNF 2014	Triple Lakes Creek 8	Badra et al.	Big South Branch Pere Marquette River
957	705	Elliptio dilatata	S	43.38785	-85.82888	DEQ 2002	Muskegon River 50	Carmen and Badra	Brooks Creek-Muskegon River
866	353	Elliptio dilatata	2	44.20401	-85.07354	DEQ 2002	Muskegon River 02	Carmen and Badra	Clam River
939	123	Elliptio dilatata	29	44.17230	-85.13352	DEQ 2002	Muskegon River 43	Carmen and Badra	Clam River
944	687	Elliptio dilatata	23	44.26649	-85.13473	DEQ 2002	Muskegon River 44	Carmen and Badra	Clam River
986	698	Elliptio dilatata	S	43.69930	-85.47687	DEQ 2002	Muskegon River 59	Carmen and Badra	Hardy Dam Pond-Muskegon River
761	A61	Elliptio dilatata	87	44.29511	-86.13416	HMNF Pine R Manistee 2011	Manistee River 2011_11	Badra et al.	Manistee River
763	A63	Elliptio dilatata	S	44.28296	-86.16966	HMNF Pine R Manistee 2011	Manistee River 2011_12	Badra et al.	Manistee River
764	A64	Elliptio dilatata	6	44.27662	-86.19705	HMNF Pine R Manistee 2011	Manistee River 2011_13	Badra et al.	Manistee River
771	A71	Elliptio dilatata	3	44.26872	-86.00368	HMNF Pine R Manistee 2011	Manistee River 2011_18_M6c	Badra et al.	Manistee River
773	A73	Elliptio dilatata	146	44.26762	-86.01272	HMNF Pine R Manistee 2011	Manistee River	Badra et al.	Manistee River
780	A22	Elliptio dilatata	111	44.26752	-86.01285	HMNF 2014	Manistee River 5_site19_2011	Badra et al.	Manistee River
783	A27	Elliptio dilatata	47	44.26231	-86.03190	HMNF 2014	Manistee River 7	Badra et al.	Manistee River
789	A95	Elliptio dilatata	S	44.26420	-86.04940	HMNF 09/01/2015	Manistee River Browns Bayou 2	Ania Corner Riley	Manistee River
796	731	Elliptio dilatata	1	44.28720	-86.15141	DEQ 2003	Manistee River M4	Badra et al.	Manistee River
808	999	Elliptio dilatata	2	44.26916	-86.00277	DEQ 2003	Manistee River M6a	Badra et al.	Manistee River
1146	A39	Elliptio dilatata	S	44.25986	-86.07996	HMNF Pine Cr Hinton 2011	Pine Creek 7	Badra et al.	Manistee River
1147	A40	Elliptio dilatata	S	44.26116	-86.07913	HMNF Pine Cr Hinton 2011	Pine Creek 8	Badra et al.	Manistee River
1148	A41	Elliptio dilatata	S	44.26136	-86.07843	HMNF Pine Cr Hinton 2011	Pine Creek 9	Badra et al.	Manistee River
1060	A78	Elliptio dilatata	32	43.65641	-86.18965	HMNF White R 2012	Osborn Creek 1	Badra et al.	North Branch White River
1076	599	Elliptio dilatata	S	43.93339	-86.43258	DEQ 2004	Pere Marquette Lake PM4	Badra et al.	Pere Marquette River
1274	631	Elliptio dilatata	3	44.36333	-84.04889	DEQ 2004	Rifle River Ri11	Badra et al.	Rifle River
1275	632	Elliptio dilatata	S	44.37666	-84.04556	DEQ 2004	Rifle River Ri12	Badra et al.	Rifle River
1278	624	Elliptio dilatata	S	44.07944	-84.03500	DEQ 2004	Rifle River Ri3	Badra et al.	Rifle River
1283	629	Elliptio dilatata	1	44.31278	-84.07000	DEQ 2004	Rifle River Ri8	Badra et al.	Rifle River
1285	121	Elliptio dilatata	1	44.33494	-84.06330	DEQ 2004	Rifle River Ri9	Badra et al.	Rifle River
958	705	Epioblasma triquetra	S	43.38785	-85.82888	DEQ 2002	Muskegon River 50	Carmen and Badra	Brooks Creek-Muskegon River
6	A109	Fusconaia flava	S	44.64244	-83.93770	HMNF 09/16/2013	Au Sable River 1	Chambers	Au Sable River
43	735	Fusconaia flava	11	44.41891	-83.33379	DEQ 2003	Au Sable River A1	Badra et al.	Au Sable River
50	736	Fusconaia flava	12	44.42654	-83.34163	DEQ 2003	Au Sable River A2	Badra et al.	Au Sable River
60	737	Fusconaia flava	S	44.43119	-83.40025	DEQ 2003	Au Sable River A4	Badra et al.	Au Sable River
63	582	Fusconaia flava	S	44.43252	-83.40400	DEQ 2005	Au Sable River A5	Badra et al.	Au Sable River
69	583	Fusconaia flava	S	44.42758	-83.40677	DEQ 2005	Au Sable River A6	Badra et al.	Au Sable River
1521	A31	Fusconaia flava	15	43.74263	-85.93813	HMNF 2014	Triple Lakes Creek 8	Badra et al.	Big South Branch Pere Marquette River
959	705	Fusconaia flava	S	43.38785	-85.82888	DEQ 2002	Muskegon River 50	Carmen and Badra	Brooks Creek-Muskegon River
965	706	Fusconaia flava	S	43.31794	-86.03817	DEQ 2002	Muskegon River 51	Carmen and Badra	Brooks Creek-Muskegon River
867	353	Fusconaia flava	1	44.20401	-85.07354	DEQ 2002	Muskegon River 02	Carmen and Badra	Clam River
940	123	Fusconaia flava	5	44.17230	-85.13352	DEQ 2002	Muskegon River 43	Carmen and Badra	Clam River
945	687	Fusconaia flava	2	44.26649	-85.13473	DEQ 2002	Muskegon River 44	Carmen and Badra	Clam River
1011	259	Fusconaia flava	S	44.19267	-85.02739	DEQ 2002	Muskegon River 71	Carmen and Badra	Clam River
738	A97	Fusconaia flava	32	44.16197	-86.00405	HMNF 08/12/2013	Little Manistee River Cool Creek	Chambers	Little Manistee River
903	662	Fusconaia flava	1	43.38085	-85.52877	DEQ 2002	Muskegon River 23	Carmen and Badra	Little Muskegon River
785	A28	Fusconaia flava	1	44.26231	-86.03190	HMNF 2014	Manistee River 7	Badra et al.	Manistee River
798	732	Fusconaia flava	1	44.26869	-86.00998	DEQ 2003	Manistee River M5	Badra et al.	Manistee River
809	999	Fusconaia flava	L*	44.26916	-86.00277	DEQ 2003	Manistee River M6a	Badra et al.	Manistee River

Appendix C.3. (Continued)

985	708	Fusconaia flava	S	43.27040	-86.15530	DEQ 2002	Muskegon River 57	Carmen and Badra	Muskegon River
1061	A79	Fusconaia flava	3	43.65641	-86.18965	HMNF White R 2012	Osborn Creek 1	Badra et al.	North Branch White River
1077	599	Fusconaia flava	1	43.93339	-86.43258	DEQ 2004	Pere Marquette Lake PM4	Badra et al.	Pere Marquette River
1540	643	Fusconaia flava	7	43.43222	-86.31361	DEQ 2004	White Lake W10	Badra et al.	White River
1554	641	Fusconaia flava	2	43.42396	-86.31240	DEQ 2004	White Lake W8	Badra et al.	White River
44	735	Lampsilis cardium	13	44.41891	-83.33379	DEQ 2003	Au Sable River A1	Badra et al.	Au Sable River
52	736	Lampsilis cardium	13	44.42654	-83.34163	DEQ 2003	Au Sable River A2	Badra et al.	Au Sable River
57	738	Lampsilis cardium	S	44.43277	-83.39455	DEQ 2003	Au Sable River A3	Badra et al.	Au Sable River
61	737	Lampsilis cardium	S	44.43119	-83.40025	DEQ 2003	Au Sable River A4	Badra et al.	Au Sable River
64	582	Lampsilis cardium	S	44.43252	-83.40400	DEQ 2005	Au Sable River A5	Badra et al.	Au Sable River
70	583	Lampsilis cardium	S	44.42758	-83.40677	DEQ 2005	Au Sable River A6	Badra et al.	Au Sable River
960	705	Lampsilis cardium	S	43.38785	-85.82888	DEQ 2002	Muskegon River 50	Carmen and Badra	Brooks Creek-Muskegon River
1005	680	Lampsilis cardium	S	43.64232	-85.44239	DEQ 2002	Muskegon River 67	Carmen and Badra	Hardy Dam Pond-Muskegon River
762	A62	Lampsilis cardium	1	44.29511	-86.13416	HMNF Pine R Manistee 2011	Manistee River 2011_11	Badra et al.	Manistee River
769	A69	Lampsilis cardium	S	44.27171	-85.97506	HMNF Pine R Manistee 2011	Manistee River 2011_16	Badra et al.	Manistee River
772	A72	Lampsilis cardium	3	44.26872	-86.00368	HMNF Pine R Manistee 2011	Manistee River 2011_18_M6c	Badra et al.	Manistee River
775	A75	Lampsilis cardium	2	44.26762	-86.01272	HMNF Pine R Manistee 2011	Manistee River 2011_19_site5_2014	Badra et al.	Manistee River
786	A25	Lampsilis cardium	3	44.26752	-86.01285	HMNF 2014	Manistee River 5_site19_2011	Badra et al.	Manistee River
787	A29	Lampsilis cardium	4	44.26231	-86.03190	HMNF 2014	Manistee River 7	Badra et al.	Manistee River
790	A94	Lampsilis cardium	S	44.26420	-86.04940	HMNF 09/01/2015	Manistee River Browns Bayou 2	Ania Corner Riley	Manistee River
800	732	Lampsilis cardium	11	44.26869	-86.00998	DEQ 2003	Manistee River M5	Badra et al.	Manistee River
811	999	Lampsilis cardium	9	44.26916	-86.00277	DEQ 2003	Manistee River M6a	Badra et al.	Manistee River
805	578	Lampsilis cardium	7	44.26916	-86.00277	DEQ 2005	Manistee River M6b	Badra et al.	Manistee River
820	A96	Lampsilis cardium	2	44.26870	-86.00340	HMNF 09/01/2015	Manistee River M6d	Ania Corner Riley	Manistee River
948	709	Lampsilis cardium	S	43.26362	-86.24281	DEQ 2002	Muskegon River 46	Carmen and Badra	Muskegon River
1542	643	Lampsilis cardium	2	43.43222	-86.31361	DEQ 2004	White Lake W10	Badra et al.	White River
1550	639	Lampsilis cardium	2	43.42251	-86.33450	DEQ 2004	White Lake W6	Badra et al.	White River
1553	640	Lampsilis cardium	2	43.42445	-86.32107	DEQ 2004	White Lake W7	Badra et al.	White River
1555	641	Lampsilis cardium	1	43.42396	-86.31240	DEQ 2004	White Lake W8	Badra et al.	White River
781	A23	Lampsilis fasciola	1	44.26752	-86.01285	HMNF 2014	Manistee River 5_site19_2011	Badra et al.	Manistee River
14	A112	Lampsilis siliquoidea	1	44.63494	-83.92322	HMNF 09/16/2013	Au Sable River 2	Chambers	Au Sable River
18	A116	Lampsilis siliquoidea	S	44.63990	-83.90937	HMNF 09/16/2013	Au Sable River 3	Chambers	Au Sable River
51	736	Lampsilis siliquoidea	1	44.42654	-83.34163	DEQ 2003	Au Sable River A2	Badra et al.	Au Sable River
1083	616	Lampsilis siliquoidea	1	43.87056	-86.07917	DEQ 2004	Pere Marquette River Big South Branch PM21	Badra et al.	Big South Branch Pere Marquette River
1522	A32	Lampsilis siliquoidea	S	43.74263	-85.93813	HMNF 2014	Triple Lakes Creek 8	Badra et al.	Big South Branch Pere Marquette River
951	704	Lampsilis siliquoidea	S	43.41485	-85.81089	DEQ 2002	Muskegon River 48	Carmen and Badra	Brooks Creek-Muskegon River
897	361	Lampsilis siliquoidea	7	44.14170	-85.09766	DEQ 2002	Muskegon River 18	Carmen and Badra	Clam River
941	123	Lampsilis siliquoidea	10	44.17230	-85.13352	DEQ 2002	Muskegon River 43	Carmen and Badra	Clam River
946	687	Lampsilis siliquoidea	S	44.26649	-85.13473	DEQ 2002	Muskegon River 44	Carmen and Badra	Clam River
1012	259	Lampsilis siliquoidea	5	44.19267	-85.02739	DEQ 2002	Muskegon River 71	Carmen and Badra	Clam River
920	696	Lampsilis siliquoidea	4	43.74169	-85.50364	DEQ 2002	Muskegon River 33	Carmen and Badra	Hardy Dam Pond-Muskegon River
1004	680	Lampsilis siliquoidea	S	43.64232	-85.44239	DEQ 2002	Muskegon River 67	Carmen and Badra	Hardy Dam Pond-Muskegon River
739	A98	Lampsilis siliquoidea	15	44.16197	-86.00405	HMNF 08/12/2013	Little Manistee River Cool Creek	Chambers	Little Manistee River
768	A68	Lampsilis siliquoidea	S	44.27171	-85.97506	HMNF Pine R Manistee 2011	Manistee River 2011_16	Badra et al.	Manistee River
774	A74	Lampsilis siliquoidea	1	44.26762	-86.01272	HMNF Pine R Manistee 2011	Manistee River 2011_19_site5_2014	Badra et al.	Manistee River
784	A24	Lampsilis siliquoidea	S	44.26752	-86.01285	HMNF 2014	Manistee River 5_site19_2011	Badra et al.	Manistee River

Appendix C.3. (Continued)

799	732	Lampsilis siliquoidea	4	44.26869	-86.00998	DEQ 2003	Manistee River M5	Badra et al.	Manistee River
810	999	Lampsilis siliquoidea	2	44.26916	-86.00277	DEQ 2003	Manistee River M6a	Badra et al.	Manistee River
1149	A42	Lampsilis siliquoidea	S	44.26136	-86.07843	HMNF Pine Cr Hinton 2011	Pine Creek 9	Badra et al.	Manistee River
1073	596	Lampsilis siliquoidea	S	43.93254	-86.44635	DEQ 2004	Pere Marquette Lake PM1	Badra et al.	Pere Marquette River
1074	597	Lampsilis siliquoidea	S	43.93221	-86.44255	DEQ 2004	Pere Marquette Lake PM2	Badra et al.	Pere Marquette River
1078	599	Lampsilis siliquoidea	1	43.93339	-86.43258	DEQ 2004	Pere Marquette Lake PM4	Badra et al.	Pere Marquette River
9	A141	Lampsilis siliquoidea	1	44.66098	-84.12322	HMNF 09/19/2013	Au Sable River 10	Chambers	Perry Creek-Au Sable River
21	A119	Lampsilis siliquoidea	S	44.66218	-84.12301	HMNF 09/17/2013	Au Sable River 4	Chambers	Perry Creek-Au Sable River
26	A124	Lampsilis siliquoidea	1	44.66465	-84.11657	HMNF 09/17/2013	Au Sable River 5	Chambers	Perry Creek-Au Sable River
29	A127	Lampsilis siliquoidea	S	44.65018	-84.10448	HMNF 09/17/2013	Au Sable River 6	Chambers	Perry Creek-Au Sable River
33	A131	Lampsilis siliquoidea	S	44.65384	-84.07938	HMNF 09/17/2013	Au Sable River 7	Chambers	Perry Creek-Au Sable River
37	A135	Lampsilis siliquoidea	S	44.65693	-84.03757	HMNF 09/18/2013	Au Sable River 8	Chambers	Perry Creek-Au Sable River
40	A138	Lampsilis siliquoidea	S	44.65988	-84.01477	HMNF 09/18/2013	Au Sable River 9	Chambers	Perry Creek-Au Sable River
817	734	Lampsilis siliquoidea	S	44.28732	-85.85728	DEQ 2003	Manistee River M8	Badra et al.	Peterson Creek-Manistee River
1153	A51	Lampsilis siliquoidea	S	44.13450	-85.69401	HMNF Pine R Manistee 2011	Pine River 2011_1	Badra et al.	Pine River
1296	A84	Lampsilis siliquoidea	S	43.52696	-86.11435	HMNF White R 2012	S. Branch White River 6	Badra et al.	South Branch White River
1538	634	Lampsilis siliquoidea	S	43.37842	-86.40395	DEQ 2004	White Lake W1	Badra et al.	White River
1541	643	Lampsilis siliquoidea	1	43.43222	-86.31361	DEQ 2004	White Lake W10	Badra et al.	White River
1545	635	Lampsilis siliquoidea	S	43.37828	-86.40038	DEQ 2004	White Lake W2	Badra et al.	White River
1546	636	Lampsilis siliquoidea	S	43.38570	-86.38055	DEQ 2004	White Lake W3	Badra et al.	White River
1547	637	Lampsilis siliquoidea	S	43.38637	-86.35788	DEQ 2004	White Lake W4	Badra et al.	White River
1549	638	Lampsilis siliquoidea	S	43.39833	-86.35650	DEQ 2004	White Lake W5	Badra et al.	White River
45	735	Lasmigona complanata	S	44.41891	-83.33379	DEQ 2003	Au Sable River A1	Badra et al.	Au Sable River
53	736	Lasmigona complanata	S	44.42654	-83.34163	DEQ 2003	Au Sable River A2	Badra et al.	Au Sable River
952	704	Lasmigona complanata	S	43.41485	-85.81089	DEQ 2002	Muskegon River 48	Carmen and Badra	Brooks Creek-Muskegon River
961	705	Lasmigona complanata	S	43.38785	-85.82888	DEQ 2002	Muskegon River 50	Carmen and Badra	Brooks Creek-Muskegon River
801	732	Lasmigona complanata	1	44.26869	-86.00998	DEQ 2003	Manistee River M5	Badra et al.	Manistee River
806	578	Lasmigona complanata	1	44.26916	-86.00277	DEQ 2005	Manistee River M6b	Badra et al.	Manistee River
949	709	Lasmigona complanata	1	43.26362	-86.24281	DEQ 2002	Muskegon River 46	Carmen and Badra	Muskegon River
818	734	Lasmigona complanata	L*	44.28732	-85.85728	DEQ 2003	Manistee River M8	Badra et al.	Peterson Creek-Manistee River
1543	643	Lasmigona complanata	1*	43.43222	-86.31361	DEQ 2004	White Lake W10	Badra et al.	White River
1548	637	Lasmigona complanata	S	43.38637	-86.35788	DEQ 2004	White Lake W4	Badra et al.	White River
1081	615	Lasmigona compressa	1	43.87583	-86.11361	DEQ 2004	Pere Marquette River Big South Branch PM20	Badra et al.	Big South Branch Pere Marquette River
10	A142	Lasmigona compressa	3	44.66098	-84.12322	HMNF 09/19/2013	Au Sable River 10	Chambers	Perry Creek-Au Sable River
22	A120	Lasmigona compressa	S	44.66218	-84.12301	HMNF 09/17/2013	Au Sable River 4	Chambers	Perry Creek-Au Sable River
962	705	Lasmigona costata	S	43.38785	-85.82888	DEQ 2002	Muskegon River 50	Carmen and Badra	Brooks Creek-Muskegon River
1013	259	Lasmigona costata	5	44.19267	-85.02739	DEQ 2002	Muskegon River 71	Carmen and Badra	Clam River
1299	A87	Lasmigona costata	S	43.52269	-86.11846	HMNF White R 2012	S. Branch White River 7	Badra et al.	South Branch White River
54	736	Leptodea fragilis	S	44.42654	-83.34163	DEQ 2003	Au Sable River A2	Badra et al.	Au Sable River
58	738	Leptodea fragilis	S	44.43277	-83.39455	DEQ 2003	Au Sable River A3	Badra et al.	Au Sable River
65	582	Leptodea fragilis	S	44.43252	-83.40400	DEQ 2005	Au Sable River A5	Badra et al.	Au Sable River
71	583	Leptodea fragilis	S	44.42758	-83.40677	DEQ 2005	Au Sable River A6	Badra et al.	Au Sable River
1551	639	Leptodea fragilis	S	43.42251	-86.33450	DEQ 2004	White Lake W6	Badra et al.	White River
1556	641	Leptodea fragilis	2	43.42396	-86.31240	DEQ 2004	White Lake W8	Badra et al.	White River
15	A113	Ligumia nasuta	L	44.63494	-83.92322	HMNF 09/16/2013	Au Sable River 2	Chambers	Au Sable River
46	735	Ligumia recta	4	44.41891	-83.33379	DEQ 2003	Au Sable River A1	Badra et al.	Au Sable River
55	736	Ligumia recta	4	44.42654	-83.34163	DEQ 2003	Au Sable River A2	Badra et al.	Au Sable River
66	582	Ligumia recta	S	44.43252	-83.40400	DEQ 2005	Au Sable River A5	Badra et al.	Au Sable River

Appendix C.3. (Continued)

72	583	Ligumia recta	S	44.42758	-83.40677	DEQ 2005	Au Sable River A6	Badra et al.	Au Sable River
953	704	Ligumia recta	S	43.41485	-85.81089	DEQ 2002	Muskegon River 48	Carmen and Badra	Brooks Creek-Muskegon River
963	705	Ligumia recta	S	43.38785	-85.82888	DEQ 2002	Muskegon River 50	Carmen and Badra	Brooks Creek-Muskegon River
802	732	Ligumia recta	9	44.26869	-86.00998	DEQ 2003	Manistee River M5	Badra et al.	Manistee River
812	999	Ligumia recta	3	44.26916	-86.00277	DEQ 2003	Manistee River M6a	Badra et al.	Manistee River
1552	639	Ligumia recta	1	43.42251	-86.33450	DEQ 2004	White Lake W6	Badra et al.	White River
47	735	Potamilus alatus	1	44.41891	-83.33379	DEQ 2003	Au Sable River A1	Badra et al.	Au Sable River
59	738	Potamilus alatus	S	44.43277	-83.39455	DEQ 2003	Au Sable River A3	Badra et al.	Au Sable River
299	A21	Pyganodon grandis	1	44.30815	-86.00094	HMNF 2014	Dickson Lake 4	Badra et al.	Bear Creek
900	690	Pyganodon grandis	3	44.23096	-85.19446	DEQ 2002	Muskegon River 20	Carmen and Badra	Clam River
942	123	Pyganodon grandis	S	44.17230	-85.13352	DEQ 2002	Muskegon River 43	Carmen and Badra	Clam River
947	687	Pyganodon grandis	S	44.26649	-85.13473	DEQ 2002	Muskegon River 44	Carmen and Badra	Clam River
1003	683	Pyganodon grandis	S	43.57050	-85.53143	DEQ 2002	Muskegon River 66	Carmen and Badra	Hardy Dam Pond-Muskegon River
803	732	Pyganodon grandis	1	44.26869	-86.00998	DEQ 2003	Manistee River M5	Badra et al.	Manistee River
813	999	Pyganodon grandis	1	44.26916	-86.00277	DEQ 2003	Manistee River M6a	Badra et al.	Manistee River
1150	A50	Pyganodon grandis	S	44.19550	-86.00829	HMNF Pine Cr Hinton 2011	Pine Lake 17	Badra et al.	Manistee River
1075	598	Pyganodon grandis	1	43.93617	-86.43469	DEQ 2004	Pere Marquette Lake PM3	Badra et al.	Pere Marquette River
11	A143	Pyganodon grandis	16	44.66098	-84.12322	HMNF 09/19/2013	Au Sable River 10	Chambers	Perry Creek-Au Sable River
23	A121	Pyganodon grandis	S	44.66218	-84.12301	HMNF 09/17/2013	Au Sable River 4	Chambers	Perry Creek-Au Sable River
27	A125	Pyganodon grandis	S	44.66465	-84.11657	HMNF 09/17/2013	Au Sable River 5	Chambers	Perry Creek-Au Sable River
30	A128	Pyganodon grandis	1	44.65018	-84.10448	HMNF 09/17/2013	Au Sable River 6	Chambers	Perry Creek-Au Sable River
34	A132	Pyganodon grandis	S	44.65384	-84.07938	HMNF 09/17/2013	Au Sable River 7	Chambers	Perry Creek-Au Sable River
38	A136	Pyganodon grandis	S	44.65693	-84.03757	HMNF 09/18/2013	Au Sable River 8	Chambers	Perry Creek-Au Sable River
1544	643	Pyganodon grandis	1	43.43222	-86.31361	DEQ 2004	White Lake W10	Badra et al.	White River
48	735	Quadrula quadrula	1	44.41891	-83.33379	DEQ 2003	Au Sable River A1	Badra et al.	Au Sable River
62	737	Strophitus undulatus	S	44.43119	-83.40025	DEQ 2003	Au Sable River A4	Badra et al.	Au Sable River
1082	615	Strophitus undulatus	1	43.87583	-86.11361	DEQ 2004	Pere Marquette River Big South Branch PM20	Badra et al.	Big South Branch Pere Marquette River
954	704	Strophitus undulatus	S	43.41485	-85.81089	DEQ 2002	Muskegon River 48	Carmen and Badra	Brooks Creek-Muskegon River
964	705	Strophitus undulatus	S	43.38785	-85.82888	DEQ 2002	Muskegon River 50	Carmen and Badra	Brooks Creek-Muskegon River
868	353	Strophitus undulatus	S	44.20401	-85.07354	DEQ 2002	Muskegon River 02	Carmen and Badra	Clam River
1014	259	Strophitus undulatus	1	44.19267	-85.02739	DEQ 2002	Muskegon River 71	Carmen and Badra	Clam River
921	696	Strophitus undulatus	1	43.74169	-85.50364	DEQ 2002	Muskegon River 33	Carmen and Badra	Hardy Dam Pond-Muskegon River
740	A99	Strophitus undulatus	S	44.16197	-86.00405	HMNF 08/12/2013	Little Manistee River Cool Creek	Chambers	Little Manistee River
776	A76	Strophitus undulatus	2	44.26762	-86.01272	HMNF Pine R Manistee 2011	Manistee River	Badra et al.	Manistee River
795	730	Strophitus undulatus	S	44.28138	-86.16400	DEQ 2003	Manistee River M3	Badra et al.	Manistee River
804	732	Strophitus undulatus	5	44.26869	-86.00998	DEQ 2003	Manistee River M5	Badra et al.	Manistee River
814	999	Strophitus undulatus	7	44.26916	-86.00277	DEQ 2003	Manistee River M6a	Badra et al.	Manistee River
807	578	Strophitus undulatus	1	44.26916	-86.00277	DEQ 2005	Manistee River M6b	Badra et al.	Manistee River
819	579	Strophitus undulatus	S	44.26815	-85.98015	DEQ 2005	Manistee River M9	Badra et al.	Manistee River
1297	A85	Strophitus undulatus	S	43.52696	-86.11435	HMNF White R 2012	S. Branch White River 6	Badra et al.	South Branch White River
1300	A88	Strophitus undulatus	S	43.52269	-86.11846	HMNF White R 2012	S. Branch White River 7	Badra et al.	South Branch White River
1539	634	Truncilla truncata	S*	43.37842	-86.40395	DEQ 2004	White Lake W1	Badra et al.	White River
815	999	Utterbackia imbecillis	1	44.26916	-86.00277	DEQ 2003	Manistee River M6a	Badra et al.	Manistee River
1557	641	Utterbackia imbecillis	1	43.42396	-86.31240	DEQ 2004	White Lake W8	Badra et al.	White River
904	246	Villosa iris	1	43.64067	-85.27119	DEQ 2002	Muskegon River 24	Carmen and Badra	Little Muskegon River
82	A18	zero	0	44.31284	-86.04884	HMNF 2014	Bear Creek 1	Badra et al.	Bear Creek
228	A20	zero	0	44.31766	-85.98494	HMNF 2014	Boswell Creek 3	Badra et al.	Bear Creek
281	A19	zero	0	44.33422	-86.02054	HMNF 2014	Chicken Creek 2	Badra et al.	Bear Creek

Appendix C.3. (Continued)

1079	614	zero	0	43.91833	-86.17889	DEQ 2004	Pere Marquette River Big South Branch PM19	Badra et al.	Big South Branch Pere Marquette River
1084	617	zero	0	43.84472	-86.07584	DEQ 2004	Pere Marquette River Big South Branch PM22	Badra et al.	Big South Branch Pere Marquette River
1085	618	zero	0	43.81556	-86.08472	DEQ 2004	Pere Marquette River Big South Branch PM23	Badra et al.	Big South Branch Pere Marquette River
1086	619	zero	0	43.74222	-85.95972	DEQ 2004	Pere Marquette River Big South Branch PM24	Badra et al.	Big South Branch Pere Marquette River
886	673	zero	0	43.34631	-85.93823	DEQ 2002	Muskegon River 10	Carmen and Badra	Brooks Creek-Muskegon River
955	685	zero	0	43.43435	-85.66695	DEQ 2002	Muskegon River 49	Carmen and Badra	Brooks Creek-Muskegon River
1002	684	zero	0	43.47994	-85.65048	DEQ 2002	Muskegon River 65	Carmen and Badra	Brooks Creek-Muskegon River
1016	A102	zero	0	43.48046	-85.75958	HMNF 08/19/2013	Muskegon River Bigelow Creek 1	Chambers	Brooks Creek-Muskegon River
1017	A103	zero	0	43.48116	-85.75458	HMNF 08/19/2013	Muskegon River Bigelow Creek 2	Chambers	Brooks Creek-Muskegon River
1018	A104	zero	0	43.44845	-85.74345	HMNF 08/20/2014	Muskegon River Bigelow Creek 3	Chambers	Brooks Creek-Muskegon River
1019	A105	zero	0	43.43555	-85.76675	HMNF 08/20/2014	Muskegon River Bigelow Creek 4	Chambers	Brooks Creek-Muskegon River
1020	A106	zero	0	43.43778	-85.76588	HMNF 08/20/2014	Muskegon River Penoyer Creek	Chambers	Brooks Creek-Muskegon River
898	689	zero	0	44.24002	-85.21477	DEQ 2002	Muskegon River 19	Carmen and Badra	Clam River
1007	688	zero	0	44.26681	-85.26167	DEQ 2002	Muskegon River 70	Carmen and Badra	Clam River
74	585	zero	0	44.77890	-84.76197	DEQ 2005	Au Sable River A8	Badra et al.	East Branch Au Sable River-Au Sable River
889	699	zero	0	43.68260	-85.43519	DEQ 2002	Muskegon River 14	Carmen and Badra	Hardy Dam Pond-Muskegon River
917	701	zero	0	43.64021	-85.48759	DEQ 2002	Muskegon River 31	Carmen and Badra	Hardy Dam Pond-Muskegon River
923	668	zero	0	43.79555	-85.40184	DEQ 2002	Muskegon River 35	Carmen and Badra	Hardy Dam Pond-Muskegon River
924	669	zero	0	43.80990	-85.40299	DEQ 2002	Muskegon River 36	Carmen and Badra	Hardy Dam Pond-Muskegon River
1015	697	zero	0	43.69980	-85.48309	DEQ 2002	Muskegon River 72	Carmen and Badra	Hardy Dam Pond-Muskegon River
741	A100	zero	0	44.14722	-85.98376	HMNF 08/12/2013	Little Manistee River Stronach Creek 1	Chambers	Little Manistee River
742	A101	zero	0	44.14981	-85.94318	HMNF 08/13/2013	Little Manistee River Stronach Creek 2	Chambers	Little Manistee River
887	703	zero	0	43.49687	-85.44877	DEQ 2002	Muskegon River 12	Carmen and Badra	Little Muskegon River
888	663	zero	0	43.43835	-85.48698	DEQ 2002	Muskegon River 13	Carmen and Badra	Little Muskegon River
905	700	zero	0	43.62576	-85.19012	DEQ 2002	Muskegon River 25	Carmen and Badra	Little Muskegon River
918	702	zero	0	43.51269	-85.37498	DEQ 2002	Muskegon River 32	Carmen and Badra	Little Muskegon River
1095	613	zero	0	43.87167	-85.76250	DEQ 2004	Pere Marquette River PM18	Badra et al.	Little South Branch Pere Marquette River
1097	621	zero	0	43.81667	-85.80000	DEQ 2004	Pere Marquette River PM26	Badra et al.	Little South Branch Pere Marquette River
767	A67	zero	0	44.26767	-85.95406	HMNF Pine R Manistee 2011	Manistee River 2011_15	Badra et al.	Manistee River
770	A70	zero	0	44.26811	-85.98030	HMNF Pine R Manistee 2011	Manistee River 2011_17	Badra et al.	Manistee River
782	A26	zero	0	44.26804	-86.02308	HMNF 2014	Manistee River 6	Badra et al.	Manistee River
788	A93	zero	0	44.26380	-86.05160	HMNF 09/01/2015	Manistee River Browns Bayou 1	Ania Corner Riley	Manistee River
791	728	zero	0	44.24823	-86.32484	DEQ 2003	Manistee River M1	Badra et al.	Manistee River
794	729	zero	0	44.25301	-86.31626	DEQ 2003	Manistee River M2	Badra et al.	Manistee River
1137	A43	zero	0	44.20829	-85.97066	HMNF Pine Cr Hinton 2011	Pine Creek 10	Badra et al.	Manistee River
1138	A44	zero	0	44.20935	-85.97318	HMNF Pine Cr Hinton 2011	Pine Creek 11	Badra et al.	Manistee River
1139	A45	zero	0	44.21226	-85.97275	HMNF Pine Cr Hinton 2011	Pine Creek 12	Badra et al.	Manistee River
1140	A46	zero	0	44.21292	-85.97067	HMNF Pine Cr Hinton 2011	Pine Creek 13	Badra et al.	Manistee River
1141	A47	zero	0	44.21145	-86.01642	HMNF Pine Cr Hinton 2011	Pine Creek 14	Badra et al.	Manistee River
1142	A48	zero	0	44.22485	-86.02430	HMNF Pine Cr Hinton 2011	Pine Creek 15	Badra et al.	Manistee River
1143	A49	zero	0	44.21245	-85.95764	HMNF Pine Cr Hinton 2011	Pine Creek 16	Badra et al.	Manistee River
1144	A37	zero	0	44.24364	-86.05781	HMNF Pine Cr Hinton 2011	Pine Creek 5	Badra et al.	Manistee River
1145	A38	zero	0	44.25960	-86.08039	HMNF Pine Cr Hinton 2011	Pine Creek 6	Badra et al.	Manistee River

Appendix C.3. (Continued)

901	676	zero	0	43.29280	-86.00775	DEQ 2002	Muskegon River 21	Carmen and Badra	Muskegon River
902	674	zero	0	43.29554	-86.24406	DEQ 2002	Muskegon River 22	Carmen and Badra	Muskegon River
950	707	zero	0	43.26151	-86.18305	DEQ 2002	Muskegon River 47	Carmen and Badra	Muskegon River
1006	677	zero	0	43.28630	-86.30148	DEQ 2002	Muskegon River 68	Carmen and Badra	Muskegon River
1040	A83	zero	0	43.54820	-86.20643	HMNF White R 2012	N. Branch White River 5	Badra et al.	North Branch White River
1062	A80	zero	0	43.64237	-86.18028	HMNF White R 2012	Osborn Creek 2	Badra et al.	North Branch White River
1063	A81	zero	0	43.62766	-86.18425	HMNF White R 2012	Osborn Creek 3	Badra et al.	North Branch White River
1467	A82	zero	0	43.59858	-86.18104	HMNF White R 2012	Swinton Creek 4	Badra et al.	North Branch White River
1087	605	zero	0	43.93545	-86.12176	DEQ 2004	Pere Marquette River PM10	Badra et al.	Pere Marquette River
1088	606	zero	0	43.93545	-86.12176	DEQ 2004	Pere Marquette River PM11	Badra et al.	Pere Marquette River
1089	607	zero	0	43.93493	-86.12079	DEQ 2004	Pere Marquette River PM12	Badra et al.	Pere Marquette River
1090	608	zero	0	43.93357	-86.11775	DEQ 2004	Pere Marquette River PM13	Badra et al.	Pere Marquette River
1091	609	zero	0	43.93096	-86.07950	DEQ 2004	Pere Marquette River PM14	Badra et al.	Pere Marquette River
1092	610	zero	0	43.93575	-86.07708	DEQ 2004	Pere Marquette River PM15	Badra et al.	Pere Marquette River
1093	611	zero	0	43.93704	-86.06211	DEQ 2004	Pere Marquette River PM16	Badra et al.	Pere Marquette River
1094	612	zero	0	43.93569	-86.05201	DEQ 2004	Pere Marquette River PM17	Badra et al.	Pere Marquette River
1096	620	zero	0	43.85750	-85.85222	DEQ 2004	Pere Marquette River PM25	Badra et al.	Pere Marquette River
1098	600	zero	0	43.93209	-86.41438	DEQ 2004	Pere Marquette River PM5	Badra et al.	Pere Marquette River
1099	601	zero	0	43.92537	-86.39842	DEQ 2004	Pere Marquette River PM6	Badra et al.	Pere Marquette River
1100	602	zero	0	43.92675	-86.39241	DEQ 2004	Pere Marquette River PM7	Badra et al.	Pere Marquette River
1101	603	zero	0	43.93479	-86.19181	DEQ 2004	Pere Marquette River PM8	Badra et al.	Pere Marquette River
1102	604	zero	0	43.93349	-86.13351	DEQ 2004	Pere Marquette River PM9	Badra et al.	Pere Marquette River
508	A33	zero	0	44.27765	-85.83160	HMNF Pine Cr Hinton 2011	Hinton Creek 1	Badra et al.	Peterson Creek-Manistee River
509	A34	zero	0	44.27776	-85.83094	HMNF Pine Cr Hinton 2011	Hinton Creek 2	Badra et al.	Peterson Creek-Manistee River
510	A35	zero	0	44.27659	-85.81613	HMNF Pine Cr Hinton 2011	Hinton Creek 3	Badra et al.	Peterson Creek-Manistee River
511	A36	zero	0	44.28129	-85.85447	HMNF Pine Cr Hinton 2011	Hinton Creek 4	Badra et al.	Peterson Creek-Manistee River
760	A60	zero	0	44.31290	-85.85559	HMNF Pine R Manistee 2011	Manistee River 2011_10	Badra et al.	Peterson Creek-Manistee River
777	A57	zero	0	44.30039	-85.85435	HMNF Pine R Manistee 2011	Manistee River 2011_7	Badra et al.	Peterson Creek-Manistee River
778	A58	zero	0	44.30253	-85.84919	HMNF Pine R Manistee 2011	Manistee River 2011_8	Badra et al.	Peterson Creek-Manistee River
779	A59	zero	0	44.30763	-85.84912	HMNF Pine R Manistee 2011	Manistee River 2011_9	Badra et al.	Peterson Creek-Manistee River
816	733	zero	0	44.28442	-85.86015	DEQ 2003	Manistee River M7	Badra et al.	Peterson Creek-Manistee River
1154	A52	zero	0	44.14069	-85.69521	HMNF Pine R Manistee 2011	Pine River 2011_2	Badra et al.	Pine River
1155	A53	zero	0	44.14329	-85.70242	HMNF Pine R Manistee 2011	Pine River 2011_3	Badra et al.	Pine River
1156	A54	zero	0	44.20428	-85.80787	HMNF Pine R Manistee 2011	Pine River 2011_4	Badra et al.	Pine River
1157	A55	zero	0	44.20193	-85.81820	HMNF Pine R Manistee 2011	Pine River 2011_5	Badra et al.	Pine River
1158	A56	zero	0	44.19892	-85.83711	HMNF Pine R Manistee 2011	Pine River 2011_6	Badra et al.	Pine River
1272	622	zero	0	44.02639	-83.83195	DEQ 2004	Rifle River Ri1	Badra et al.	Rifle River
1276	633	zero	0	44.39778	-84.03611	DEQ 2004	Rifle River Ri13	Badra et al.	Rifle River
1277	623	zero	0	44.04611	-83.85667	DEQ 2004	Rifle River Ri2	Badra et al.	Rifle River
1279	625	zero	0	44.14139	-84.04389	DEQ 2004	Rifle River Ri4	Badra et al.	Rifle River
1280	626	zero	0	44.18000	-84.07361	DEQ 2004	Rifle River Ri5	Badra et al.	Rifle River
1281	627	zero	0	44.21028	-84.07361	DEQ 2004	Rifle River Ri6	Badra et al.	Rifle River
1282	628	zero	0	44.25028	-84.06917	DEQ 2004	Rifle River Ri7	Badra et al.	Rifle River
1302	A90	zero	0	43.48598	-86.15708	HMNF White R 2012	S. Branch White River 9	Badra et al.	South Branch White River
751	A91	zero	0	43.47582	-86.18977	HMNF White R 2012	Main Stem White River 10	Badra et al.	White River
752	A92	zero	0	43.47581	-86.21202	HMNF White R 2012	Main Stem White River 11	Badra et al.	White River
1558	642	zero	0	43.42753	-86.31050	DEQ 2004	White Lake W9	Badra et al.	White River