

Management Plan for State-owned Lands on Northern Lake Michigan Islands

**Michigan Department of Natural Resources
Wildlife Division**

Revised February 2017



Photo by Josh Cohen, Michigan Natural Features Inventory

Purpose and Need for the Plan

Several recent efforts have highlighted the need to examine state land management on Lake Michigan islands and formulate an approach for effective management of these unique resources in the future. The Department of Natural Resources (DNR or the Department) recognizes that state land management actions can have social, economic, and ecological impacts within and beyond state land borders. In addition, actions on lands adjacent to state land can have similar effects. Based on these relationships, the DNR has undertaken a collaborative approach to developing this plan. The purpose of this plan is to provide a vision and intended actions for the future management of state owned lands on northern Lake Michigan islands, in partnership with local units of government, tribal governments, and other interested stakeholders.

In 2013, the Department published a draft *Managed Public Land Strategy*, and in the same year, the Beaver Island Natural Resources and Ecotourism Steering Committee developed *Recommendations for Natural Resource Management in the Beaver Archipelago*.

At a very high level, the Department's *Managed Public Land Strategy* answered questions regarding the location of public lands, what values are associated with those lands, and how the Department manages them today and how they should be managed in the future. The Strategy provided a broad framework for the continued conservation, use and enjoyment of these lands that was congruent with the Department's goals of protecting cultural and natural resources, providing recreational opportunities, and fostering economic prosperity. Successful implementation of the Department's Strategy will be driven by collaboration with local units of governments, regional organizations, and the private and non-profit sectors. Similarly, the *Recommendations for Natural Resource Management in the Beaver Archipelago* recognized the link between the unique natural resources and the wellbeing of island residents and visitors. This recognition has been manifested in goals that call for effective management of the archipelago's natural resources, economic vitality and growth that results from effective management, and how education and outreach focused on unique natural, historical, and cultural resources can lead to greater appreciation and protection of those resources.

The DNR Wildlife Division administers the state-owned land on the northern Lake Michigan islands, and the completion of these two plans provided a timely opportunity to leverage those efforts and develop a collaborative plan for these properties. The geographic scope of this management plan includes North and South Fox islands, Beaver Island, Garden Island, High Island, Hog Island and Whiskey Island. Collectively, these properties are referred to as the Beaver Island State Wildlife Research Area (Figure 1).

Planning efforts were also guided by the Department's official policy 29.20-05 Management of State Owned Island Properties (February 1994). That policy recognizes the wide range of values that management efforts may be directed toward, ranging from protection of ecological function and strict limitation of activities, to the development of opportunities for intensive recreational activities. The policy emphasizes the degree of human impact should decrease in proportion to increasing levels of ecological, historical and cultural sensitivities. In addition, the Department must consider the potential economic impact of development plans, recognizing that in most cases the considerations will not override ecological or historical values.

Over the years, documents related to the northern Lake Michigan islands have been developed by various organizations (e.g., Townships, County, State of Michigan, U.S. Fish & Wildlife Service, U.S. Environmental Protection Agency, The Nature Conservancy, Michigan Natural Features Inventory, etc.). These documents provide information on the biodiversity and integrity of native plant and animal communities, migratory birds, fish, and threatened and endangered species, and some reflection of the recreational and economic desires of island residents and visitors. Many of these documents also reflect a desire to manage and maintain the natural resources for the benefit of current and future generations. A number of related reports, plans or policies helped to influence the content and direction of this plan and include:

1. Charlevoix County (2015). Charlevoix County Recreation Plan 2015 – 2019 as adopted by Charlevoix County Board of Commissioners.
2. Charlevoix County (Update in Progress) Beaver Island Master Plan as adopted by Peaine and St. James Townships.
3. Henson, B.L., et. al. 2010. Islands of life: a biodiversity and conservation atlas of the Great Lakes islands. Nature Conservancy of Canada. Ontario, Canada.
4. LTBB NRD (2015) 1855 Reservation Islands – Blueprints for Biodiversity, Protection and Restoration. Little Traverse Bay Bands of Odawa Indians Natural Resource Department. GLRI Project Final Report Number 2015-IFWP-01.
5. MDNR (2013) Northern Lower Peninsula Regional State Forest Management Plan—Great Lakes Islands Management Area.
6. NRESC (2013) Recommendations for Natural Resource Management in the Beaver Island Archipelago.
7. Peaine Township (Draft) Recreation Plan 2013-2018 Peaine Township, Beaver Island.
8. Pearsall, D., et. al. 2012. Michigami: Great Water. Strategies to Conserve the Biodiversity of Lake Michigan. Technical Report. A joint publication of The Nature Conservancy and Michigan Natural Features Inventory. 309 pp. with Appendices.

9. St. James Township (Draft) Recreation Plan 2012-2016 St. James Township, Beaver Island.
10. US DoI, FWS (2013) Gravel Island, Green Bay, Harbor Island, Huron, and Michigan Islands National Wildlife Refuges – Comprehensive Conservation Plan. Region 3 (Midwest Region); Bloomington, MN. 320 pp.
11. Vigmostad, K., et al. (2007) Great Lakes islands: biodiversity elements and threats. A final report to the Great Lakes National Program Office of the Environmental Protection Agency.
12. West Michigan Shoreline Regional Development Commission (2014) Lake Michigan Water Trail Plan, Phase I: Inventory and Analysis of Access Sites in Support of a Lake Michigan Water Trail.
13. DNR POLICIES & PROCEDURES 29.20-05 – Management of State owned island properties (ISSUED: 07/11/2005)

How the Plan Was Developed

With the recognition of the unique class of state lands we are striving to manage, we developed this plan after multiple opportunities for input by interested stakeholders. These opportunities included three public meetings on Beaver Island, public meetings in Leland, Traverse City, and Charlevoix, discussions with Tribal governments (Grand Traverse Band of Ottawa and Chippewa Indians, Little Traverse Bay Bands of Odawa Indians), meetings with other groups interested in island management (e.g., The Nature Conservancy, Central Michigan University Biological Station, the Recreational Aviation Foundation, Fox Island Lighthouse Association, and the Office of the Great Lakes), and multiple informal discussions and written correspondence with interested stakeholders. In addition, a writing team was convened for two days to discuss and develop draft goals and objectives that were later provided for public review and comments. Press releases and direct email broadcasts were used to solicit public comment on draft goals and objectives and to provide information on progress. The Vision, Goals, Objectives and Proposed Actions are a direct result of these combined interactions.

Vision, Goals, Objectives, and Proposed Actions

Vision: Respect the ecological and cultural integrity of Northern Lake Michigan Islands while providing island-appropriate opportunities within the context of a broader natural resource-based economy, and providing effective administration of state-owned properties—a distinctively unique class of State lands.

Goal 1, Partnerships and Collaborative Governance: Strengthen and broaden partnerships that focus on the effective stewardship of the cultural and ecological resources of the State-owned Lake Michigan island properties—a distinctively unique class of State lands.

1. Establish a diverse partnership group to implement this plan (see Plan Implementation Section) that includes island residents, local, tribal, and federal governments, other state agencies, universities, user groups, non-government organizations, and others, to increase capacity for stewardship of ecological and cultural resources on State-owned lands
 - a. Identify relevant interested parties that can represent the most relevant values and issues
 - b. Identify governance principles under which this partnership will operate, including leadership, guiding principles, and decision making
 - i. Engage in regular partnership dialogue to understand how ecological, social, and economic values intersect, thus identifying and clarifying the short- and long-term challenges and opportunities that exist
2. Integrate decision-making, management actions, and education and outreach across all ownerships
 - a. Identify values common to all ownerships
 - b. Identify where opportunities exist to implement shared values
 - c. Develop and implement on-the-ground strategies
3. Engage with government programs and partners responsible for management of aquatic resources, where land management decisions may cross land-water boundaries
 - a. Identify stakeholders with near shore interests (e.g., DNR Fisheries Division, US Coast Guard, Chippewa Ottawa Resource Authority, National Ocean and Atmospheric Administration Coastal Zone Management Program, Michigan Sea Grant) and collaborate when appropriate
4. Implement an adaptive approach to management
 - a. Set priorities, implement management, report and evaluate
 - b. Establish timelines and milestones

Goal 2, Ecological Resources: Collaborate with partners to manage important ecological resources.

1. Identify and document important ecological resources
 - a. Create a suite of ecological objectives, either narrative or numeric, for short-term and long-term time horizons
 - b. Monitor the distribution and abundance of key ecological elements through time
2. Identify key stressors or threats facing those ecological resources
 - a. Characterize severity, scope, irreversibility of stressors/threats

- b. Identify gaps in knowledge
- 3. Identify and prioritize management efforts needed to address stressors and achieve the ecological objectives
 - a. Implement priority management strategies
 - i. Protect prioritized ecological resources
 - ii. Restore prioritized ecological resources
 - b. Monitor success of prioritized management strategies
- 4. Develop educational materials that focus on promoting respect and understanding of important ecological resources

Goal 3, Cultural Resources: Collaborate with partners to promote respect and understanding of important cultural resources.

- 1. Identify and document important cultural characteristics
 - a. Create a suite of cultural objectives, either narrative or numeric, for short-term and long-term time horizons
 - b. Monitor key cultural resources through time
- 2. Identify key stressors or threats facing those cultural elements
 - a. Characterize severity, scope, irreversibility of stressors/threats
 - b. Identify gaps in knowledge
- 3. Identify and prioritize protection efforts needed to address stressors and achieve the cultural objectives
 - a. Implement priority cultural strategies
 - i. Protect prioritized cultural resources
 - 1. Create cultural education program including signage and other educational materials
 - ii. Restore prioritized cultural resources
 - b. Monitor success of prioritized cultural strategies
- 4. Develop educational materials that focus on promoting respect and understanding of important cultural resources

Goal 4, Recreation and Subsistence Activities: Enhance opportunities for island-based recreation or subsistence activities compatible with the maintenance of ecological and cultural integrity.

- 1. Define a suite of recreational and subsistence objectives, either narrative or numeric, for short-term and long-term time horizons
 - a. Review current list of recreational objectives from township, county and state recreational and master plans
 - b. Prioritize recreational objectives using a collaborative process

2. Identify existing recreational and subsistence use infrastructure
 - a. Inventory existing infrastructure including location, condition, and deferred maintenance needs.
3. Identify desired recreational and subsistence opportunities
 - a. Prioritize infrastructure actions
 - b. Collaborate with partners to implement recreational actions
4. Monitor recreational and subsistence use on state-owned lands
 - a. Track number of use permits issued
 - b. Track number of special hunt permits issued
 - c. Survey recreational and subsistence users
 - d. Evaluate impacts of recreational use and subsistence activities on ecological and cultural resources
5. Support and promote island based recreational and subsistence opportunities
 - a. Create print and social media promotional materials
 - b. Identify new potential users/audience

Goal 5, Other Natural Resources-Based Activities: Integrate all natural resource-based activities with the protection of ecological and cultural features.

1. Document other existing natural resource-based practices on state lands and evaluate how they interface with ecological and cultural resources
 - a. Identify the location and intensity of key practices including timber management, mineral extraction, and academic research activities
 - b. Evaluate and monitor impacts of key activities
 - c. Minimize incompatible uses and restore as necessary
 - d. Enhance compatible uses
2. Identify other new potential economic opportunities that may be viable and compatible with the enhancement and maintenance of the integrity of ecological and cultural resources
 - a. Identify and engage organizations that may assist in the development of potential new uses
 - b. Identify potential location and intensity

Goal 6, State Land Administration: Develop and implement an effective framework for the administration of State-owned Lake Michigan island properties.

1. Identify roles and responsibilities for land management of the island properties among the Divisions within the DNR
 - a. Review existing documentation on island decision-making authority
 - b. Communicate decision making authority to the partners
2. Identify internal DNR and external resources that can help meet administrative needs
 - a. Human resources
 - b. Fiscal resources
 - c. Physical resources (equipment, housing, office, etc.)
3. Address unresolved land matters
 - a. Identify land matters (e.g., Forest Certification inclusion, official land designations)
 - b. Develop strategies to address them

Plan Implementation

This Plan represents a new approach to state land management, one based on partnerships and shared governance responsibilities. Because of the approach, implementation will come under the purview of the partnership group that is proposed under Goal 1. As a state land management agency, the DNR cannot abdicate its ultimate responsibilities, yet believes that shared governance is the best approach to managing these unique properties. To that end, the DNR will participate fully in the partnerships and seriously consider any recommendations of the partnership, unless they are considered a violation of state law or policy.

The first task of the partnership will be to convene the group and develop a charter under which the group will operate. This should include, at the very least, timetables and frequency of meetings, leadership of the group, discussions of acceptable behavior of members, expectations for communication among group members and communications to the groups they represent, and a decision making process that is based on a consensus or "will live with" approach.

The expected next steps of the group will be to conduct a thorough discussion and analysis of where we are today and where we would like to be in the future. This will require serious discussion and prioritization of the actions that can be reasonably and effectively carried out by partners to reach our desired future conditions.

Description of State-owned Lands and Important Management Issues

Beaver Island

Beaver Island is the largest island in this group, and the most biologically diverse (biodiversity score of 273, Henson et al. 2010). There are approximately 12,400 acres of state-owned land on the island, or about one-third of the island, mostly located on the southern half of the island. It is the only island with state ownership considered in this plan where DNR forest inventory has been conducted. Major cover types on state land include northern hardwoods, lowland deciduous forest, and lowland coniferous forests. In addition, natural features surveys have identified numerous occurrences of threatened and endangered species on the island (including designated critical habitat for piping plovers, Federal Register 2001: 22938) and several high quality natural communities (from all ownerships), including open dunes, boreal forest, dry-mesic northern forest, mesic northern forest, bog and poor fen. Descriptions of these high quality natural communities can be found in Cohen et al. (2015). Beaver Island is the only island considered in this plan with scheduled commercial ferry and airline service (two airports), and year-round residents (the exception being several staff at Mirada Ranch on South Fox Island).

Important management matters on state lands, among others, include administration of an existing gravel pit, public access sites at Lake Geneserath, Green Lake, and Bonner's Landing, infrastructure at Martin's Bluff, historical and cultural sites like old homesteads and "Mormon fields," hiking trails, old well sites, bald eagle nesting territories, and Federally-designated Piping Plover critical habitat (Federal Register 2001: 22938).

Garden Island

Garden Island lies just north of Beaver Island and according to local residents is the easiest and most frequently visited of the outer islands. With the exception of approximately 80 acres, the remainder of the island is state owned (slightly more than 5,000 acres). Garden Island is also biologically diverse (biodiversity score of 221, Henson et al. 2010). Major cover types on the island include northern hardwoods, mixed broadleaf deciduous forests, conifer forests, and wetlands. There are many records of threatened and endangered species on the island and natural communities noted include coastal fen, boreal forest, and mesic northern forest. There are several small lakes and interior wetlands on the island. Garden Island has a long history of occupation and there are at least two cabins on the island (both on state land) and a Native American cemetery.

Important management matters on state lands, among others, include the so called "DNR Cabin," other cabins still standing (e.g., Golden's cabin), other

historical structures, the current land use permit with the Miniss Kitigan Drum organization, historical garbage dumps, trails and trail maintenance, the old apple orchard at the former “Indian Village” site, the cemetery (including the unknown areal extent of the site), bald eagle nesting territories, and nearshore waterbird colonies.

High Island

High Island, lying west of Beaver Island is approximately 3,600 acres and is entirely state-owned. According to local residents, it is visited far less frequently than Garden Island even though the east side of the island has good anchorage and landing sites. The island is somewhat less biologically diverse (biodiversity score of 181, Henson et al. 2010), yet has some very distinct features, including perched dunes on the west side of the island and a long narrow spit on the northeast. Major cover types include northern hardwoods, broadleaf deciduous and coniferous forests, and sand and dune dominated shorelines. Canada yew is prevalent in the understory. There are records of threatened and endangered species on the island (including designated critical habitat for piping plovers, Federal Register 2001: 22938), and natural communities noted include sand and gravel beach, limestone cobble shore, and open dunes. In addition, there is one small lake and numerous old fields that are filling in (mostly on the north half of the island).

Important management matters on state lands, among others, include the two research cabins in need of removal, House of David structures and other historical structures, protection and signage of the colonial nesting spit, trails and trail maintenance, proposed camping sites, a historical apple orchard, an agreement with The Nature Conservancy natural area designation, pending Natural Area proposal, potential old water well site in Section 27, bald eagle nesting territories, and Federally-designated Piping Plover critical habitat.

Hog Island

Hog Island, located to the northeast of Beaver Island and east of Garden Island, is about 2,200 acres in size and is entirely state owned. The biodiversity score is 212 (Henson et al. 2010) and there have been numerous occurrences of threatened and endangered species recorded there. Topographically, Hog Island is lower in elevation and there are numerous wetland areas around the island that grow and shrink in size depending on Lake Michigan water levels. Natural communities noted on the island include interdunal wetland and Great Lakes marsh. Major cover types include northern hardwoods, conifer swamp, and wetlands.

Important management matters on state lands, among others, include nearshore colonial waterbird sites, bald eagle nesting territories, abandoned vehicles, and Federal mineral rights.

Whiskey Island

The smallest of the islands in this plan, Whiskey Island's approximately 100 acres is entirely state owned and undeveloped. The state acquired Whiskey Island in 2012 as part of a land exchange on Beaver Island. Cover types include mixed conifer, balsam fir and some aspen. No natural heritage surveys have been conducted on the island, yet earlier visits noted several threatened and endangered plant species on the island.

Important management matters on state lands, among others, include the nearshore colonial waterbird site, and bald eagle nesting territories.

North Fox Island

The Fox islands are more isolated from the mainland than those in the Beaver Island group and thus are more impoverished from a biodiversity standpoint (North Fox biodiversity score is 163). North Fox Island is approximately 820 acres, is entirely state-owned, and is oriented in a general north-south direction. Canada yew is prevalent in the understory and major cover types include northern hardwoods, mixed conifers, and lowland conifers. Several threatened and endangered species have been recorded on the island and natural communities include mesic northern forest and boreal forest. While uninhabited, the island does have a small cabin and a grass airstrip that has been minimally maintained by interested aviators.

Important management matters on state lands, among others, include the airstrip, cabin, old foundations, caches, trails and trail maintenance, bald eagle nesting territories, and wells.

South Fox Island

South Fox Island is approximately 3,400 acres in size, of which 1,258 acres are state owned, the rest belonging to one landowner. Biologically, South Fox Island is the least diverse of the islands considered in this plan (biodiversity score of 129), yet there are some notable natural features, including perched dunes on the west side of the island, and several areas of centuries-old white cedar trees. Major cover types include northern hardwoods, mixed conifers, and dune complexes. A number of threatened and endangered species have been recorded on the island (including designated critical habitat for piping plovers, Federal Register 2001: 22938), and natural communities noted include boreal forest and open dunes. There is a small Native American cemetery on the island.

and a lighthouse on the south tip of the island that has recently undergone renovations conducted by a conservancy group.

Important management matters on state lands, among others, include a land locked state parcel, remnant fences, trails and trail maintenance, hunting camp refuse, a cemetery, historical structures, critical dunes, bald eagle nesting territories, Federally-designated Piping Plover critical habitat, and clarifying the administrative authority for the lighthouse property.

State Land Acquisition History

Department owned and administered lands are managed to meet the Department's mission, and some of these lands are managed for a specific subset of the mission based on the funds used to acquire and manage these lands. State lands on the islands have been purchased with a variety of fund sources including the Natural Resources Trust Fund, the Land Exchange Facilitation Fund, Federal funds, and revenues from or associated with Michigan hunting and fishing licenses.

State administration of lands within the Beaver Island Archipelago began in 1856 with the transfer of Federal "Swamp Grants" and for tax reverted parcels as early as 1903 on Beaver Island and 1907 on Garden Island. State acquisition of properties through purchase began in earnest in the 1950s. The primary sources of funds for purchases of island properties were the State Game Fund and the Federal Aid in Restoration/Pittman-Robertson Fund.

The State Game Fund was established by the legislature and is derived from the sale of hunting and fishing licenses. Expenditures from the fund can only be used for fish and wildlife programs, including management, research, enforcement, and land acquisition.

The Federal Aid in Wildlife Restoration Act, commonly called the "Pittman-Roberston Act," is administered by the US Fish and Wildlife Service and is derived from an excise tax on most types of firearms, ammunition, and archery equipment. Expenditures must be used to manage birds and mammals and includes acquisition and improvement of wildlife habitat, research, surveys and inventories, acquisition and development of access facilities for public use, and hunter education programs, including construction and operation of public target ranges.

All of the state lands considered in this plan are administered under Wildlife and Game Area State Land Rules (PA 451, Section 504).

The history and distribution of acquisition source by island is detailed below:

Beaver Island

The island is 33% state land. The first properties tax reverted in 1903 and significant acreages reverted in 1932 and 1939. Most State purchasing occurred in 1950s using the State Game Fund.

Acquisition Type	Acres	% of Total
Tax Reverted	6,422	52.5%
Purchase	4,034	33.0%
Exchange-Private	822	6.7%
Exchange-Federal Government	678	5.5%
Swamp Grant	238	1.9%
Gift	40	0.3%
Court Ordered Acquisition	3	0.0%
Total	12,237	

Garden Island

The island is 98% state land. The first properties tax reverted on Garden Island in 1907 and significant acreage reverted in 1939 and 1941. Most state purchases occurred in the 1950s using State Game and Pittman-Robertson funds. In addition, the State acquired lands on Garden Island through exchange with the Federal Government in 1958 and 1964.

Acquisition Type	Acres	% of Total
Tax Reverted	1,866	43.9%
Purchase	1,843	43.3%
Exchange-Federal Government	545	12.8%
Total	4,254	

High Island

High Island is 100% state land. The first properties tax reverted to the State in 1925 and additional parcels reverted in 1939 and 1940. The State acquired additional properties through exchange in 1952. The State purchased the remainder of the island properties in 1958 with the use of Pittman-Robertson Funds.

Acquisition Type	Acres	% of Total
Purchase	3,077	87.9%
Tax Reverted	215	6.2%
Exchange-Private	134	3.8%
Gift	73	2.1%
Total	3,500	

Hog Island

Hog Island is 100% state land. The first parcel tax reverted to the State in 1925 with an additional parcel reverting in 1939. Much of the island was purchased by the State in the 1950s with the State Game Fund. The State acquired additional acreage in 1962 through an exchange with the Federal Government. The last private parcel on Hog Island was purchased by the State in 1995.

Acquisition Type	Acres	% of Total
Exchange-Federal Government	1,288	62.4%
Purchase	690	33.4%
Tax Reverted	61	2.9%
US Govt transfer of unclaimed land	24	1.2%
Total	2,063	

Whiskey Island

Whiskey Island is completely state owned and was acquired in 2012 through an exchange with St. James Township/Charlevoix County.

North Fox

North Fox is completely state owned. The island was purchased in 2000 with Michigan Natural Resources Trust Fund and Land Exchange Facilitation Fund dollars.

South Fox Island

The island is 33% state land. Most was purchased in 1958 with Pittman-Robertson Funds. Nearly 300 additional acres were acquired through an exchange with the Federal Government in 1964.

Acquisition Type	Acres	% of Total
Purchase	798	72.5%
Exchange-Private	219	19.9%
Exchange-Federal Government	74	6.7%
Gift	10	0.9%
Total	1,101	

History of Wildlife Research and Management

Through the 1970s, nearly all of the research and management activities undertaken by the Department centered on game species research, introductions, and special hunts on the islands. Since that time there has been greater recognition of the broader ecological, cultural and historical significance of these islands. As such, the emphasis has shifted to efforts focusing on conservation planning, historic preservation, the importance of the land/water interface, threatened and endangered species, high quality natural communities, and colonial and migratory bird studies.

White-tailed Deer

In 1927, the Department relocated 17 deer from a private facility in Frankenmuth to Beaver Island (Bartlett 1938). In 1938, Beaver Island was opened to deer hunting under a “one buck law.” At that time, Department staff estimated the island population to be 500-750 deer (Dayton 1939). In 2011, regulations for antler-point restriction began on Beaver Island. In recent years (2010-2014) the annual deer harvest has varied from 100-150 deer. While a few deer probably remain on Garden Island, local residents have mentioned significant hunting effort has declined in recent years due to the low deer numbers.

In 1915, a private landowner on South Fox Island planted an unknown number of white-tailed deer. The population was estimated to be 40-50 animals by 1925. During a visit in 1945, little deer sign on was found on the island, although they were still present (Bartlett 1945). A second introduction of 17 deer from the Department’s Cusino and Houghton Lake research pens, and the Traverse City zoo took place in 1962 and the population increased rapidly (Firestone 1996). Hunts with special regulations to reduce the herd were initiated in the late 1960s. Starting in 1971, an administrative “exchange” of hunting lands restricted public hunting to lands north of the township line. Deer hunting on state land on South Fox Island has been by permit only since the mid-1980s. South Fox antler-point restrictions were initiated in 1997. In 2005 there were 111 permits requested and 23 deer taken. No requests to hunt deer on South Fox Island were received in 2014, the first year since permits were issued.

The North Fox Island deer population was started in 1959 with two bucks and five does from a deer farm in Charlotte, Michigan (Firestone 1996). The population grew quickly and by the early 1970s the once abundant Canada yew was disappearing, prompting the owner to begin reducing the deer herd. Between October 1974 and January 1975, 144 deer were harvested, and by 1976 there were few, if any, deer on the island.

Current information suggests deer are present on Beaver, Garden and South Fox islands, and there are no deer on High, Whiskey, Hog, or North Fox islands.

Ruffed Grouse

In 1948 and 1949, 68 ruffed grouse were introduced to Beaver Island from Sandhill Game Farm, Babcock, WI (Ammann and Palmer 1958). In 1951, High Island was evaluated as a potential location for a long-term research study and several grouse and deer studies were proposed (Douglass 1951). These views undoubtedly lead to much of the justification for a large number of island property acquisitions that occurred in the 1950's. Beaver Island was first opened to ruffed grouse hunting in 1954. In 1956 and 1957 ruffed grouse were released on High, Garden, and Hog Islands at a stocking rate of 5 birds per square mile as part of a research study (Moran and Palmer 1963). Grouse became established on High and Garden Islands, however the reintroduction to Hog Island was an apparent failure. In 1961, 28 ruffed grouse were released on Hog Island again. This attempt on Hog Island also failed. Currently, grouse are common on Beaver and High islands and less common on Garden Island.

Wild Turkey

Presently, wild turkeys are abundant on Beaver Island but are not present in significant number on any of the other islands. In 1961 or 62, thirty-eight wild turkeys were released on Beaver Island. A turkey hunt was attempted on Beaver Island in 1967 and 1968 with limited success. In 1992, a number of wild turkeys were moved to Beaver Island in an attempt to supplement the low population and hunting was re-opened on Beaver Island in 2002.

Woodcock

From 1968 to 1971, an investigation of the characteristics of the local woodcock population was conducted on High Island (Whitcomb 1974). The major objectives of the project included the determination of: 1) dynamics of a heavily exploited local woodcock population; 2) the degree to which singing-ground counts and wing collections may be useful in appraising population status; 3) the effects of hunting on the population; and 4) behavioral characteristics of the population that may limit the population growth.

The study determined that extreme exploitation resulted in male woodcock population decline while the overall population was maintained through immigration. Furthermore, the study determined that peenting counts are an effective measure of population trends. These study findings were important in influencing both woodcock regulations and survey methodology in the Eastern US.

Pheasant and Sharp-tailed Grouse

Ring-necked pheasants were released on Beaver Island in 1922 and several more introductions apparently continued through 1938. In 1940, twenty-nine sharp-tailed grouse were introduced to Beaver Island from Babcock, WI by the Department (Ammann 1957). The last hunting season for sharp-tailed grouse on Beaver Island was 1950-51. In 1963, one flock was observed. Sharp-tailed grouse are no longer present and pheasant are present only when they are released by private landowners. Loss of extensive, diverse grassland and shrubland complexes to forest succession and/or agriculture is thought to be the primary reason for sharp-tailed grouse and pheasant declines throughout Lower Michigan (Maples and Soulliere 1996, Midwest Pheasant Study Group 2012).

Reptiles and Amphibians

Several herpetological studies have been conducted on the islands (e.g., Hatt et al. 1948, Bowden and Gillingham 2004), and some of that survey work continues by the Little Traverse Bay Band of Odawa Indians; Michigan Natural Features Inventory; Herpetological Resource and Management, LLC; and Central Michigan University.

A list of species and their island distribution, gleaned from several sources, is provided in Appendix A.

Piping Plovers

The Great Lakes population of piping plovers is a federally-listed endangered species. Research and monitoring has been conducted on this species with renewed interest since the 1980s. In addition, critical habitat for this species was officially designated in 2001 (Federal Register 2001: 22938). These designations, which include land use considerations, are located on Beaver Island from Indian Point to McCauley's Point (5 km of shoreline) and in Greenes Bay (0.8 km). Additional areas include 1.8 km of shoreline on High Island and 6 km on South Fox Island. During 2015, 78 unique pairs were observed in the Great Lakes region including a pair at Greenes Bay on Beaver Island. High Island and South Fox Island have also had nesting pairs in the recent past.

Colonial nesters

The northern Lake Michigan islands are well known for concentrations of colonial nesters (e.g., Blokpoel and Scharf 1999). Every ten years, the US Fish and Wildlife Service collaborate with many other agencies and groups to conduct a comprehensive survey of colonial nesting birds across the Great Lakes. While the potential for nesting on certain sites is variable from year to year (e.g., due to water levels or weather), several of the islands considered in this plan had colonial nesting activity during the last survey in 2007, including Beaver and High islands. In addition to the 10-year survey, Central Michigan University has been monitoring many of these colonies on a yearly basis. Some of the species

expected to be observed nesting in the area include Herring Gulls, Ring-billed Gulls, Common and Caspian Terns, Black-crowned Night Herons, Great Blue Herons, and Double-crested Cormorants.

Migratory Birds

Northern Lake Michigan islands are important stopover sites for migrating birds and many studies have detailed the species that are most prevalent during migration, particularly during spring migration (e.g., Scharf 1999, Scharf et al. 2014, Scharf 2015). In addition, the protected bays on many of the islands annually support large concentrations of migrating waterfowl. The National Audubon Society has designated much of the area as Important Bird Areas (IBA), including 1) Beaver Islands Colonial Waterbirds IBA, 2) Beaver Island Beaches (piping plover) IBA, 3) High Island Beaches (piping plover) IBA, and 4) South Fox Island Beaches (piping plover) IBA. At a local level, the islands have long been recognized as an excellent destination for birders, and in 2014, the Beaver Island Birding Trail and associated annual festival were launched.

Threatened and Endangered Species

Because of their isolated location and unique natural features, the islands are home to many rare species and have been the focus of survey work for many years (e.g. Penskar et al. 1998, 1999, Higman et al. 2012). Discussions continue regarding how these species contribute to the overall biodiversity of the islands (e.g., Soule 1997, Pearsall, et al. 2012).

A list of threatened and endangered species and their island distribution, gleaned from several sources, and a map of Biodiversity Element Occurrences in relation to state lands is provided in Appendix B.

Description of Fisheries Resources

Beaver Island has a total of eight inland lakes and three major streams and their tributaries that contribute to the fisheries on the island, and a rich history of fishing in the waters of the archipelago.

Streams

Iron Ore Creek is located on the southern end of the island, and rises from swamps and a small hillside before flowing down to Iron Ore Bay in Lake Michigan. Iron Ore Creek presently supports a naturally reproducing population of brook trout and rainbow trout (steelhead), and migratory runs of adult steelhead and suckers can be observed there each spring. Iron Ore Creek historically has hosted runs of “coaster” brook trout. Iron Ore Creek is a Type 1 designated trout stream.

Cable’s Creek flows out of the east side of Lake Geneserath and continues easterly before flowing into Cable Bay in Lake Michigan. Cable’s Creek flows

through very sandy soils with little groundwater contribution. When water tables are low, this stream often has portions that dry up during the late summer months. Despite that, Cable's Creek supports naturally reproducing populations of brook trout and rainbow trout (steelhead), and warm water species such as bluegill, pumpkinseed, longnose dace, white sucker, blacknose dace, creek chub, and central mudminnows can be found here in the summer months. Cable's Creek is a Type 1 designated trout stream.

The Jordan River flows from Hannigan's Swamp east before joining Lake Michigan in Sand Bay. While observations of migratory suckers and steelhead have been noted here, DNR Fisheries Division has only been able to document warm water species such as brook stickleback, creek chub, dace, and central mudminnows in its waters.

Lakes

There are a total of eight waterbodies that have historically been identified on Beaver Island. One of these, Round Lake, only has water seasonally (and depending on the water table). In 1964, Fish Division staff reported surface water acreage of 10 acres; however in 2013 Fish Division staff reported only wet soils, no actual surface water. It no longer has the ability to sustain fish populations.

Miller's Marsh is the island's most western waterbody, and is a bog/shallow pond found within the Miller's Marsh Natural Area. There is very limited access to the water itself, although small rowboats and kayaks can be used on the lake. Miller's Marsh does support some fish species such as brook stickleback and central mudminnow, but due to its tendency to winterkill it does not support a game fish community.

Egg Lake is a deep lake (~60 feet) surrounded by wetlands, includes a sphagnum bog along the north and east shore and a cedar swamp along the south and west shore. Fish Division has not documented the presence of any fish species here, either through surveys or through angler reports. Access to the shoreline is difficult.

Green's Lake is a very shallow lake surrounded by state land on the island's west side. Green's Lake is approximately 4-6 feet deep with a sphagnum bog along the southeast shore. This lake has been stocked in the past by the Department of Conservation; both bluegill and black bullheads were stocked in 1939. By 1942, only the bullheads remained and the observation of annual winterkills in this shallow lake prompted the Department to discontinue fish stocking here.

Barney's Lake has a size of 45 acres, a maximum depth of 12 feet, and is one of the better fishing lakes on the island. There are some adjacent wetlands along the shore, and much of the surrounding terrain is high with hardwoods and cedar trees present. The Department of Conservation stocked Barney's Lake with both

largemouth and smallmouth bass up until 1942; studies from the 1940's through the 1960's show that bass and northern pike populations were very good. Angler reports from the past five years speak to a sparse perch and panfish fishery, but good northern pike and largemouth bass fisheries. In the spring of 2014 staff and students from the CMU Biological Station documented one adult lake sturgeon in the nearshore area of Barney's Lake.

Font Lake has an area of 380 acres, but is very shallow. During Fish Division's 2013 hook and line survey, the deepest water that was located was 8 feet deep, with the majority of the lake being 2-3 feet deep. Rock bass, yellow perch, and smallmouth bass were collected during this survey. Font Lake was stocked with walleye fry and smallmouth bass by the Department of Conservation in 1940; however subsequent studies determined that the walleye fry were unsuccessful in establishing themselves, most likely due to the shallow nature of the lake. Angler reports speak to abundant rock bass, small perch, and the occasional large smallmouth bass.

Fox Lake has a surface area of 75 acres, and depths up to 20 feet. Fox Lake is tannic, with both gravel and pulpy peat bottom types. It's a popular fishing lake, and has been surveyed numerous times by Fish Division. For many years the concern on Fox was the abundant but stunted yellow perch population, and a more robust population of game fish was desired by anglers. The Department of Conservation chemically treated Fox Lake on several occasions to remove the fish populations; in the 1940's and 1950's the lake was stocked with brook trout after these treatments. In the 1960's the stocking of rainbow trout followed these treatments, however trout never really took hold and by 1978 trout stocking had ceased. Today, Fox Lake is known as a panfish, pike, and walleye lake; the walleye were most likely brought over from the Beaver Island Wildlife Club's walleye rearing pond without Fish Division's knowledge. Official walleye stocking in Font Lake is set to begin in 2016.

Lake Geneserath is the island's most popular and largest lake at 485 acres. The lake is comprised of two basins, has one tributary that flows out to Lake Michigan (Cable's Creek), and has depths of up to 50 feet. Bottom types include gravel floats, sand shoal areas, and pulpy peat. Northern pike, largemouth bass, yellow perch, bluegill, pumpkinseed sunfish, smallmouth bass, and walleye all create a good sport fishery on this lake. The occasional spring-time steelhead are also caught in Lake Geneserath, particularly in years where water levels are high, as these migrate up Cable's Creek from Lake Michigan. Species such as largemouth bass were stocked into Lake Geneserath back in the 1930's and 1940's, but much of Fish Division's stocking effort has been concentrated on walleye. For approximately 15 years, Fish Division has used the assistance of the Beaver Island Wildlife Club to operate a walleye rearing pond on the island. The goal of this pond has been to rear walleye for stocking specifically in Lake Geneserath, to supplement the low level of natural reproduction of walleye that occurs here and create a sustainable walleye fishery for anglers on the island. In

addition, Lake Geneserath is managed as a walleye lake system under the 2007 Consent Decree with 1836 treaty tribal governments.

Lake Michigan

The nearshore waters of Lake Michigan that surround the archipelago are an abundant resource for tribal subsistence and sport fishing. There is a long history of whitefish and lake trout fishing for subsistence, commercial, and recreational purposes and today the smallmouth bass fishing and common carp fishing are popular sport fishing activities.



Figure 1. Geographic coverage of the Beaver Island State Wildlife Research Area, Charlevoix and Leelanau Counties, MI. State-owned lands are shaded.

Glossary

Adaptive approach—A systematic approach for improving resource management by studying past management outcomes, planning future actions, evaluating results of actions, and adjusting management practices as a result.

Cultural resources—Sites or objects that have important historical and social significance, including meeting places, documents, objects, stone structures and stone works, archaeological sites and historic places. From a tribal perspective cultural resources are places where the lifestyle and culture of the Anishinaabek, past and present, has created some type of importance to the site. These include, but are not limited to fishing and hunting sites, places where spirits inhabit or use, places where specific plants, minerals, and rocks are obtained for traditional uses, places where ceremonies were or are performed, burial locations, and places where significant events occurred.

Ecological resources—Natural resources such as forests, wildlife (including birds, mammals, reptiles, amphibians, and fish), native vegetation, and the conditions needed for functional interaction and survival.

Governance—The structure, policies, procedures, regulations and philosophies that groups follow in order to interact, make decisions, and conduct operations.

Partnership—For the purposes of this plan, a partnership is an alliance of individuals representing groups with a vested interest in collaborating on the governance and management of state-owned properties on northern Lake Michigan islands. The partnership acts collectively to meet the plan goals and objectives.

Recreation—Natural resource-based activities such as hunting, fishing, trapping, hiking, camping, mushroom picking, bird watching, etc.

Recreational infrastructure—Constructed objects supporting natural resource-based recreation such as access sites, trails, campsites, outhouses, etc.

Stressor or threat—A negative event, process, or entity with the potential to have detrimental effects on cultural or ecological resources. Stressors or threats may result in risks to the long-term sustainability of those resources (e.g., invasive species).

Subsistence—From a tribal perspective, any activity by tribal members that involves gathering, harvesting, or using natural resources. The areas covered by this plan are part of the 1836, Treaty of Washington, ceded territories and the five tribes party to the 2007 Consent Decree have rights to hunt, fish and gather in these areas.

Literature Cited

- Ammann, G.A. 1957. The Prairie Grouse of Michigan. Department of Conservation, Lansing, MI. 200 pp.
- Ammann, G.A. and W.L. Palmer 1958. Ruffed Grouse Introductions on Michigan Islands. Division Report No. 2172. Michigan Department of Natural Resources, Lansing, MI. 4 pp.
- Bartlett, I.H. 1938. Beaver Island Deer. Division Report No. 338. Michigan Department of Natural Resources, Lansing, MI. 4 pp.
- Bartlett, I.H. 1945. A Report on a Preliminary Investigation of the Deer Herd and Deer Habitat on South Fox Island, Leelanau County, Michigan. Division Report No. 893. Michigan Department of Natural Resources, Lansing, MI. 5 pp.
- Blokpoel, H. and Scharf, W. 1999. The importance of Great Lakes islands as nesting habitat for colonial waterbirds. Pp. 32-41 in Vigmostad, K. ed. 1999. State of the Great Lakes Islands. Department of Resource Development. Michigan State University, East Lansing, MI 124 pp.
- Bowen, K.D., Seefelt, N.E. and Gillingham, J.C. 2011. *Notophthalmus viridescens* Geographic distribution. Herpetological Review 42(2): 235.
- Bowen, K.D. and Gillingham, J.C. 2004. Distribution of reptiles and amphibians on islands of eastern Lake Michigan: Summary and analysis. Michigan Academician 36: 213-223.
- Cohen, J.G., M.A. Kost, B.S. Slaughter, and D.A. Albert. 2015. A Field Guide to the Natural Communities of Michigan. Michigan State University Press, East Lansing, MI. 362pp.
- Cohen J.G., and B.S. Slaughter. 2015. Natural Community Surveys and Stewardship Prioritization of Michigan's Coastal Zone. Michigan Natural Features Inventory Report Number 2015-27, Lansing, MI. 244 pp.
- Dayton, L. 1939. Beaver Island Deer Hunting Investigation. Division Report No. 421. Michigan Department of Natural Resources, Lansing, MI. 6 pp.
- Douglass, D.W. 1951. Reconnaissance of High Island, 1951. Division Report No. 1131. Michigan Department of Natural Resources, Lansing, MI. 3 pp
- Federal Register. 2001. Endangered and Threatened Wildlife and Plants; Final Determination of Critical Habitat for the Great Lakes Breeding Population of the Piping Plover. Pp 22938-22969.

Firestone, K.C. 1996. The Fox Islands. Michigan Island Research, Northport, MI. 228 pp.

Harding, J.H. 2014. Amphibians and Reptiles of the Great Lakes Region. University of Michigan Press, Ann Arbor, MI 378 pp.

Henson, B.L., D.T. Kraus, M.J. McMurtry and D.N. Ewert. 2010. Islands of Life: A Biodiversity and Conservation Atlas of the Great Lakes Islands. Nature Conservancy of Canada. 154pp.

Higman, P.J., Penskar, M.R., Lee, Y.M., Sanders, M.A. and Rogers, R. L. 2012. High Island rare species and invasive plant survey. Michigan Natural Features Inventory. Report 2012-03. 49 pp.

Little Traverse Bay Bands of Odawa Indians Natural Resource Department. 2015. 1855 Reservation Islands – Blueprints for Biodiversity, Protection and Restoration. Little Traverse Bay Bands of Odawa Indians Natural Resource Department. GLRI Project Final Report Number 2015-IFWP-01.

Maples, T.E. and G.J. Soulliere. 1996. Status of Michigan sharp-tailed grouse in the 1990s. Michigan Department of Natural Resources, Wildlife Division Report 3256, Lansing, Michigan, USA.

Michigan Department of Natural Resources. 1994. Policy 29.20-05 Management of State Owned Island Properties.

Michigan Department of Natural Resources. 2013. Managed Public Land Strategy. 35 pp.

Midwest Pheasant Study Group. 2012. National wild pheasant conservation plan. N.B.Veverka (ed.). Association of Fish and Wildlife Agencies. 111 pp.

Mifsud, D.A. 2014. Reptile and Amphibian Community Assessment and Evaluation for the Beaver Island Archipelago. Herpetological Resource and Management Report, 2014.

Moran, R.J., and W.L. Palmer. 1963. Ruffed grouse introductions and population trends on Michigan islands. Journal of Wildlife Management 27: 606-614.

Natural Resources and Ecotourism Steering Committee. 2013. Recommendations for natural resource management in the Beaver Island archipelago. 43 pp.

NatureServe. 2013. Biotics 5 database. NatureServe, Arlington, Virginia.

Pearsall, D., P. Carton de Grammont, C. Cavalieri, P. Doran., L. Elbing, D. Ewert, K. Hall, M. Herbert, M. Khoury., S. Mysorekar., S. Neville., J. Paskus., and A. Sasson. 2012. Michigami: Great Water. Strategies to Conserve the Biodiversity of Lake Michigan. Technical Report. A joint publication of The Nature Conservancy and Michigan Natural Features Inventory. 309 pp. with Appendices.

Penskar, M.R., Higman, P.J., Hyde, D.A., Cuthrell, D.L., Corner, R.A., Kost, M.A., and Judzewicz, E.J. 1999. Biological inventory for conservation of Great Lakes islands: 1998 progress report. Michigan Natural Features Inventory. Report 1999-01. 38 pp.

Penskar, M.R., Hyde, D.A., Higman, P.J., Paskus, J.J., Goforth, R.R. Cuthrell, D.L., Albert, D.A., and Boehm, R.L. 2000. Biological inventory for conservation of Great Lakes islands: 1999 progress report. Michigan Natural Features Inventory. Report 2000-11. 68 pp. with appendices.

Scharf, W. 1999. The importance of Great Lakes islands to nearctic-neotropical migrant birds. Pp. 42-46 in Vigmostad, K. ed. 1999. State of the Great Lakes Islands. Department of Resource Development. Michigan State University, East Lansing, MI 124 pp.

Scharf, W.C., M.L. Chamberlin, G.W. Shugart, and L. Graf. 2014. Landbirds banded on seven Lake Michigan islands 1968-1998. North American Bird Bander 39:39-41.

Scharf, W.C. 2015. Sharp-shinned hawks migrate Northward on islands in Lake Michigan and Southward along the Wisconsin Shore. Michigan Birds and Natural History 22(2): 99-100.

Seefelt, N.E., Gillingham, J.C., Farrell, P.D., Ortmann, L.A., Rasmer, D.R. and Bowen, K.D. 2013. *Plethodon cinereus* Geographic distribution. Herpetological Review 44(2): 269.

Seefelt, N.E., Gillingham, J.C., Farrell, P.D., Ortmann, L.A., Rasmer, D.R. and Bowen, K.D. 2013. *Chrysemys picta marginata* Geographic distribution. Herpetological Review 44(2): 272.

Seefelt, N.E., Gillingham, J.C., Farrell, P.D., Ortmann, L.A., Rasmer, D.R. and Bowen, K.D. 2013. *Storeria dekayii* Geographic distribution. Herpetological Review 44(2): 275.

State of Michigan. 2015. Wildlife and Game Area State Land Rules (PA 451, Section 504).

Soule, J.D. 1993. Biodiversity of Michigan's Great Lakes Islands. Michigan Natural Features Inventory, Lansing, MI. 40 pp plus appendices.

Whitcomb, D. A. 1974. Characteristics of an insular woodcock population. Mich. Dept. Nat Resour., Wildl. Div. Rep. 2720. 78pp.

Wood, R, and E. Carlson. 1980. The Michigan Deer Range Improvement Program-September, 1971 – September, 1979. Michigan Department of Natural Resources, Wildlife Division Report No. 2849. Lansing, MI. 7pp.

Other sources used to inform discussions

State of Michigan 2015. Draft Sustaining Michigan's Water Heritage. Michigan Department of Environmental Quality, Office of the Great Lakes. Lansing, MI 74 pp. plus appendices.

Appendix A. List of Amphibians and Reptiles

This list is based on information compiled over many years (references below) and represents all records for all lands surveyed, regardless of ownership.

Species	Common name	Beaver	Garden	Hog	High	Whiskey	South Fox	North Fox
<i>Notophthalmus viridescens</i>	Eastern newt	X	X	X ¹	X			
<i>Plethodon cinereus</i>	Red-backed salamander	X	X	X ²	X		X	X
<i>Ambystoma laterale</i>	Blue-spotted salamander	X	X		X			
<i>Ambystoma maculatum</i>	Spotted salamander	X			X ³			
<i>Bufo americanus americanus</i>	Eastern American toad	X	X	X	X	X	X	X
<i>Hyla versicolor</i>	Eastern gray treefrog	X			X ³			
<i>Pseudacris crucifer crucifer</i>	Northern spring peeper	X	X		X ³			X
<i>Rana catesbeiana</i>	Bullfrog	X						
<i>Rana clamitans melanota</i>	Green frog	X	X ³		X			
<i>Rana sylvatica</i>	Wood frog	X	X					
<i>Rana pipiens</i>	Northern leopard frog	X	X					
<i>Terrapene carolina carolina</i>	Eastern box turtle	X ³						
<i>Chelydra serpentina serpentina</i>	Common snapping turtle	X	X		X ³	X ³		
<i>Chrysemys picta</i>	Painted turtle	X	X	X ²	X	X ³		
<i>Thamnophis sirtalis</i>	Common garter snake	X	X		X	X	X	X
<i>Thamnophis sauritus septentrionalis</i>	Northern ribbon snake	X						
<i>Nerodia sipedon</i>	Northern water snake	X	X	X	X	X		X
<i>Storeria dekayi</i>	Brown snake			X ²			X	
<i>Storeria occipitomaculata occipitomaculata</i>	Northern red-bellied snake	X	X		X	X		
<i>Diadophis punctatus edwardsii</i>	Northern ring-necked snake	X	X				X	X
<i>Opheodrys vernalis</i>	Smooth green snake	X						
<i>Lampropeltis triangulum triangulum</i>	Eastern milk snake	X	X		X	X		X

¹ From Herpetological Review (2011) 42(2):235

² From Herpetological Review (2013) 44(2):269, 272, and 275

³ From Mifsud 2014

Rest from Michigan Academician (2004), 213-223

Appendix B. List of Threatened, Endangered and Special Concern Species and Biodiversity Map

This list is based on information compiled over many years and archived in the NatureServe Biotics database and represents all records for all lands surveyed, regardless of ownership through Spring 2015.

Scientific name	Common name	Federal status	State Status	Beaver	Garden	High	Hog	North Fox	South Fox	Whiskey
<i>Adlumia fungosa</i>	Climbing fumitory		SC		X			X		
<i>Asplenium viride</i>	Green spleenwort		SC						X	
<i>Botaurus lentiginosus</i>	American bittern		SC	X						
<i>Botrychium campestre</i>	Prairie Moonwort or Dunewort		T						X	
<i>Bromus pumpellianus</i>	Pumpelly's brome grass		T	X				X	X	
<i>Calypso bulbosa</i>	Calypso or fairy-slipper		T	X	X			X		
<i>Carychium nannodes</i>	File thorn		SC						X	
<i>Charadrius melodus</i>	Piping plover	E	E	X		X			X	
<i>Cincinnati cincinnatiensis</i>	Campelema spire snail		SC	X						
<i>Cirsium pitcheri</i>	Pitcher's thistle	T	T	X	X	X	X	X	X	
<i>Cypripedium arietinum</i>	Ram's head lady's-slipper		SC	X						
<i>Drosera anglica</i>	English sundew		SC	X	X					
<i>Euxoa aurulenta</i>	Dune cutworm		SC			X				
<i>Falco columbarius</i>	Merlin		T	X						
<i>Falco peregrinus</i>	Peregrine falcon		E						X	
<i>Gallinula chloropus</i>	Common moorhen		T	X						
<i>Gavia immer</i>	Common loon		T	X						
<i>Haliaeetus leucocephalus</i>	Bald eagle		SC	X	X	X	X	X	X	X
<i>Iris lacustris</i>	Dwarf lake iris	T	T	X	X		X			
<i>Littorella uniflora</i>	American shore-grass		SC	X						
<i>Mimulus michiganensis</i>	Michigan monkey flower	E	E	X						
<i>Orobanche fasciculata</i>	Broomrape		T	X		X			X	
<i>Panax quinquefolius</i>	Ginseng		T						X	
<i>Physella magnalacustris</i>	Great Lakes physa		SC	X		X				
<i>Pinguicula vulgaris</i>	Butterwort		SC	X	X					
<i>Pisidium idahoense</i>	Giant northern pea clam		SC	X		X	X			
<i>Pyganodon lacustris</i>	Lake floater		SC	X						
<i>Ranunculus cymbalaria</i>	Seaside crowfoot		T	X						
<i>Scirpus torreyi</i>	Torrey's bulrush		SC	X						
<i>Solidago houghtonii</i>	Houghton's goldenrod	T	T	X	X		X			
<i>Somatochlora hineana</i>	Hine's emerald dragonfly	E	E		X					
<i>Stagnicola contracta</i>	Deepwater pondsnail		E	X						
<i>Stagnicola woodruffi</i>	Coldwater pondsnail		SC			X				
<i>Stellaria longipes</i>	Stitchwort		SC			X				
<i>Sterna caspia</i>	Caspian tern		T			X				
<i>Sterna hirundo</i>	Common tern		T		X	X	X			
<i>Tanacetum huronense</i>	Lake Huron tansy		T	X	X	X	X	X	X	
<i>Trimerotropis huroniana</i>	Lake Huron locust		T	X	X	X	X	X	X	

**Biodiversity Element Occurrences in
Relation to State-Administered Lands (Gray)
Beaver Island Wildlife Research Area
Northern Lake Michigan
Charlevoix & Leelanau Counties, MI**

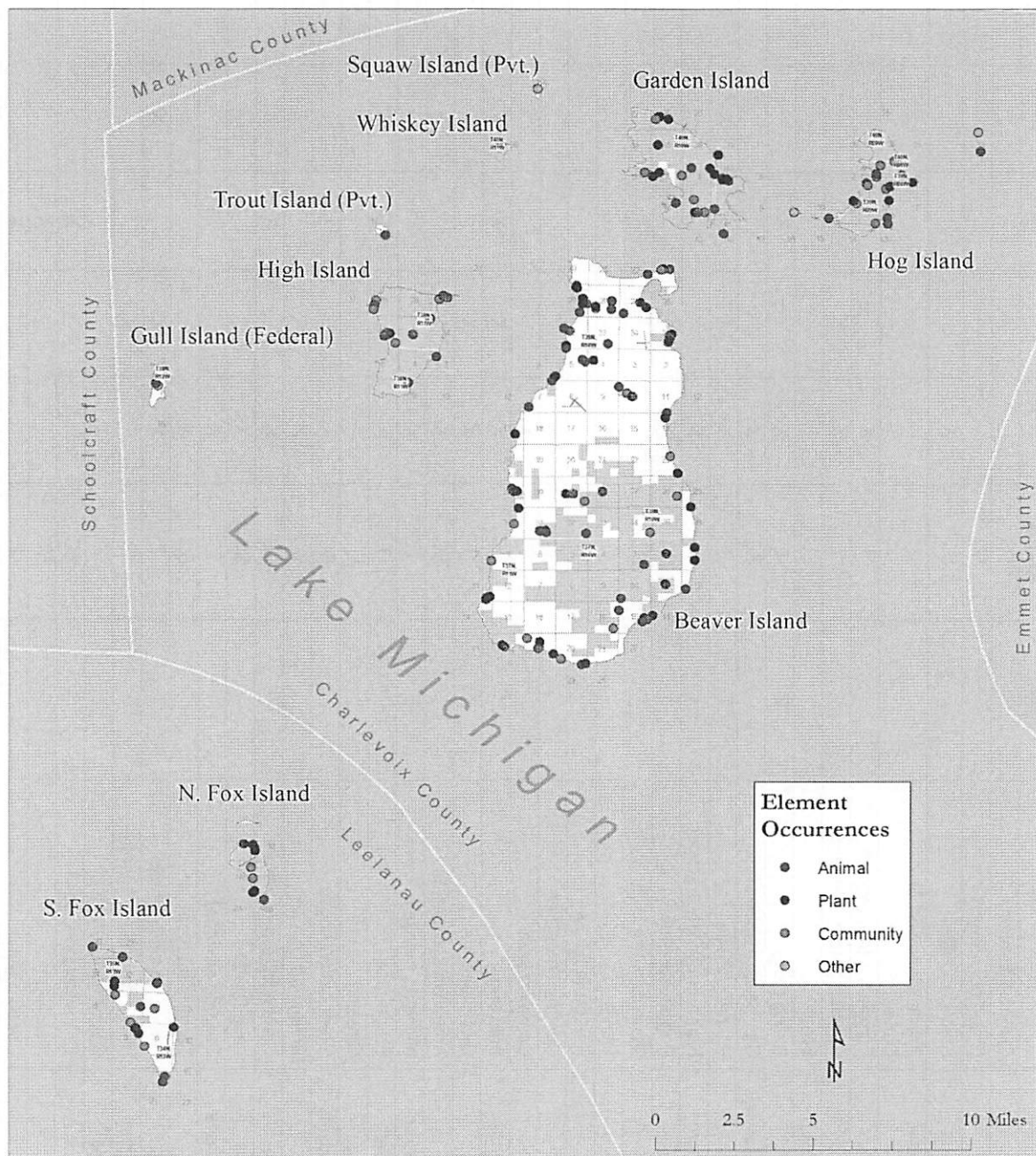


Figure 2. Biodiversity Element Occurrences in Relation to State-Administered Lands

Appendix C. Maps of Northern Lake Michigan Great Lakes Islands State Land Fund Source

These maps represent DNR Land Ownership and Fund Source information derived from the MDNR's Land Ownership Database as of 2/16/2016. Parcel information is compiled to the quarter-quarter section level.

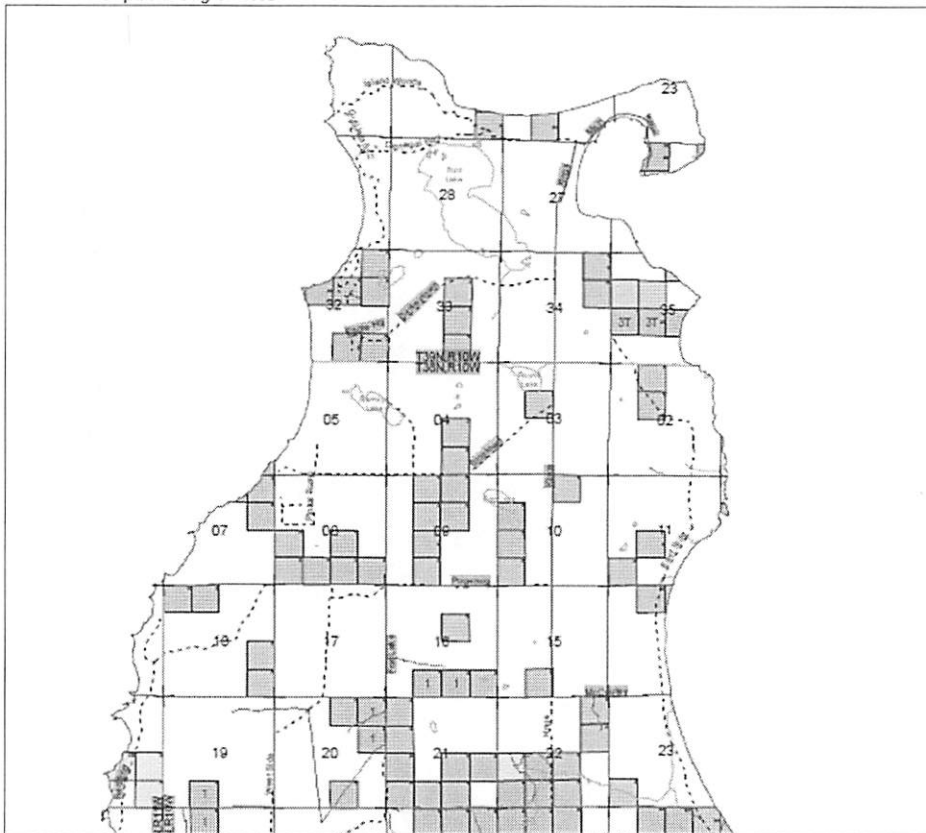
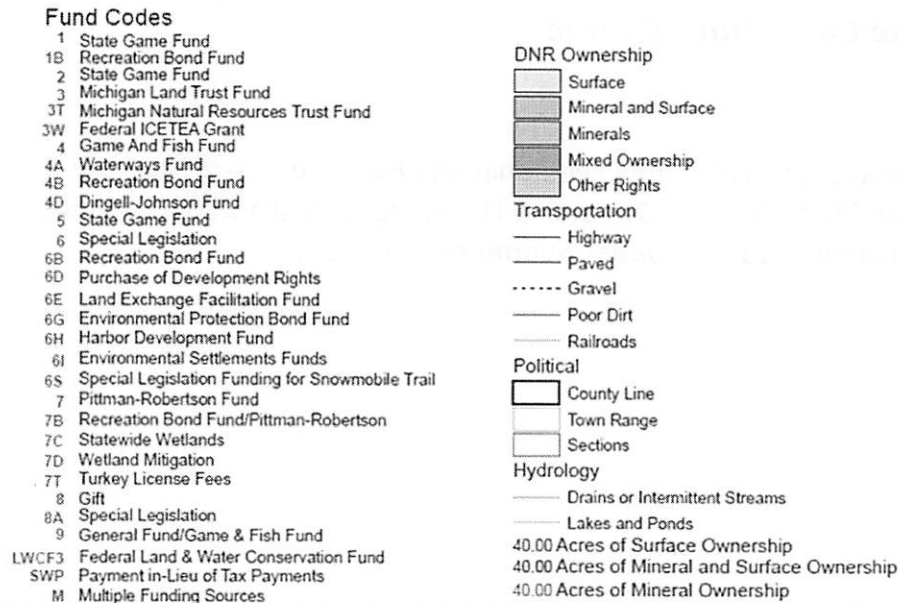
LEGEND

Figure 3. Land ownership and fund source information for State Lands, north Beaver Island, MI.

LEGEND

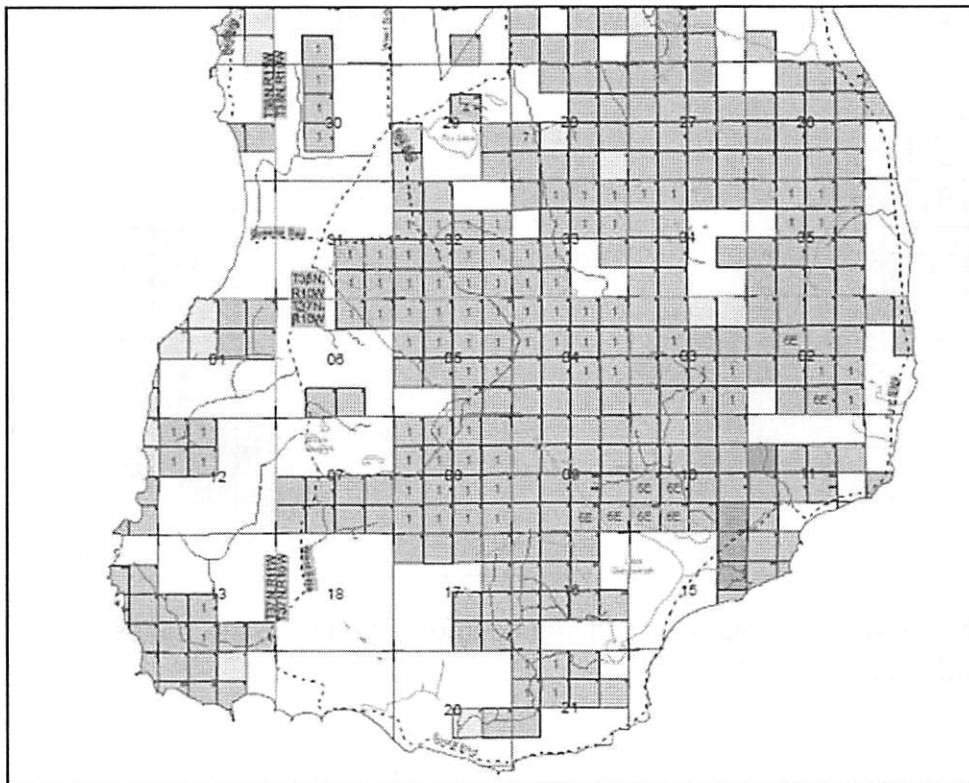
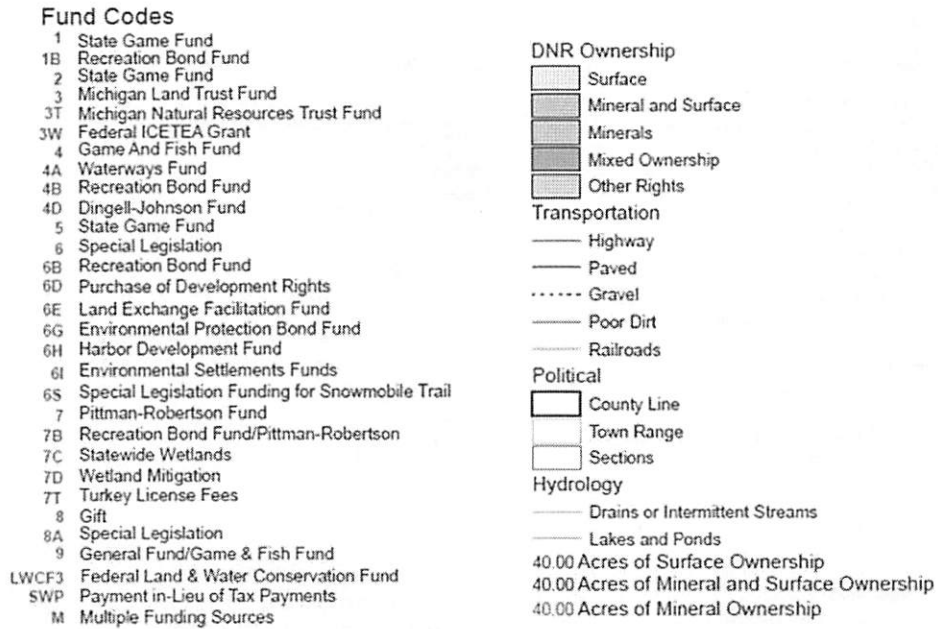


Figure 4. Land ownership and fund source information for State Lands, south Beaver Island, MI.

LEGEND

Fund Codes

1	State Game Fund
1B	Recreation Bond Fund
2	State Game Fund
3	Michigan Land Trust Fund
3T	Michigan Natural Resources Trust Fund
3W	Federal ICETEA Grant
4	Game And Fish Fund
4A	Waterways Fund
4B	Recreation Bond Fund
4D	Dingell-Johnson Fund
5	State Game Fund
6	Special Legislation
6B	Recreation Bond Fund
6D	Purchase of Development Rights
6E	Land Exchange Facilitation Fund
6G	Environmental Protection Bond Fund
6H	Harbor Development Fund
6I	Environmental Settlements Funds
6S	Special Legislation Funding for Snowmobile Trail
7	Pittman-Robertson Fund
7B	Recreation Bond Fund/Pittman-Robertson
7C	Statewide Wetlands
7D	Wetland Mitigation
7T	Turkey License Fees
8	Gift
8A	Special Legislation
9	General Fund/Game & Fish Fund
LWCF3	Federal Land & Water Conservation Fund
SWP	Payment in-Lieu of Tax Payments
M	Multiple Funding Sources

DNR Ownership

	Surface
	Mineral and Surface
	Minerals
	Mixed Ownership
	Other Rights

Transportation

	Highway
	Paved
	Gravel
	Poor Dirt
	Railroads

Political

	County Line
	Town Range
	Sections

Hydrology

	Drains or Intermittent Streams
	Lakes and Ponds

40.00 Acres of Surface Ownership

40.00 Acres of Mineral and Surface Ownership

40.00 Acres of Mineral Ownership

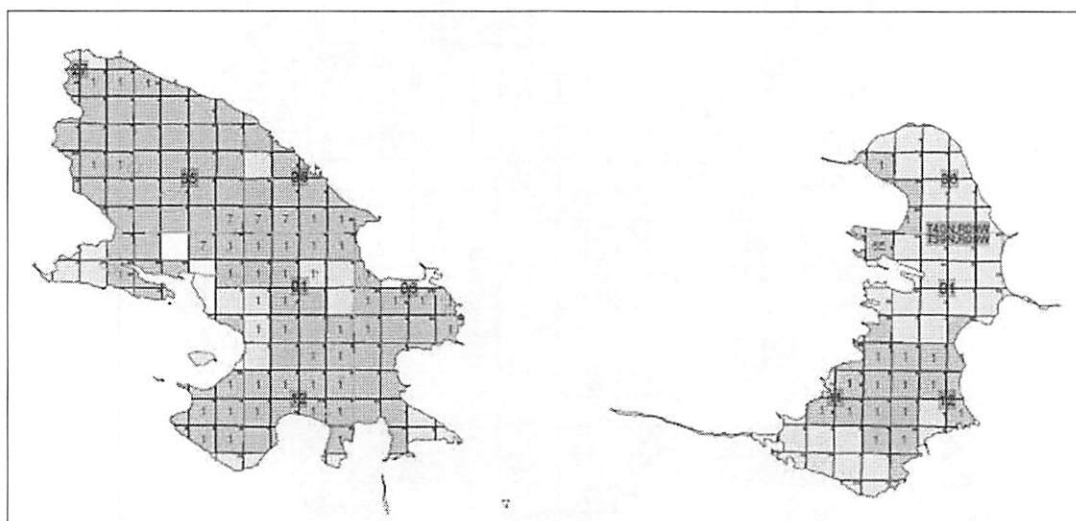


Figure 5. Land ownership and fund source information for State Lands, Garden and Hog Islands, MI.

LEGEND

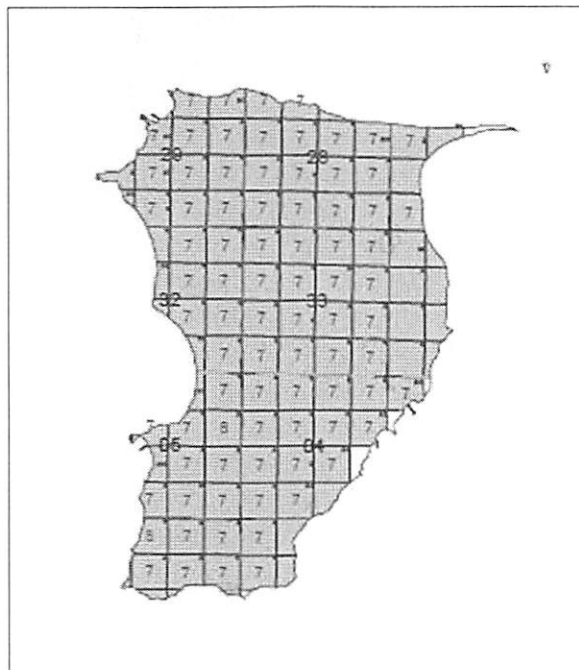
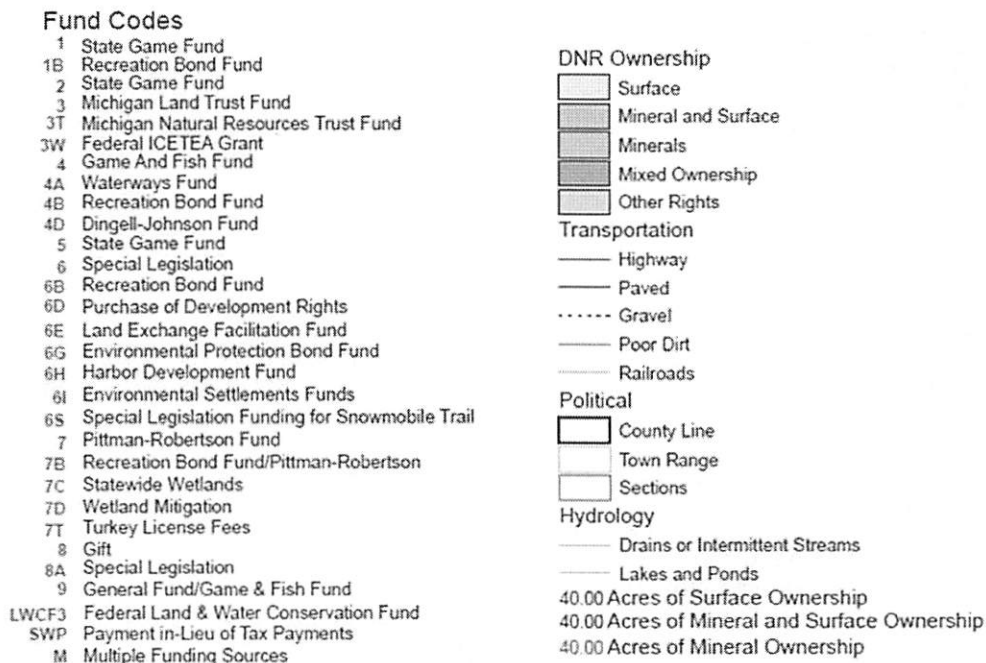


Figure 6. Land ownership and fund source information for State Lands, High Island, MI.

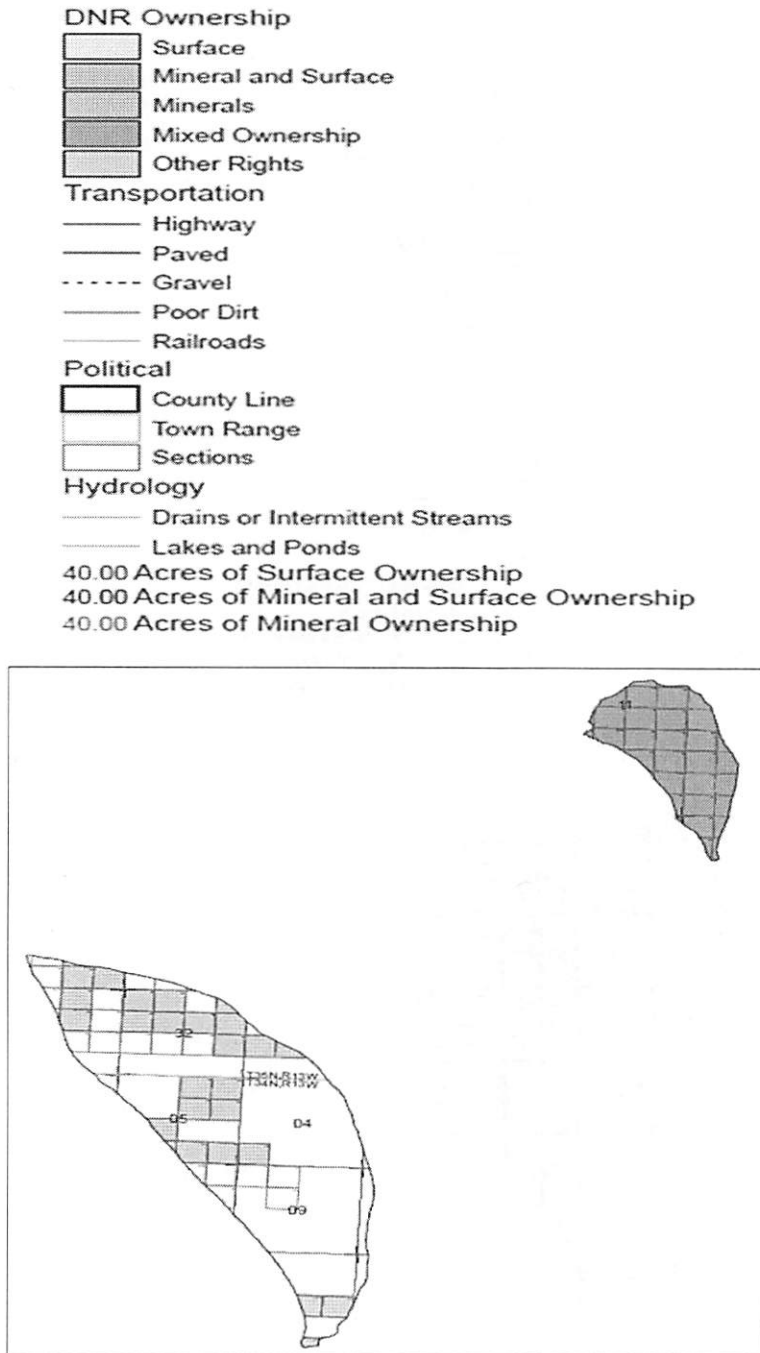


Figure 7. Land ownership and fund source information for State Lands, North and South Fox Islands, MI.