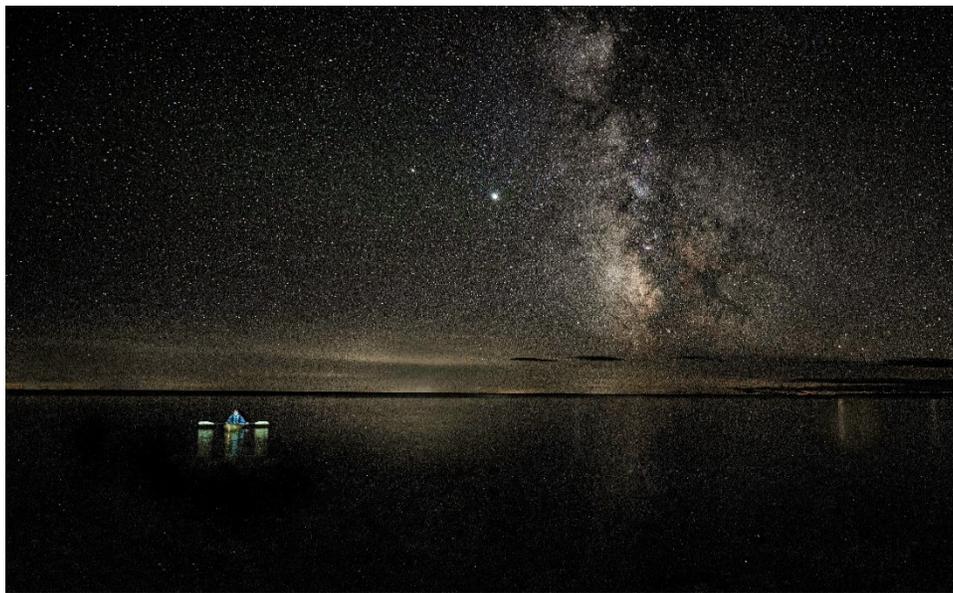


“We Have Dark Skies and We Are Going to Keep Them!”

APPLICATION FOR INTERNATIONAL DARK SKY SANCTUARY DESIGNATION

Beaver Island Association & Beaver Island Chamber of Commerce

BEAVER ISLAND DARK SKY SANCTUARY



“There is more to dark skies than just looking at astronomical objects through a telescope. “

~ Brian Vaeth, 2020

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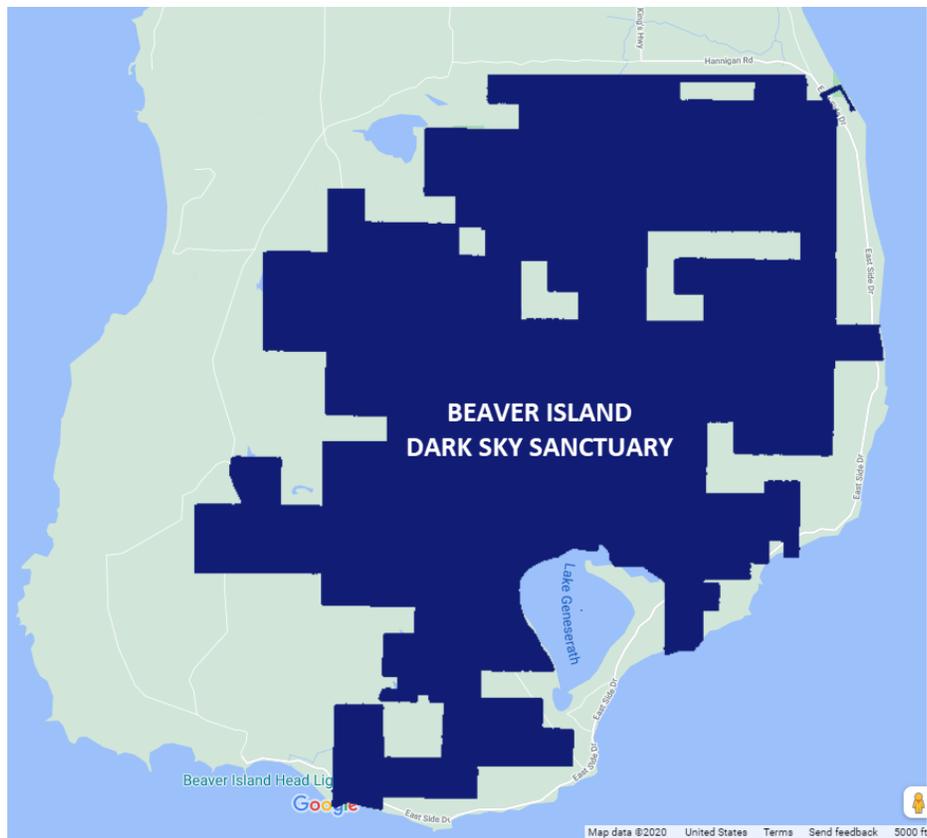
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Special Thanks: Beaver Island Dark Sky Committee and the Beaver Island Association



Introduction

Beaver Island is the largest island in the Beaver Island Archipelago in Northern Lake Michigan. The proposed Dark Sky Sanctuary, located at the southern least populated area of the island, is made up of (i) portions of the Beaver Island State Wildlife Research Area that include limited access roads and trails, (ii) adjacent land owned by the County of Charlevoix that includes a historic lighthouse and fog signal station as well as rustic camping facilities and (iii) an adjacent research area owned by Central Michigan University that includes a marsh and hiking trails. This isolated location features an unimpeded deep and dark night sky along with many other unique features due to location and conservation efforts. Night sky quality is illustrated and documented in this application with broad spectrum night sky photography, SQM readings, and statements of support by expert star gazers, astro-photographers and telescope buffs.

When observing in Beaver Island's dark sky landscape, viewers are gifted with deep and vast views of constellations, galaxies, nebulae, and the Milky Way, and with the phases of the moon and the cycles of the planets; the Island provides excellent views of meteor showers, Northern Lights, the occasional comet, and rare Zodiacal light. Members of the original Beaver Island Astronomical Society, now the Beaver Island Dark Sky Project, have recorded SQM readings at multiple Island-wide viewing areas including inside the proposed Sanctuary ranging to 21.86 and averaging 21.75 on the magnitudes per arcsecond squared scale. Even the skies above the Harbor lights downtown hold a dark sky background of the Universe.

Beaver Island is in Lake Michigan in the U.S. state of Michigan. It is the only inhabited island in the Beaver Island Archipelago (pictured at left in Figure 1 with the proposed sanctuary area shown in red). At 55.8 sq mi (145 km²), it is the largest island in Lake Michigan and the third largest island in the state of Michigan. The island is located approximately 32 miles (51 km) from the city of Charlevoix. Beaver Island had a total population of 657 at the 2010 census. Travel to the island is only possible via plane or boat. These means of travel can be abruptly halted due to snow, wind/ gales and ice. Inaccessibility has historically kept the island sparsely populated, isolated and far from any civilization marred by illumination. Even in the age of advanced technology, Beaver Island has remained free of

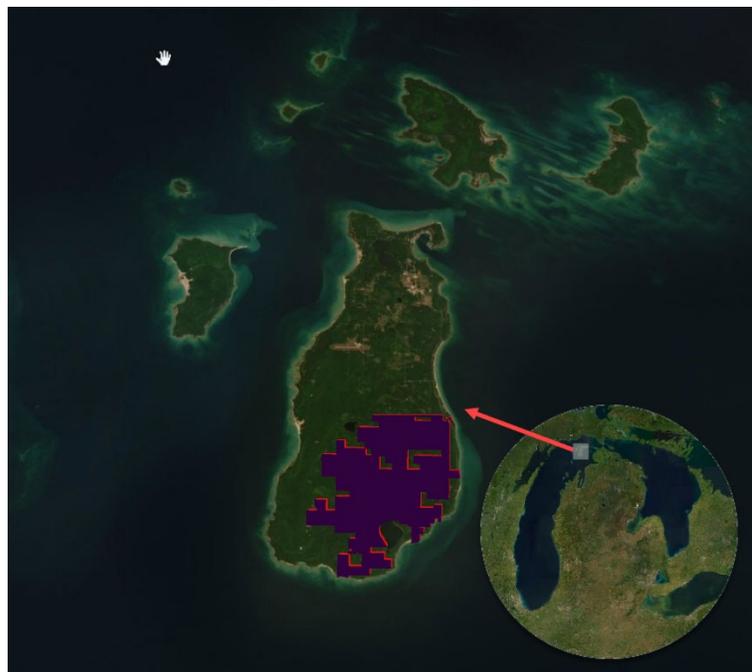


Figure 1: Beaver Island Dark Sky Sanctuary Location Map (Google Maps)

pollution except for nominal sky glow from the mainland, red and green lake channel markers and two airport beams.

The isolated circumstances of the island attract residents and visitors that are generally intent on preserving and enjoying its multiple natural resources. The island hosts a broad variety of eco-systems representative of those found in the great lakes areas and, as a result, a large portion of land is reserved for research purposes. The archipelago is designated as an Important Birding Area, providing important nesting habitat for colonial waterbirds, and is recognized for its significance to Neo-arctic-Neotropical migrants as a critical stop over, refueling, and as nesting habitats which are important to the bird conservation. The community recognizes that Beaver Island is a fragile ecosystem demanding constant vigilance in protection measures against invasive species, erosion and now at the top of the list, harmful light pollution that could damage our wild and human life.

The Beaver Island Dark Sky Sanctuary is a uniquely isolated location that also enjoys the support infrastructure of a vacation destination. The Dark Sky Sites map below (Figure 2) shows its location and ideal viewing conditions. Notably, the skies on the island are several degrees darker than those in the nearby Headlands Dark Sky Park, which is recognized by the IDA.

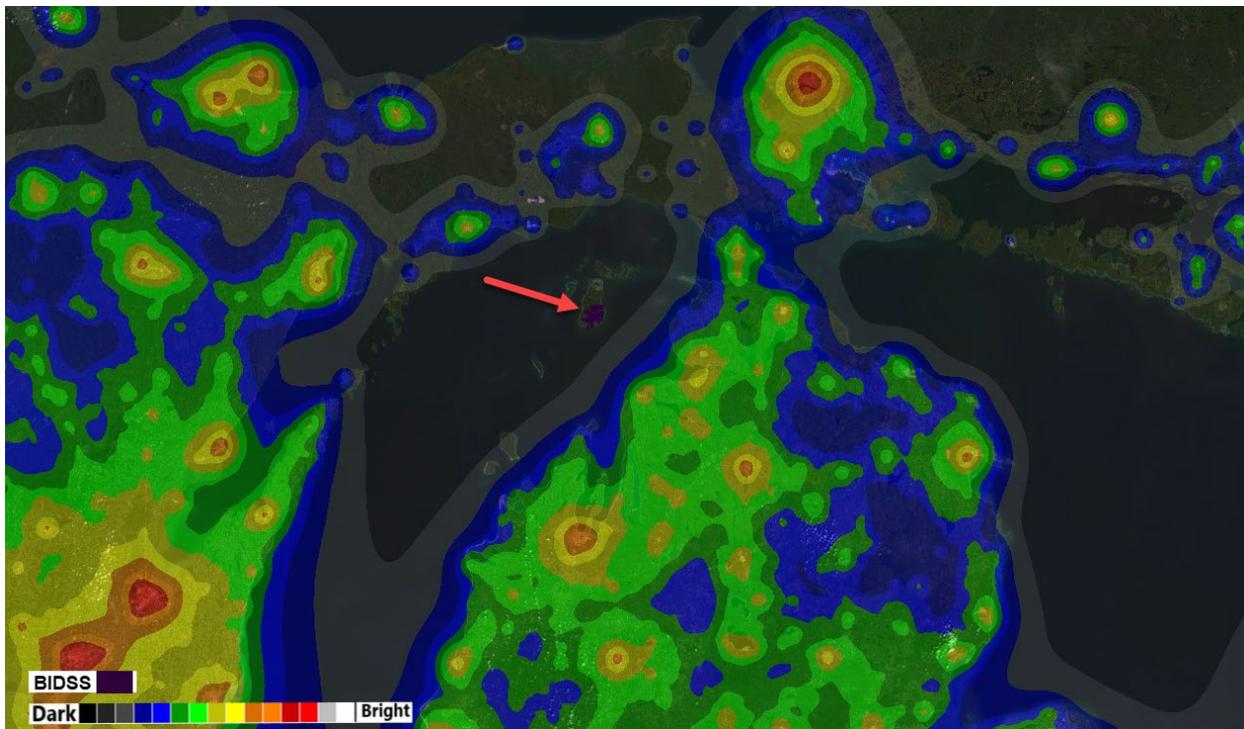


Figure 2: Dark Site Finder Location Map Overlay (darksitefinder.com)

While the island is uniquely dark and remote, it is within easy travel distance in the Midwest. Nearby mainland airports with commercial service from international carriers include Cherry Capital Airport in Traverse City (about an hour drive south from Charlevoix) and Pellston Regional Airport (about a 45 minute drive north). Indeed, as the next map (Figure 3) shows, it is difficult to find an accessible location with darker skies in the whole of the eastern United States.

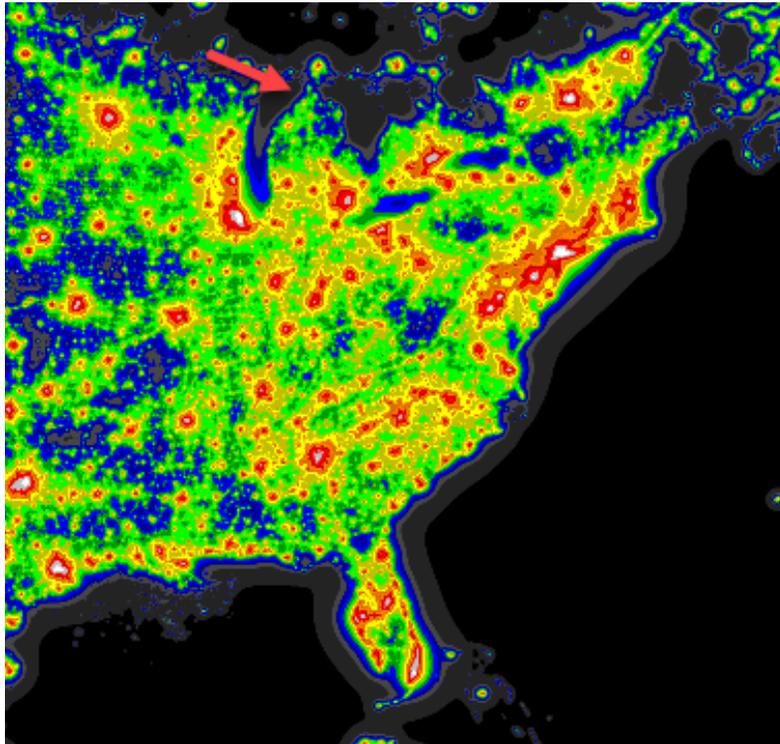
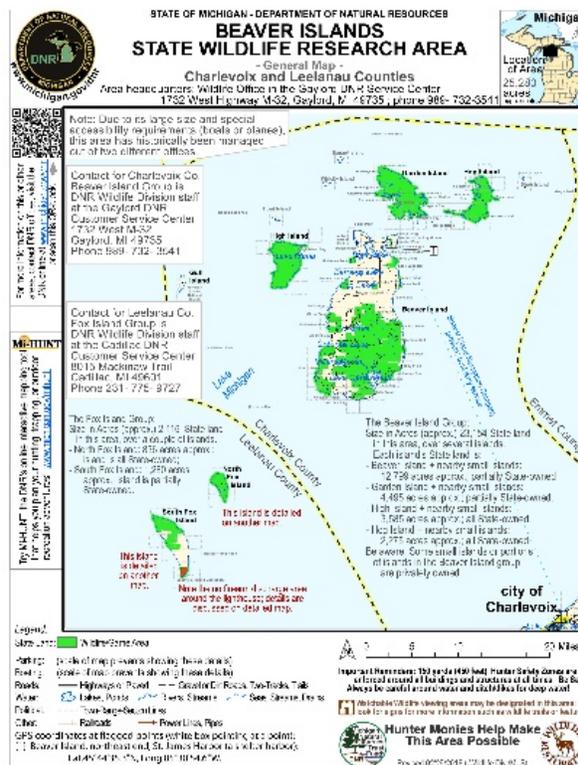


Figure 3: Dark Site Finder Map of Eastern U.S. (darksitefinder.com)

More about the Beaver Islands State Wildlife Research Area

The bulk of the Beaver Island Dark Sky Sanctuary lies within the southeastern boundaries of the Beaver Islands State Wildlife Research Area, a networked set of insular properties of the U.S. state of [Michigan](#). This section of the Research Area is approximately 12,000 acres in size. The entire research area is shown shaded in green in the adjacent map. It is overseen by the [Michigan Department of Natural Resources](#), Wildlife Division in Gaylord, Michigan and, as is discussed in greater detail elsewhere in the application, the DNR generally manages the research area in accordance with its name—as wilderness. Structures, roads and other improvements beyond those in place are prohibited. There is no artificial lighting, and the management plan does not allow for it. The Research Area includes other land on the island as well as the outlying islands in the archipelago. While the Beaver Island Dark Sky Sanctuary includes only those contiguous lands shown in the Beaver Island Dark Sky Sanctuary map (and not the entire Wildlife Research Area, it is important to note that the presence of those areas adjacent to the sanctuary area will help preserve its dark sky status (because of the strict limitations on development on those lands). In addition to the Wildlife Research areas, adjacent properties also include additional public lands that are protected from developments as well as private lands that are subject to conservation easements that limit development.



Signage from the Little Traverse Conservancy shows adjacent private lands being conserved and protected by that agency.

Access to the Beaver Island Dark Sky Sanctuary

To reach the BIDSS, go five miles south of the town of St. James, in Peaine Township, on East Side Drive or King’s Highway, the one paved road on the island. King’s Highway turns to gravel and several sections of the sanctuary are accessible by unmarked footpaths. At the end of

King's Highway at Hannigan's Road is a marked Birding Trail to enter. Along Hannigan's Road to the East and West are footpaths or two track drives interspersed between private property and state land for entrance. There are Seasonal Road, Birding Trail or Walking Trail signs to indicate entry points. Signs indicating the boundary of the sanctuary will be added to this signage. From the shoreline, the Beaver Island Water Trail Signage leads visitors onto the island near trails to access the sanctuary. Access points are also found on the Beaver Island Bike Trail.



Beaver Island Birding Trail Signage is consistently dispersed throughout the sanctuary denoting access and entrance. BIDSS signage will be added.

The sanctuary is easily accessible at Bill Wagner Memorial Campground on East Side Drive. The 22-site campground is owned by the state with reservations available via Peaine Township. Situated on the beach, this location offers views to the North, direct West and south.

The recommended and featured dark sky viewing areas inside the proposed Beaver Island Dark Sky Sanctuary are both easily accessible from the West Side Road. The Big Field, as it's traditionally called, is just north of Miller's Marsh and a quarter mile from the main road with its own two-track entrance. The Camp #3 viewing area is a mile and a half south of the West Side Road - Camp #3 Trail intersection with many views of the sky and multiple viewing areas. Both have zero light sources and no horizon light domes to interfere with any dark sky application from eyeball astronomy to astrophotography. Appropriate signage and directions will be put in place after receiving Sanctuary designation.

Below Hannigan's Road on the West Side is a seasonal road leading into the sanctuary, as well as many other seasonal roads around the sanctuary. The Birding Trail map above is clearly marked and many of these lead into the sanctuary. A good portion of the sanctuary simply has no marked paths and one can wander in and out of the state land as designated and governed by the DNR Wildlife division.

Map 5.2

Birding Trail

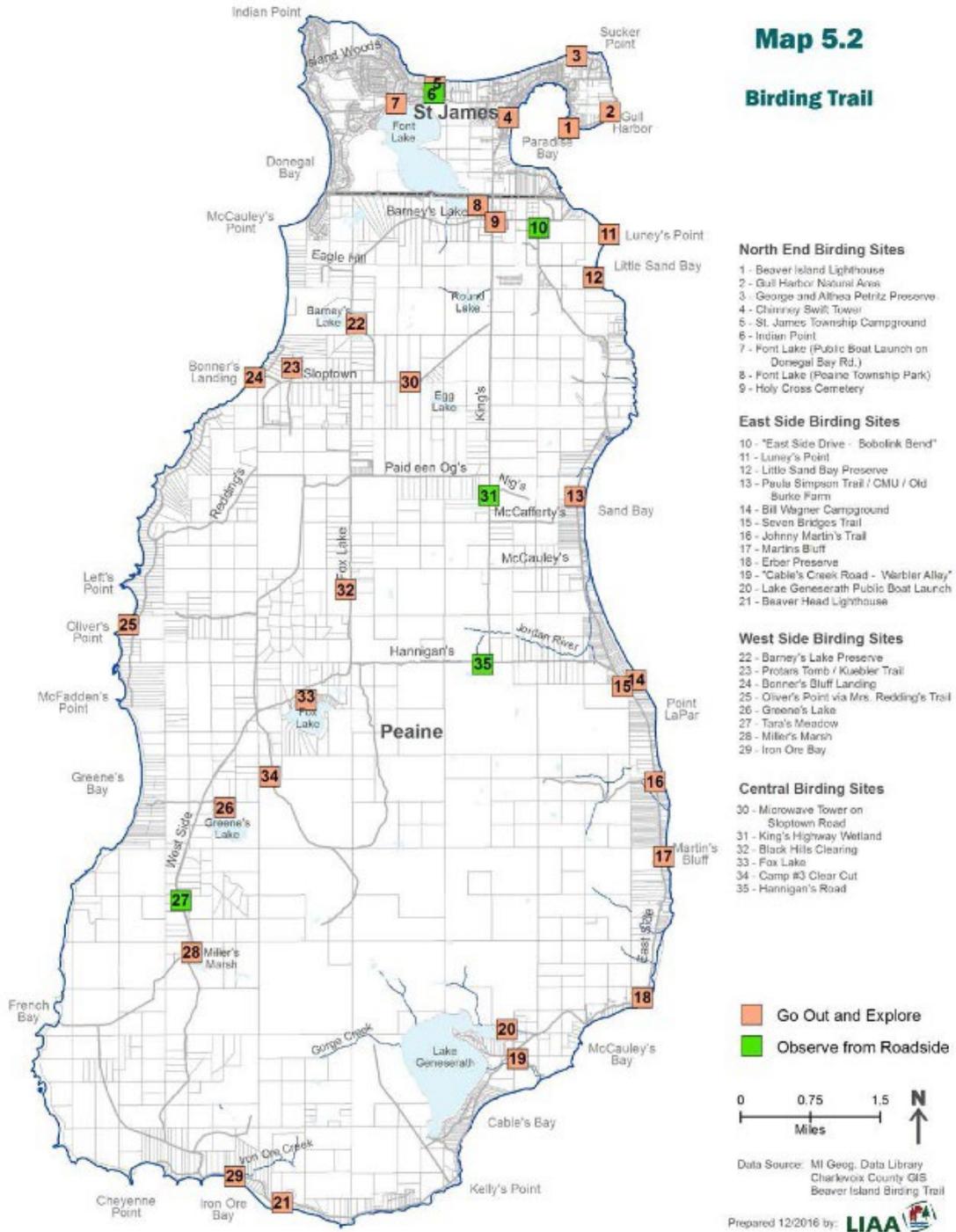


Figure 4: Beaver Island Birding Trail Map

The Certification Zone in Detail

The proposed area for certification as the Beaver Island Dark Sky Sanctuary (“**BIDSS**”) includes contiguous lands that are part of (i) the Beaver Islands State Wildlife Research Area (“**State Wildlife Research Area**” or “**SWRA**”), (ii) the Charlevoix County Beaver Head Light Park (“**Beaver Head Light Park**” or “**BHLP**”) and (iii) the Central Michigan University Miller’s Marsh Research Area (“**Miller’s Marsh**”).

Beaver Islands State Wildlife Research Area

The State Wildlife Research Area¹ is primarily made up of lands that were either never patented for settlement or were logged off and then allowed to revert to the state of Michigan in lieu of unpaid property taxes. Approximately 55% of the Research Area by land extent (12,734 acres) is located on the largest of the islands, Beaver Island. The remaining lands of the Research Area are distributed among the other islands of northern Lake Michigan. The Research Area cooperates with a federal unit, the Michigan Islands National Wildlife Refuge.

The Research Area is a place for the study of shoreline animal, bird, and plant life. The Michigan DNR manages the northern four islands of the Research area, located in Charlevoix County, from a full-time staffed office in Gaylord, Michigan. The proposed Beaver Island Dark Sky Sanctuary resides under the management of this office.

The Research Area hosts field studies on biology and ecology. The area has been and continues to be altered by human life and use. Hunting, fishing, boating, and camping are allowed subject to state laws and regulations.

¹ The US Geological Survey description of the SWRA is available at tis link: <https://www.topoquest.com/place-detail.php?id=1625039>

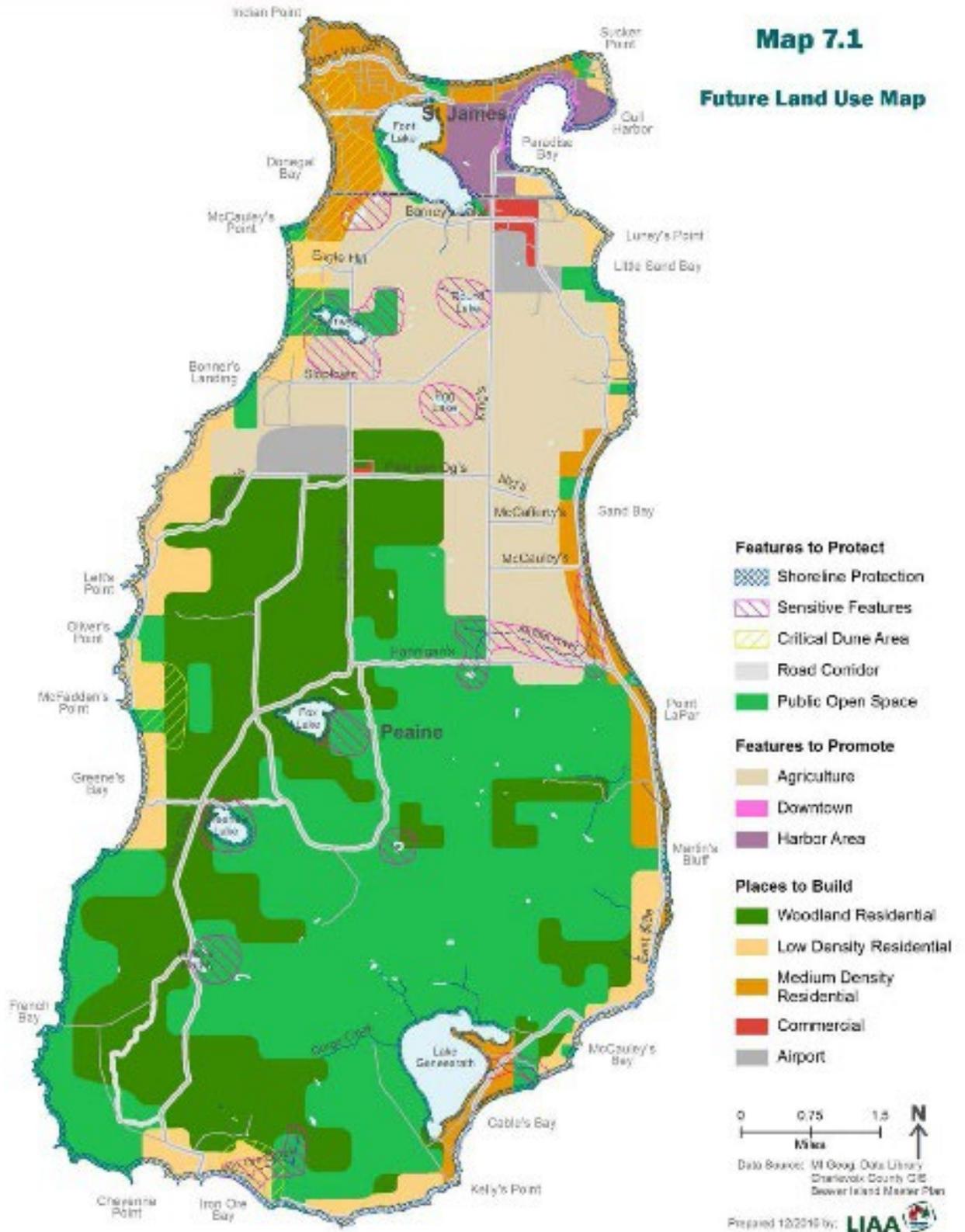


Figure 5: Land Use Plan from Beaver Island Master Plan

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

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 and the other islands in the group are significant from a cultural perspective because of the history of indigenous peoples here. The oral tradition of the Odawa, who have resided on the island for 350 years, says Native Americans began passing the islands 2,200 years ago, and there is archaeological evidence of this presence. As is discussed later in this application, the traditions of the Odawa and other indigenous peoples in the area respected the balance of nature and stewardship of resources.

Beaver Island is the only island considered in this plan with scheduled commercial ferry and airline service (two airports), and year-round residents. Important management matters on state lands, among others, include administration of an existing gravel pit, public access sites at Lake Geneserath, Greene's 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. See Federal Register 2001: 22938.

Several land conservancy agencies and individual property owners listed below have coordinated efforts to preserve and manage numerous sites on the island for use by the public as natural, protected areas.

Management Zones on State-owned Lands

Northern Lake Michigan Islands Collaborative

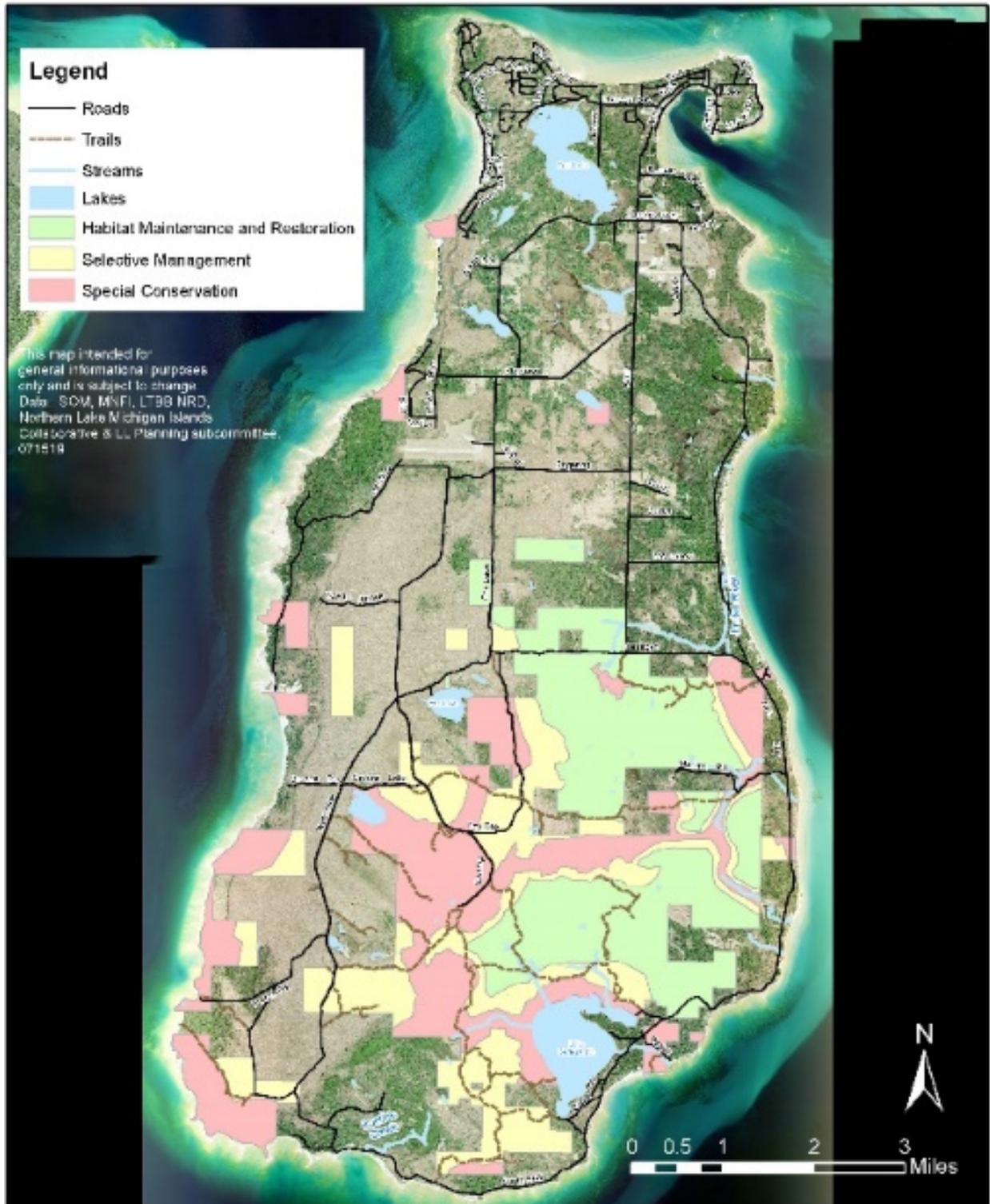


Figure 6: NLMIC Land Use Planning Map

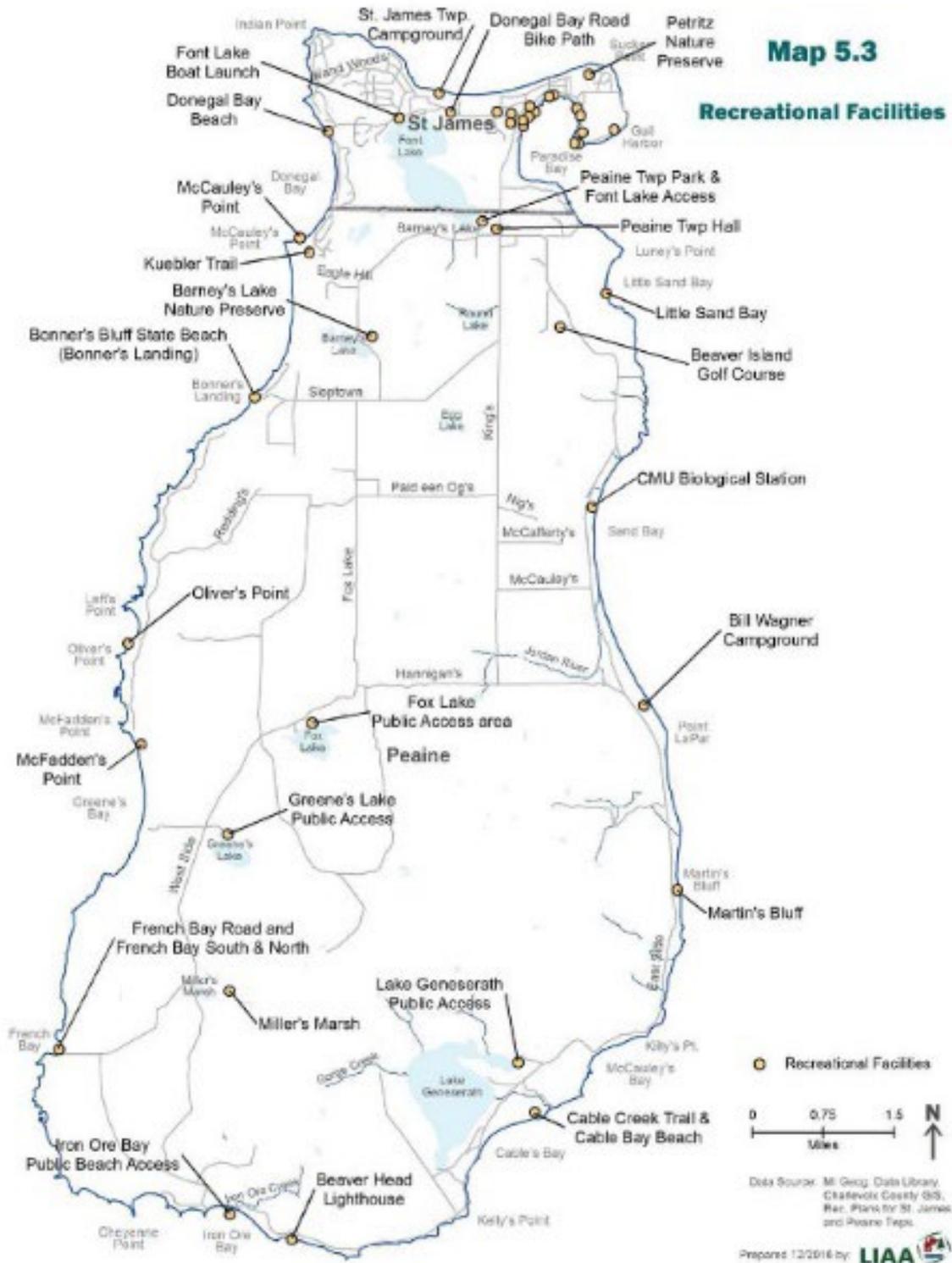


Figure 7: Recreational Facilities Map from Beaver Island Master Plan

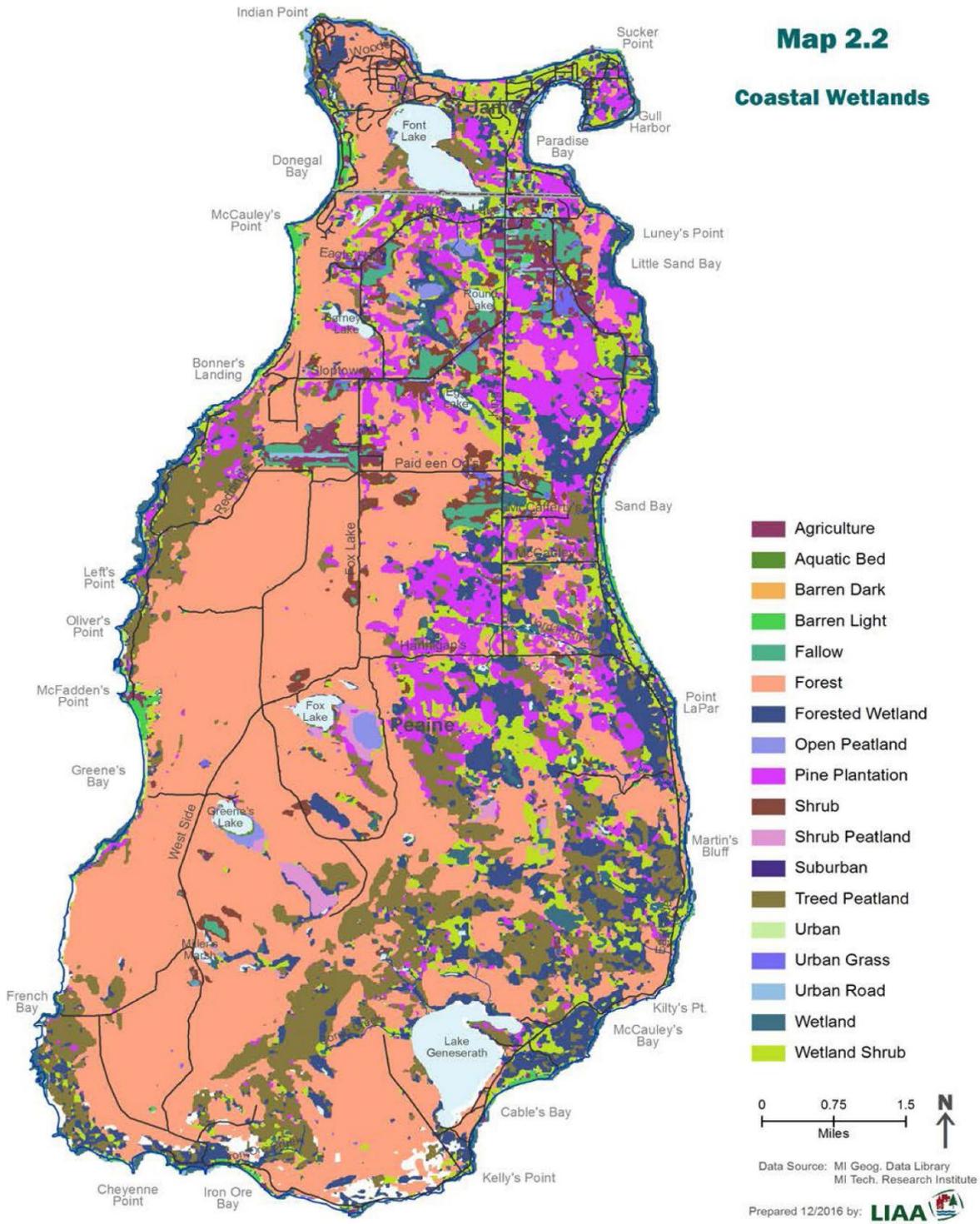


Figure 8: Beaver Island Wetland Areas from Beaver Island Master Plan

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, Little Traverse Conservancy, Little Traverse Bay Band of Odawa Indians. John Woollam Foundation).

The documents listed below 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. 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.
7. 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. with Appendices. Page | 3 Management Plan for State-owned Lands on Northern Lake Michigan Islands February 2017
8. St. James Township (Draft) Recreation Plan 2012-2016 St. James Township, Beaver Island.
9. Peaine Township (draft) Recreation Plan, Beaver Island.
10. U.S. Department of Interior, Fish & Wildlife Service (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. DNR POLICIES & PROCEDURES 29.20-05 – Management of State-owned island properties (ISSUED: 07/11/2005)

Charlevoix County Beaver Head Light Park

Beaver Head Light Park is made up of three contiguous parcels of land including 1,400 feet of Lake Michigan frontage at the south end of Beaver Island. Charlevoix County, the Michigan county in which Beaver Island is located, owns BHLF. Most of the property is wooded and undeveloped, but it features several historic buildings, including a lighthouse, a carriage house, a fuel building, and a fog signal building. Academic facilities are also located on the property, including a school, commercial kitchen/cafeteria building, three (3) bunk houses, and a maintenance building. The property also features a former rustic campground, including a well pump, two (2) outhouses and a storage building.



Figure 9: Beaver Head Lighthouse

The academic facilities were used for many years as an alternative school operated by Networks Northwest in an arrangement with the Charlevoix Public School District, the prior owner of the property. The county and community are investigating future uses for the academic facilities and the Beaver Island Historical Society is leading community efforts to repair and restore the lighthouse in cooperation with the county. Renovations at the site will include installation of compliant lighting. It is envisioned that the facilities could be used in connection with educational programs for the BIDSS.

The lighthouse is a beloved fixture on the island and is deeply intertwined in its history. It has



Figure 10: The fog signal building has been restored and has potential for use as meeting and assembly facility. It is steps from Lake Michigan.

gone through two distinct stages: in the nineteenth century it was almost in a world of its own because of the difficulty of reaching it, but in the twentieth a road linked it to St. James and it became one of the stretch points that expanded the scope of life on Beaver Island. Its keepers gave their names to such Island

features as Appleby's Point and Miller's Marsh, and Islanders like Owen McCauley, Dominick Gallagher, Tom Bonner, and Bert McDonough served at the Island's far end. Over the years docks and additional buildings were added and rebuilt. The oil light was replaced with an electric arc in 1938, and in 1962 the Lighthouse was decommissioned. It was sold as surplus and became a hunting club until it was acquired by the Charlevoix Public Schools in 1975.



Figure 11: Developed area of Beaver Head Lighthouse Park

Central Michigan University Miller’s Marsh Research Area

The Miller’s Marsh Research Area is a 230-acre site owned by Central Michigan University (“**CMU**”). It is used in conjunction with the CMU Biological Station on the east side of the island. Miller’s Marsh is the largest and most diverse marsh found on Beaver Island. This wetland’s diversity consists of a combination of open shallow water, extensive sedge (to the west), and sphagnum mats (to the east) surrounded by a vast mature second growth beech-maple forest. It is home to frogs, migratory birds, and waterfowl. The marsh is biologically unique since it is the only site on Beaver Island where blue-green algae can be found. Miller’s Marsh is an ideal site for both aquatic and terrestrial biological research.

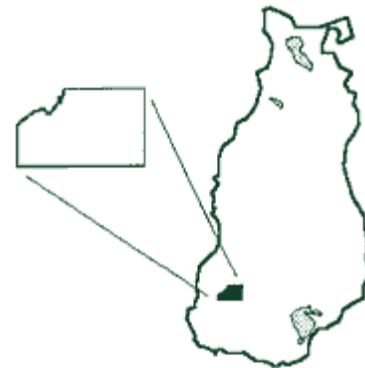


Figure 11: MMRA location on the island

There is a marked nature trail that circles the marsh and that includes several open areas that are good dark sky observation sites including the “Big Field” mentioned elsewhere in this application. The trail starts and ends at a small parking area. This area also marks the southern end of the island’s Doty’s Camp Trail.

Miller’s Marsh is named after former Beaver Head Lighthouse Keeper Harrison “Tip” Miller. Purchased by the Little Traverse Conservancy in 1997, this property was conveyed to the Central Michigan University Biological Station in 1998.

IDA Sanctuary Definition, Eligibility and Requirement Statements

Definition of an IDA International Dark Sky Sanctuary

The BIDSS consists of mostly public land possessing an exceptional or distinguished quality of starry nights and nocturnal environment, and is specifically protected for scientific, natural, educational, cultural, and public enjoyment values. It differs from a Dark Sky Park or Reserve in that it is situated in a very remote location with few nearby threats to the quality of its dark night skies and does not otherwise fall into the category of Park or Reserve. The Beaver Island Dark Sky Sanctuary chose the “Sanctuary” certification for the following reasons.

- The Wildlife management unit is not a “Park”. From a land manager’s perspective, this is a specific State-managed Wildlife Research Area, accessible to the public. Management objectives guide the promotion of sustainable ecotourism/astro-tourism.
- Management objectives guide to further the protection of nocturnal habitats, public enjoyment of the night sky, the area’s cultural heritage, and identification of areas ideal for professional and/or amateur astronomy.
- The BIDSS contains remote geographic locations within the area. The IDSS certification could help increase awareness of fragile locations and help promote their long-term conservation management.
- To encourage landowners/administrators, land managers in surrounding public lands, communities, and private interests to identify dark skies as a valuable resource in need of proactive conservation and preservation.
- To encourage other public land managers to become environmental leaders on dark sky issues by communicating the importance of dark skies and by providing an example of what is possible with proper stewardship.

Eligibility for All Sanctuaries – BIDSS Statements

The BIDSS:

1. Is publicly owned by State land agencies. The South End, Beaver Island Beaver Head Lighthouse property is a publicly accessible property owned jointly by Charlevoix County and Networks Northwest. All State land included in the sanctuary is legally protected for scientific, natural, educational, cultural, heritage and/or public enjoyment purposes, and other wilderness character qualities. Verbal permission has been granted from the co-owners of the Lighthouse property, indicated in orange shading on the Beaver Island Map for access and use as a dark sky viewing area.
2. Provides an opportunity for regular public nighttime access, with or without supervision. Access is available any night. There is no need for a waiver concerning endangered wildlife, archaeological sites, or other sensitive resources as they are already protected in this primitive area.
3. Ensures public accessibility as all night sky viewing areas are accessible with or without private land transit.

4. Provides exceptional dark-sky resource where the night sky brightness at the zenith is routinely equal to or darker than 21.5 magnitudes per square arc second in the visual band and significant light domes are not present toward the local horizon in any direction. (Illustrations below show light pollution levels for Beaver Island on the David Lorenz Light Pollution Atlas in 2006, and in 2016.

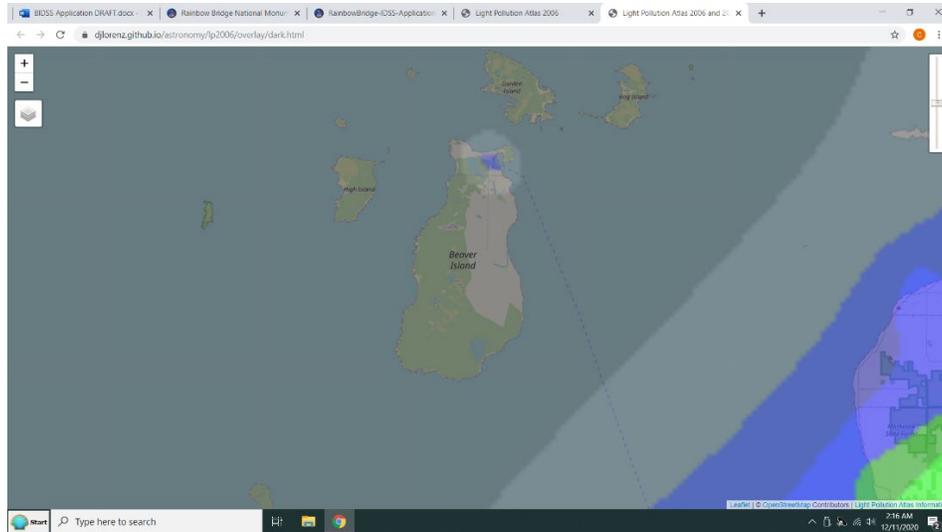


Figure 12: David Lorenz Light Pollution Atlas 2006

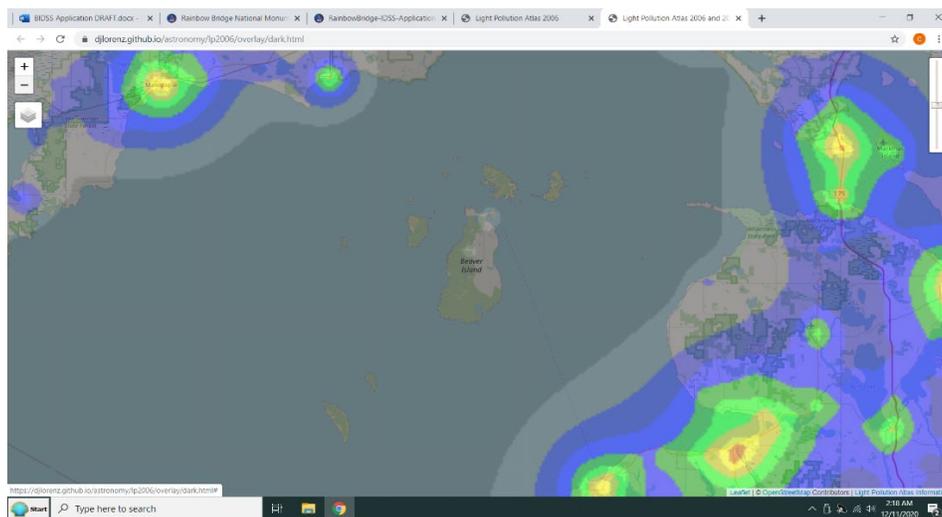


Figure 13: David Lorenz Light Pollution Atlas 2016

Minimum Requirements for All Sanctuaries – BIDSS Statements

1. A comprehensive Lighting Management Plan (LMP) is adopted by the Beaver Island Dark Sky Sanctuary under the policies of the DNR Wildlife Division that holds title to and manages the BIDSS land.
2. The BIDSS does not have or permit outdoor lighting, and we are committed to protecting this primitive nature of the area as designated wilderness.

3. Although the BIDSS does not have a lighting conformity schedule because there are no light fixtures in the area, we are committed to keeping it that way via law, policy and guidance related to the management of a state and federally designated wilderness area.
4. The DNR has established and will maintain a monitoring program that follows the evolution of any light pollution in the BIDSS to ensure that the night sky quality does not degrade over time. The Beaver Island Dark Sky Sanctuary and DNR will also consider the option of submitting our light measurement needs as a citizen science volunteer opportunity.
5. See the section below titled “Threats to Dark Skies” for a description of current and potential future threats to dark skies over the BIDSS. Any ecological threat to wildlife, environmental changes, erosion, invasive species and more can threaten dark sky conditions.
6. The importance of dark skies/natural darkness is addressed in BIDSS external communications. The dark skies theme is communicated through on-site interpretation, social media (Beaver Island Dark Sky Project Facebook page, a Dark Sky website and other materials for the public. As more visitors discover Beaver Island, the rich history and heritage and the pristine lands available for exploration and dark sky viewing, these opportunities grow every year.
7. Dark skies in the BIDSS area are acknowledged as an important scientific, natural, cultural, and/or scenic resource value by jurisdictions higher than community level such as the, National Forestry Service, the Fish & Wildlife Division of the DNR, EGLE, MNFI, Beaver Island Dark Sky Sanctuary, State of Michigan, County and local governing agencies. Private investors and conservationists recognize the value of preserving rare areas and have taken steps to install policies that protect many areas. Examples include the recent downtown Marina acquisition that includes a dark-sky lighting plan, recent real estate purchases of private land that have incorporated the preservation in conjunction with said purchases and extreme efforts and donations and preservations of tracts of land by private individuals. Sarah Martin Preserve-2016: 150 Acres A list of donated and preserved land and nature reserves on Beaver Island can be found at the DNR and Little Traverse Conservancy, plus the Nature Conservancy websites.
8. Once established, the BIDSS, in coordination with the DNR will erect and maintain appropriate signage, indicating the International Dark Sky Sanctuary certification, in appropriate locations. Beaver Island Dark Sky Sanctuary is the title currently under consideration. BIDSS ENTRANCES, will be promoted at the local Chamber of Commerce, Library and Community Center, referenced or indicated on existing preserves, nature parks, water trail, bike trails, birding trails, as BIDSS entry point kiosks as approved by the IDA. Once the signs are erected, a photograph documenting placements will be taken and sent to IDA for records, along with a description of the locations.
9. Night sky quality has been established through:
 - Measurements/calculations, maps, and photographs of possible areas within the proposed zone that may be affected by sources of light pollution. See the section below

titled “Threats to Dark Skies” for a description of current and potential future threats to dark skies over the BIDSS.

- A determination of whether the minimum sky quality standard has been met through sky brightness measurements made via an IDA-approved data collection method. Measurements were distributed over a sufficiently long enough period (summer, fall and spring based on staff availability) in order to average out fluctuations over timescales ranging from nights to seasons in length. The BIDSS believes that the BIDSS management area meets the definition and eligibility requirements for certification as a Dark Sky Sanctuary as specified in the IDA’s Dark Sky Sanctuary certification guidelines and requirements.

Night Sky Preservation Guidance

The BIDSS is a management area within the Beaver Island State Wildlife Research Area and legally protected for scientific, natural, educational, cultural/heritage resources and/or public enjoyment purposes. Dark sky quality is part of that protected wilderness character fabric already being preserved and monitored. To protect our dark skies is to add another layer of protection for all life in these areas. To add this layer of protection, education and guidance is the key to awareness and preservation of these skies.

The following list of natural communities was compiled by the Michigan Natural Features Inventory (MNFI) scientists for the Michigan Department of Natural Resources during a survey conducted in 2017. Protecting and managing representative natural communities is critical to biodiversity conservation, since native organisms are best adapted to environmental and biotic forces with which they have survived and evolved for over the millennia (Kost et al.2007, Cohen et al.2015).

- Boreal Forest – One of highest ranked examples documented in state (Confirmed)
- Coastal Fen – One of the highest ranked examples documented in state (Confirmed)
- Dry-mesic Northern Forest (Confirmed)
- Great Lakes Marsh – Two of highest ranked ex. in region (Confirmed)
- Hardwood-Conifer Swamp – Highest ranked example documented in state (Confirmed)
- Interdunal Wetland (Confirmed) Limestone Cobble Shore (Confirmed)
- Mesic Northern Forest (Confirmed) Northern Wet Meadow – Highest ranked example documented in state (Confirmed)
- Open Dunes (Confirmed) Poor Fen (Probable) Rich Conifer Swamp (Confirmed)
- Sand and Gravel Beach – Gr. Lk. Ver.: one of highest ranked ex doc in state (Confirmed)
- Wooded Dune and Swale Complex (Confirmed)

Figure 14: Beaver Island Archipelago Natural Communities

Beaver Island's natural resources define our community's sense of place; we value them as a source for beauty and spiritual well-being, economic activity and recreation, scientific knowledge and cultural heritage, and because they provide food and fuel. Over the years, the Archipelago has benefited from the decisions of people here and afar: decisions to protect the Lake Michigan waterfront from rampant commercial development; to place outer islands in the public trust for conservation; to use conservation easements and public land acquisition to maintain natural beauty and environmental health; to develop land with environmentally friendly practices; to monitor, enhance, and carefully manage wildlife—both plant and animal. All of it relatively unspoiled and easily accessible to the public.

Beaver Island contains species of global significance, is listed as a high-value conservation area, and is one of the highest ranked of 32,000 Great Lakes islands for its biodiversity. Designated as an Important Birding Area, the Archipelago provides significant habitat for colonial water birds, neo-tropical migratory songbirds, and rare plants, and serves as an important fish spawning and nursery area. It's easy to imagine that all of this will remain much as it has been without anyone having to make an effort. It's so vast and beautiful—what could go wrong? But we saw in the last century, with the historic decline of fishing and the end of virgin timber logging, that this uniqueness and abundance of natural resources can be seriously damaged when it is not carefully maintained. By their nature, the islands of the Beaver Archipelago are more vulnerable to external environmental threats than comparable mainland areas. For these reasons, preservation of the living natural resources of the Beaver Archipelago requires our ongoing monitoring and scrutiny. And now, the community embraces the idea of an IDA designation to preserve and promote the dark sky philosophy.

Although it is a benefit being geographically isolated from the mainland's light pollution, threats to the island's dark sky need to be mitigated and potential threats anticipated. The Beaver Island community is known for its proactive efforts to preserve and promote the island's natural assets. It has been a pioneer in invasive species control in the State of Michigan and serves as an inspiration to other communities in the development of water and birding trails. As more property is developed, best practices are being put in place to protect the very natural experiences that have been enjoyed for generations on the island.

The International Dark Sky Sanctuary designation will ultimately enhance Beaver Island's dark sky as owners engage in efforts to preserve its dark skies. As a point of pride for property owners, it will serve as a model for those summer residents and visitors who hail from multiple states across America. The island's environment will be preserved as homeowners alter their lighting choices through information designed by the island's planning commissions and encouraged through educational meetings with builders, real estate agents, and the Beaver Island Association's outreach material. With engagement and encouragement from residents and the business community along with readily available educational information, fostering best lighting practices and nurturing residential stargazing along with neighborly good lighting,

participation will increase. Ultimately, dark-sky friendly lighting practices will have a positive effect on the Wildlife Research Area.

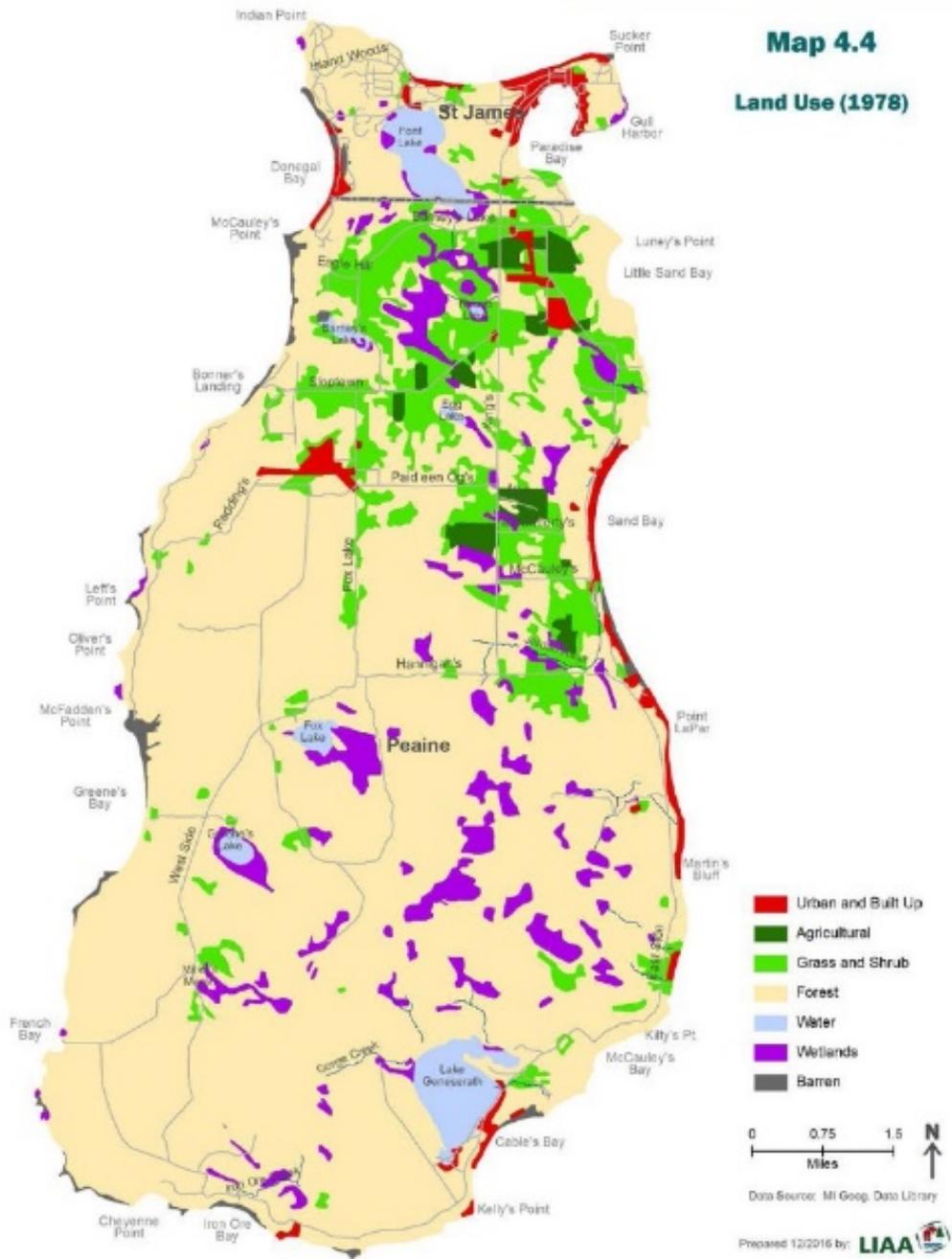


Figure 15: Depiction of 1978 land use from Beaver Island Master Plan. Not much has changed.

Protection for Scientific, Natural, Educational, Cultural, and Public Enjoyment Values

Scientific

The BIDSS, in conjunction with the DNR Wildlife Division recognizes that research is an appropriate activity in the Wildlife Research Area. Any approved research project must be conducted in a manner compatible with the preservation of wilderness values. Research proposals are reviewed on a case-by-case basis by an interdisciplinary team. Decisions may be based on, but not limited to, the following factors: meeting wilderness objectives; research that is wilderness-dependent; proposed modes of travel; alternatives to proposed motorized or mechanized equipment; and effects on wilderness values and the magnitude of the effects, as governed by the DNR Wildlife division.

Central Michigan University Biological Station

At the Central Michigan University (“**CMU**”) Biological Station on Beaver Island (“**CMUBS**”) biologists and students conduct many kinds of research in a variety of conditions, all at the same time. The station boasts one of the Great Lakes basins few mesocosm facilities, where 12 water tanks simulate natural environments under controlled conditions. Current research at the station includes studies of three wild species: bloody red shrimp, an invasive pest with a foothold in the Great Lakes; lake whitefish, an important food source in decline; and island chipmunks, which are more than just cute faces.

The Institute for Great Lakes Research (“**IGLR**”) at CMUBS takes a multidisciplinary approach to understanding the complex environmental issues affecting the Great Lakes basin. This area includes associated ecosystems such as tributaries, wetlands, and coastal regions, as well as the lakes themselves. The IGLR is committed to promoting and facilitating collaborative research and education on the Great Lakes. We partner with other institutions and agencies to leverage our expertise and training. IGLR faculty members are nationally and internationally recognized experts on coastal wetlands, conservation genetics, fisheries, invasive species, limnology, aquatic population modeling, microbial ecology, landscape ecology, and geographic information sciences. External agencies supporting research include the Environmental Protection Agency, the U.S. Fish and Wildlife Service, the Michigan Department of Natural Resources and Environment, and the Sea Grant.

CMUBS and IGKR have published numerous scientific articles based on research completed on the island. Below are some examples:

<https://www.cmich.edu/news/article/Pages/beaver-island-research.aspx>

<https://www.cmich.edu/search/Pages/default.aspx?k=beaver%20island%20research>

<https://www.fws.gov/uploadedFiles/TaylorHoffman2015cjz.pdf>

Nature Conservancy and Little Traverse Conservancy

A biodiversity and conservation overview completed by David Ewert of The Nature Conservancy clearly states the governing agencies plans to “maintain and monitor” a variety of natural conditions on the island.² All these plans would be enhanced and necessary to the preservation of dark skies. See https://www.michigan.gov/documents/deq/SOLMII1030-EwertL-MIIIslandsBiodiversity_507258_7.pdf.

Statement of Mission from the Wildlife Division of the Michigan DNR

“Our Mission: To enhance, restore and conserve the State’s wildlife resources, natural communities, and ecosystems for the benefit of Michigan’s citizens, visitors, and future generations.

Our Principles: Public Service: The Wildlife Division believes it has the privilege and responsibility to serve the public by managing wildlife populations and habitat for the use and enjoyment by the citizens of Michigan and by communicating effectively and helping ensure the public understands wildlife management.

Public Trust Responsibilities: The Wildlife Division believes in the public trust doctrine; that wildlife resources are held in trust for the people of Michigan, and it is the privilege and responsibility of the Division to manage those resources wisely.

Scientific Management of Wildlife Resources: The Wildlife Division believes in the principles of scientific management of wildlife resources. Scientific management is in the public interest, and sound science will be used to inform management decisions and to evaluate the outcomes of those decisions.

Sustainability: The Wildlife Division believes it is our responsibility to facilitate the resolution of wildlife issues in a fashion that conserves the long-term viability of populations and the habitats upon which they depend.

Principles of Ecosystem Management: The Wildlife Division believes in a management approach that integrates biological, social, and economic factors into a comprehensive

² The overview notes that 46% of Lake Michigan island land area is protected by various conservation organizations: Little Traverse Conservancy preserves (Beaver and St. Helena Islands) – Central Michigan University (Beaver Island) – Michigan DNR (Beaver, High, S. and N. Fox, Garden, High, Whiskey and others) – Wisconsin DNR (Rock Island, parts of other islands) – USFWS (Michigan Islands, Green Bay, Gravel Island National Wildlife Refuges) • Hat, Gull, Pismire, Shoe Islands; Hog, Plum, Pilot, Rocky, St. Martin Islands; Gravel Island – Others (USFS; Michigan Nature Association) • Protect/monitor threatened/endangered species – Piping Plover, colonial nesting waterbirds – Pitcher’s thistle, dwarf lake iris • Forest management – Maintain viable populations of all tree species • Maintain viable populations of game, nongame species – Terrestrial and aquatic • ID, monitor, rapid response to invasive species (10 focal species) – Common reed control (Phragmites) – Wash trucks before arriving on island – Monitor sites most likely to receive invasive species – Quarantine hardwood logs, maybe hemlock • Improve education, resource appreciation – Birding trail, festival (2014); bike trails – Beaver Island Water Trail.

strategy aimed at protecting and enhancing sustainability, diversity, and productivity of wildlife resources.

Adaptive Management: The Wildlife Division recognizes that our understanding of many ecosystem functions is incomplete and will improve with new information. Management approaches will be viewed as hypotheses to be tested by research, monitoring, and evaluation. This adaptive, empirical approach is useful and will be applied to processes used by the Division whenever possible.

Trust and Credibility: The Wildlife Division believes that trust and credibility are possible only when there is open and two-way communication.

Competence: The Wildlife Division believes that truly effective and efficient management can be achieved when personnel are well-trained, objective, and professional.³

These paragraphs above clearly states a policy to protect these lands within the BIDSS in keeping with the same principles that protect dark skies.

Cultural Values

In the Odawa and Ojibwe oral tradition the Turtle Island refers to the continent of North America. The name comes from various Indigenous oral histories that tell stories of a turtle that holds the world on its back. For some Indigenous peoples, the turtle is therefore considered an icon of life, and the story of Turtle Island consequently speaks to various spiritual and cultural beliefs. In various Indigenous origin stories, the turtle is said to support the world, and is an icon of life itself. Turtle Island therefore speaks to various spiritual beliefs about creation and for some, the turtle is a marker of identity, culture, autonomy and a deeply-held respect for the environment

Zooming in on the Beaver island Archipelago Dark Sky Zone is on north end of Lake Michigan bordered by the Manitou islands to the south to the Straits of Mackinac to the north. The archipelago is an extension of Waugoshance Point to the east. The subaerial ridges along the cape rise approximately 13 ft (4.0 m) above lake level (an elevation of about 590 ft (180 m) above sea level. Waugoshance Point is part of the Niagara Escarpment which originates at the Niagara Falls in the east and extends to the north end of Lake Winnebago in Wisconsin in the west.

Our island, situated in the remote blue waters in the great north woods, defines our heritage, history and our connection to the water and the sky. To the Odawa Nation, who arrived on Beaver island Archipelago 2200 years ago, the universe was created by Glitche Manitou manifesting everything we know and those unseen things and then birth it into being. Each part

³ Available at: https://www.michigan.gov/documents/dnr/Wildlife_GPS_Strategic_Plan_434049_7.pdf.

of Manitou's creation supported the other and maintained balance: the four legged – the animals, those beings. The Odawa indigenous astronomy reflects the connection with nature and constitutes the difference between Western science and indigenous perspectives of the natural world.

Teach your children well

To protect our Dark Sky, we must return to the teaching of Beaver Island Archipelago's indigenous ancestors, the Odawa of the Land of the Crooked Tree, that reflects the connection and balance with nature. In the 21st Century the challenge is to define a place as a geological location - the landscape of the Great Lakes region and especially Beaver Island with a mystical connection with the indigenous ancestor's myths and oral traditions.

The Loon and the North Star - Maang – Loon of the Ojibwa Constellation are present in the summertime on Fox and Barney's lakes on Beaver Island. The spirit of the Odawa Gizhebaa Giizhig "Revolving Sky" is revealed in Beaver Island's "Stone Circle".

Thirty-nine stones forming a 397-foot circle were found on the western side of Beaver Island. As the site was explored, Native American elders from the surrounding areas recalled stories of a stone calendar located on Redding Trail, below Angeline Bluff, near Peshawbestown, which is a historic Native American village. The site has a large stone with unknown markings in the center of the site, with other stones seemingly arranged around it. The stones and boulder arranged around it also have carving, which appear to be sheaths of feathers.

Research found that the stones connect to star positions and were aligned to the midsummer solstice. The pattern of the stones is like that of a Native American medicine wheel. It is mostly accepted that the site had a high significance and was used as an important, ceremonial site for Native Americans who once inhabited Beaver Island.

The Northern Michigan mainland is in the remote north wood with beautiful lakes, streams, and trails. But the sense of place and a feeling of connection on a Lake Michigan island is different. The difference is its boundaries. On an island those boundaries open an awareness and hone in on the individual ecosystems that comprise the whole of the island's natural environment. On the mainland you don't have the same sense of the interconnection and balance of nature

Beaver island is a magical place.

On Beaver island, in the early spring on the east side Wicklow Beach there are no buds on the trees. Traveling south to Lake Geneserath the buds are becoming visible. Journeying past Iron Ore Bay to Westside Drive where the western sky afternoon sunshine effects the more pronounced budding of the beach trees. When you get to Millers Marsh, the buds on the maple trees are almost blooming. The buds recede as you travel north and east past Fox Lake along Hannigan's Trail back to Wicklow beach.

In a less than eight-mile circular path, the island boundaries focus awareness and magnify your senses, perceptions of the infinitesimal changes in nature around you. The boundaries create an understanding microcosm of place.

You can closely follow the four seasons with the changes in colors, plants, and migration of the waterfowl on Millers Marsh. You are in a place following the Gizhebaa Giizhig circular movement of the sky throughout the year. The circular movement of the sun, moon, stars, and seasons. On Beaver Island the sense of place accelerates your awareness of the seasonal and the diurnal changes of the sun into dark sky with a connection to the Odawa indigenous astronomy relationship with natural world.

A mystical magical Turtle Island, our island is a place that is separate from the 21st Century advanced western world. These manitous do not exist in a hierarchy like European gods/goddesses but are more akin to one part of the body interacting with another and the spirit of everything; the collective is named Gitche Manitou or Skyfather

The sacred ground is where everything has its own manitou—every plant, every stone and since their invention. These manitous do not exist in a hierarchy like European gods/goddesses but are more akin to one part of the body interacting with another and the spirit of everything; the collective is named Gitche Manitou or Skyfather

Manitou is one aspect of the interconnection and balance of nature. In simpler terms it can refer to a spirit. This spirit is seen as a person as well as a concept. Everything has its own manitou—every plant, every stone and, since their invention, even machines. These manitous do not exist in a hierarchy like European gods/goddesses but are more akin to one part of the body interacting with another and the spirit of everything; the collective is named Gitche Manitou or Skyfather. The term refers to the tendency for worshipers to associate supreme power with the sun, the sky, and/or "heaven."

Along with protecting the Dark Sky, the Manitou implores us to stop the onslaught of pollution that is threatening the Archipelago. The Maang – Loon, Piping Plover, Bald Eagle, Common Tern, Limestone oak fern, and Pitcher's thistle and many more Archipelago birds and plants are endangered, threatened or species of concern.

Indigenous astronomy reflects the connection with nature and constitutes the difference between Western science and indigenous perspectives of the natural world. All knowledge is interconnected. The Anishinaabek (Odawa or Ojibway), keen observers of cosmological and ecological relationships, evolved traditions, and ceremonies from this knowledge.

Understanding the synchronicity of natural and astronomical cycles is integral to Anishinaabe cosmology and shows us how the Anishinaabe cultural worldview and philosophy are reflected in their celestial knowledge and how indigenous knowledge relates natural phenomena to everyday.

"Gizhebaa Giizhig," which means "Revolving Sky." The name, Gizhebaa Giizhig refers to the circular movement of the sky throughout the year. It refers to the circular movement of the sun, moon, stars, and seasons.

"Gizhebaa" also refers to people dancing in a circular fashion around the drum arbor at powwows. That mystical movement around a source of energy is reflected in the name of Gizhebaa Giizhig.

This ancient knowledge of the Anishinaabe came from watching the stars move to different regions in the night sky throughout the year and observing the relationship between seasonal changes and stellar movement.

That feeling of "connection" constitutes the difference between western science and the indigenous perspective of the natural world. The spiritual connection or kinship with the natural world is what defined and sustained Native American communities for thousands of years before the dawn of industrialized society.

The landscape of the Great Lakes region, weather patterns, sun and moon, revolving star patterns, bird and animal migrations are affirmations of who we are, what we believe, why we exist, and how we make sense of the world around us. Understanding the synchronicity of these cycles, as well as the physical and metaphysical essences of creation, make up the cosmology of the Anishinaabek.

Because stars move from east to west, the Anishinaabe believe that when we die, our spirits travel to "Ningaabii'anong;" the Western sky. The Anishinaabek also believe that new life and knowledge emerge from "Waabanong; " the eastern sky. Thus, many ceremonies and traditions reflect these cardinal directions.

The constellations and star knowledge relate to seasonal changes, subsistence activities, ceremonies, and storytelling of the Anishinaabek. Seasonal changes correlate with the movement of stellar constellations, which, in turn, are reflected in tribal stories and ceremonies.

Anishinaabek Constellations

The constellations and star knowledge relate to seasonal changes, subsistence activities, ceremonies, and storytelling of the Anishinaabek. Seasonal changes correlate with the movement of stellar constellations, which, in turn, are reflected in tribal stories and ceremonies.

All knowledge is interconnected. The Anishinaabek, keen observers of cosmological and ecological relationships, evolved traditions, and ceremonies from this knowledge.

Public Enjoyment Values

Dark Sky Interpretation and Education

The goal of the education program is, in a balanced and equitable way, to affect public awareness of the purpose, values and appropriate uses of wilderness, the functioning of natural ecosystems, and to promote the preservation of wilderness resources, especially as dark skies.

For various dark sky presentations, the objectives for attendees include knowing the relative distances of the planets from the sun; identifying terms associated with NEOs (Near Earth Objects); understanding the effects or possible effects of the Sudbury meteor; learning about other historical meteor events; knowing the meteor schedule; recognizing summer constellations; and appreciating the importance and rarity of dark skies in the United States, and what actions can be taken at home to help keep skies dark. The dark skies over the Beaver Island Wildlife Research Area provide ample opportunities for interpretation.

NOTE: Due to the Covid-19 global pandemic, 2020 activities are postponed as of May 2020 until further notice.

The Beaver Island Community Schools has a 10-inch Meade telescope donated for use. Brian Foli, Science teacher will use this telescope for Science classes. Community members are working on a plan for future use of the scope. This will broaden current astronomy programs beyond “naked eye” astronomy and allow the BIDSS to participate in other astronomy programs in the area to better serve visitors. Astronomy presentations are often group efforts with several groups bringing scopes to the event. Having a telescope will give BIDSS an invitation to better participate in these events and talk about the dark sky over the BIDSS. When the Beaver Island Dark Sky Sanctuary obtains sanctuary status, naturally the Beaver Island Dark Sky Sanctuary will add and/or participate in more dark sky events. The status would draw more visitors to the presentations and initiate further collaborative efforts/discussions with the public as well as the Counties, State and local agencies and organizations.

Below is a proposed dark sky education structured plan for future education and promotions to create awareness about access, use and sustainability of preserved areas, the sanctuary and all of Beaver Island.

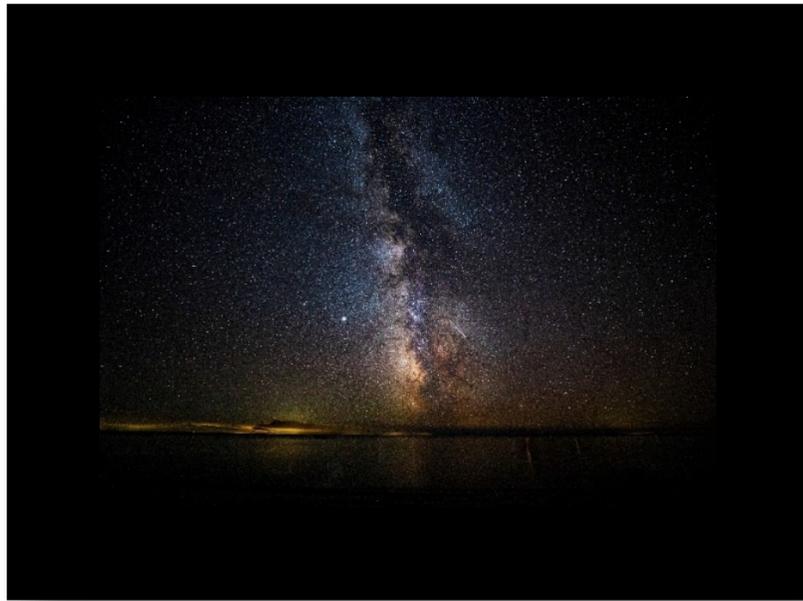


Figure 16: Iron Ore Bay View of the Milky Way, Autumn 2020 by Libby Henderson Photography



Figure 17: Starry, Starry night on Beaver Island, South End by Libby Henderson, Photography

BIDSS Night Sky Quality Sky Quality Meter (SQM -L) Readings

All readings use SQM recommended procedures. No moon/clear sky. November 7, 2020, 7:30 to 9:30 p.m.

Beaver Island Dark Sky Sanctuary:

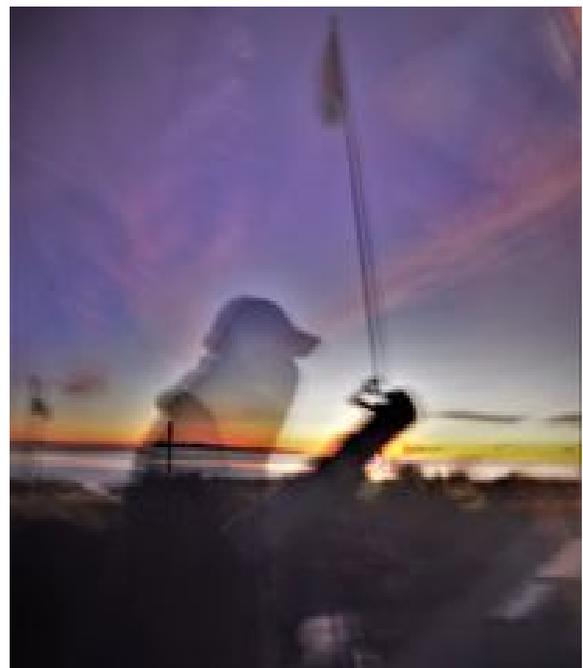
The Big Field. 45°37'03"N - 85°35'30"W	21.54
Miller's Marsh. 45°36'44"N - 85°35'37"W	21.56
Lake Genesereth. 45°36'08"N - 85°35'30"W	21.86?
Wagner Campground. 45°39'27"N - 85°29'41"W	21.55



Figure 18: Bill Markey using an SQM to collect some of the readings in this application.

Beaver Island (outside Dark Sky Sanctuary)

Eagle Hill 45°43'11"N - 85°33'50"W	21.57
Little Sand Bay NP. 45°43'30"N - 85°30'34"W	21.54
Iron Ore Bay Beach 45°34'46"N - 85°35'04"W	21.54



**Beaver Island Dark Sky Sanctuary
Additional Sky Quality Meter (SQM) readings
from some locations noted above**

Locations:

<i>Little Sand Bay Nature Preserve</i>		
45°43'10.47"N - 85°30'33.87W		
May 4 2019	11:00pm	21.73
May 4/5 2019	12:00am.	21.75
May 7 2019	11:00pm.	21.74
May 8 2019	1:00 am.	21.83
May 25 2019	11:00pm.	20.90
May 26 2019	11:35pm.	21.76
June 7 2019	12:30am.	21.79
July 24 2019	12:10am.	21.75
Aug 30 2019	11:45pm.	21.62
Feb 20 2020	10:15pm	21.55
April 24 2020	10:30pm.	21.68
July 17 2020	11:00pm.	20.75
Aug 11 2020	10:30pm.	21.65
Aug 11 2020	11:00pm.	21.73
Aug 12 2020	12:30am.	21.81
Aug 18 2020.	4:00am.	21.73

Donegal Bay Pavilion/beach

45°44'35.85N - 85°35'41.27W

June 7 2019	12:00am.	21.81
July 23 2020	11:50pm.	21.75
July 30 2019	11:30pm.	21.81
(Solar System Amb.)		
Sept 20 2019	11:00pm	21.61
(Mary Stewart Adams)		
Sept 28 2019	11:10pm.	21.38
Sept 29 2019.	11:30pm.	21.83
July 13 2020	11:55pm.	21.59
July 18 2020	12:40am.	21.73
July 24 2020	12:30am	21.78
Sept 17 2020	10:45pm	21 57

Little Iron Ore Bay

45°34'46.10N - 85°35'04.00W

No moon, clear sky, Bortle scale Est 2/1. Average of multiple readings at NSEW directions. Magnitudes/square arcsecond is a logarithmic measurement of sky brightness within a 40° cone above meter. Higher the number equals darker the sky. Accuracy within +/- 0.10

May 8 2019	12:15am	21.85
May 8 2019	12:30am	21.89
June 27 2019	1:00am	21.83

On clear nights, visible from the shores that wrap the island, there are remarkable, celestial glows on the horizon to the northwest, from the upper peninsula and Wisconsin. Due west, the midnight-blue is lit by the Milky Way, Scorpio, and descending planets that reflect in Lake Michigan waters over distant islands. Within the boundaries of the sanctuary are dark meadows and heavy woodlands. Except for old logging trails, hiking paths and birding trails, there are no roads.

Cynthia Johnson photographed the view on the next page of the Milky Way, with Jupiter and Saturn in the southwestern sky above 600-foot elevation sand dunes, taken facing southwest.

This photo gives a clue to the amazing dark sky quality offered to even the amateur photographer.

Threats to Dark Skies

Beaver Island is located 32 miles from Charlevoix, Michigan, a mainland town that broadcasts a glow on the horizon to the east. Northwest lies Wisconsin and sections of the Upper Peninsula that also send gleams across the waters. Channel markers light up a waterway to the Northeast. In spite of these far away cities, the Beaver Island Harbor and Island area remains dark. There are few threats to the night sky quality here due to the remoteness of the location, the improbability of significant development of business or industry in the area and the ongoing conservation efforts of the governing bodies.



Figure 19: Milky Way photo by Cynthia Johnson



Figure 20: Hannigans Road, gazing Southwest into the Sanctuary, Jupiter and Saturn Convergence (December 2020)

Light Inventory

The largest part of the Beaver Island Dark Sky Sanctuary currently is in the State Wildlife Research Area, which is managed by the Michigan DNR's Wildlife Division. There are no lights located on this land, and the DNR's management plan property does not envision the introduction of any such lighting. The Miller's March Research Area, the next largest part of the Sanctuary also has no lights and CMU's plan for the MMRA includes no lighting. Existing lighting at the Beaver Head Lighthouse Park is limited. Charlevoix County, the owner of the park, plans renovation during which any noncompliant course will be resolved. The following lighting plan will, in material respects, be incorporated into the County's operational plans for the site.

Lighting Management Plan

LIGHTING MANAGEMENT PLAN

Beaver Island Dark Sky Sanctuary

1. Purpose and Philosophy

The purpose of Beaver Island's Lighting Management Plan (LMP) is to encourage and promote dark sky compliant lighting choices in order to ensure the preservation of health, life, and growth for nature, wildlife, and human life. By providing support, education, and accessibility to approved lighting options as well as clear direction on the placement, installation and operation of lighting for new and replacement lighting both inside the sanctuary as well as across Beaver Island, the island's dark skies will be protected from increased light saturation and environmental damage.

The BIDSS is pursuing a formal approved plan, researched, developed and created by the Beaver Island Dark Sky committee in conjunction with local planning commissions in an effort to encourage protection and preservation of wildlife and designated outdoor areas.

The LMP is designed to ensure safety of those on location at any dark sky viewing area while also maintaining limited impact in those areas. In the Sanctuary, the state has essentially adopted this plan as it is consistent with their management approach for wildlife management areas.

The LMP was written and developed on the belief that darkness brings light, life, and health. Every decision made by every individual, whether a resident or a visitor, can positively or negatively affect the many delicate ecosystems on Beaver Island. By treasuring its complexities and respecting its fragility, we can protect life that thrives under dark skies through proactive communication, education, training, and structure.

2. Applicability

The sanctuary represents that this LMP meets or exceeds all applicable agency and/or departmental policies regarding outdoor lighting and conforms to all local, regional, and national laws.

3. Exemptions

The following types of outdoor lighting installations shall be permitted in the sanctuary and are not subject to the other regulations of this LMP:

- Lighting installations required by the relevant local, regional or national legal jurisdiction.
- Lighting installations required temporarily for the safe performance of nighttime tasks, such as construction, at the discretion of the sanctuary manager/superintendent. (See “Temporary Lighting,” below)
- Outdoor lighting controlled with motion-activated switches limiting the duration of illumination to less than five (5) minutes after activation.
- Unshielded, low intensity ‘holiday’ lighting¹ whose use is specific to events or time periods as prescribed by the sanctuary manager/superintendent
[Add any other desired exemptions here that are otherwise not inconsistent with the other provisions of this LMP.]

4. Warranting of outdoor lighting installations.

The installation of new outdoor lighting in the sanctuary is permitted only in instances where the underlying owner determines that a public safety hazard exists that can only be mitigated through the use of outdoor light at night. Where light at night is required for the safe performance of tasks or safe transit between locations, it will be used; otherwise, the default policy of the sanctuary is to **not** light.

5. Shielding

All outdoor lighting fixtures whose lamps have an intensity of equal to or greater than 500 initial lamp lumens² shall be fully shielded. Lighting whose lamps have an intensity of less than 500 initial lamp lumens may be left unshielded for special purposes, such as historical preservation, upon determination by the sanctuary manager or superintendent. These lights shall not be exempt from the other requirements of the LMP and must be designed in such a way to minimize impact to the nighttime environment. Further, to the greatest possible extent, the sanctuary will endeavor to limit the inadvertent or incidental emission of light from indoor spaces to the outdoors through the use of window coverings, indoor lighting timers/switches, and other appropriate measures.

6. Spectrum

Outdoor lighting fixtures in the sanctuary shall be chosen to minimize the amount of short wavelength light³ emitted into the nighttime environment. The sanctuary will prefer amber and similar colors for lighting and avoid white light wherever practically possible unless a demonstrated need for color rendition exists. In no case shall the correlated color temperature of any lamp exceed 3000 Kelvins.

7. Lamp selection and illuminance values

In all applications, outdoor lighting deployed throughout the sanctuary will use the most energy-efficient lamp technology that minimizes the emission of short-wavelength light into the nighttime environment.

The following table gives the maximum illuminances that will be used throughout the sanctuary unless a demonstrated need for larger values exists.

Application	Illuminance (lux)		Illuminance (foot-candles)	Note	
Building entry	0.5		0.05		
Trailheads	0.3		0.03	1	
Parking lot	10 /	1	1 / 0.1	2	
Restroom entry	0.5		0.05	3	
Entrance station	10 /	1	1 / 0.1	2,	4
Roadway	0		0	5	
Signage	0.5		0.05	6	
Flag	0		0	7	

Table notes:

1. Trails should not be lit. Visitors are expected to provide their own flashlights/headlights for nighttime transit on foot or bicycle.
2. Values are quoted for amber light / white light, respectively.
3. Hazards at/near should be clearly marked to ease the transition from a brightly lit interior environment to a darker exterior environment.
4. The lighted area should be restricted to the interface between incoming vehicles and sanctuary staff.
5. Roadway lighting in sanctuaries should be restricted only to 'conflict zones' (typically, intersections or at the interface between motor vehicles and bicyclists/pedestrians), and appropriate to the nature of the hazard.
6. Signs should be made of high-reflectivity materials, and generally only lit in areas where they are not intended to be seen by passing motorists.
7. Flags should be lowered at sunset and not flown overnight.

8. Illuminated Signs

Internally illuminated signs⁵, and signs illuminated by electronic means such as LEDs and similar lighting⁶, are prohibited in the sanctuary.

9. Curfew

Dusk-to-dawn lighting is not generally allowed in the sanctuary. All outdoor lighting will be extinguished between the hours of 10 PM and one hour before sunrise, except in cases where visitor or staff presence or traffic dictates otherwise.

10. Adaptive Controls

To the greatest practical extent possible, all sanctuary lighting will make appropriate use of adaptive controls to limit the duration, intensity, and/or extent of outdoor lighting.

11. Temporary Lighting

Allowable installations of outdoor lighting in the sanctuary for temporary purposes, as exempted above, shall be limited to the minimum number of nights required to complete the task that the lighting illuminates. Staff responsible for such installations will follow these guidelines to the greatest practical extent and will endeavor to limit as much as possible off-site impacts of such lighting.

12. Visitor Lighting

Lighting of vehicle exteriors, tents, and other personal property belonging to sanctuary visitors shall be limited by the sanctuary in such a way as to provide for reasonable use while maintaining the above policies.

Overall, without a current local, state or national Lighting Plan specific to the Beaver Island Dark Sky Sanctuary and in regard to the lack of lighting currently in use in the Sanctuary, the Beaver Island Dark Sky Sanctuary Committee, oversight managers and affiliated property managers would follow the suggested approach below:

<https://www.fs.fed.us/nrs/pubs/gtr/gtr-nrs-p-183papers/19-turina-VRS-gtr-p-183.pdf>

The Beaver Island Dark Sky Sanctuary oversight manager is the DNR Wildlife Division, Gaylord. This division works in conjunction with other conservation protection agencies listed above.

International Dark Sky Sanctuary Nomination and Support Letters

LTCC; Michigan Astronomy: Senator Schmidt: Rex Ainslee: Tony Miller: Nomination: Robert Parrish, IDA Advocate

November 10, 2020

Robert Parrish
IDA Advocate, 26588 Hamilton St.
Edwardsburg, Michigan 49112

International Dark Sky Association
3223 N. First Ave., Tucson, Arizona 85719

Dear IDA:

It is with great pleasure that I nominate the Beaver Island Wildlife Research area, located on Beaver Island, Michigan as a Dark Sky Sanctuary. This area is managed by the Michigan Department of Natural Resources and offers some of the darkest skies within Michigan.

Located within Lake Michigan, Beaver Island is 32 miles west of Charlevoix, Michigan. With an area of nearly 57 square miles and a population of less than 700, Beaver Island is accessible only by boat or plane. With the nickname of “America’s Emerald Isle”, Beaver Island is a Midwestern oasis with a natural beauty that shines into the night.

From a quantitative perspective, twenty-seven SQM light readings, taken from May 3rd – December 2nd, 2019 have been recorded and compiled to reveal a mean average of 21.71. A number that I am sure you would agree is an excellent starting benchmark.

Through multiple conversations with island residents working towards the goal of obtaining IDA recognition, I have no doubts concerning their sincerity or drive in successfully reaching that goal.

Sincerely,

Robert Parrish, IDA Advocate

26588 Hamilton Street,

Edwardsburg, Michigan 49112

(269) 262-6117 rbtparrish@comcast.net



WAYNE A. SCHMIDT
37TH DISTRICT
P.O. BOX 30038
LANSING, MI 48909-7938

**THE SENATE
STATE OF MICHIGAN**

PHONE: (517) 373-2413
TOLL-FREE: (855) 347-6007
FAX: (517) 373-6144
senwschmidt@senate.michigan.gov

November 9, 2020

Mr. Kevin Boyle, President
Beaver Island Association
PO Box 390
Beaver Island, Michigan 49782

Dear Mr. Boyle,

It is a great privilege to write in support of Beaver Island's application for official designation as part of the International Dark Sky Association. As the State Senator for the area, I can assure you that Beaver Island exhibits the qualities that the International Dark Sky Association seeks in a dark sky sanctuary designation.

Beaver Island's Dark Sky Island Committee has worked diligently to establish a framework for continued conservation, use, and enjoyment of these lands that are congruent with the State Department's goals of protecting cultural and natural resources, providing recreational opportunities, and fostering economic prosperity.

In addition, this committee has worked with residents of Beaver Island to protect and manage the night sky for the benefit of future scientific, cultural, and natural resources. Constituents on Beaver Island see these unique resources as a source of pride and intend to provide continued educational presentations to foster a greater appreciation and protection of the dark sky.

The International Dark Sky Association's sanctuary designation will not interfere with wildlife but improve the natural environment for wildlife. St. James and Peaine Township Planning Commissions have agreed to work with private landowners, many of whom are adjacent to state lands, to improve lighting toward meeting dark sky standards.

The designation will be low-impact and allow for camping only at already DNR-approved sites such as the Bill Wagner Campground or Lake Geneserath. No new trails, improvements, or facilities will be developed on state lands held by the Department of Natural Resources for this designation.

It is for these reasons that I genuinely believe Beaver Island to be worthy of a sanctuary designation from the International Dark Sky Association. Thank you for taking the time to consider this letter. If you have any questions, please feel free to call my office at 517-373-2413 or by email at senwschmidt@senate.michigan.gov.

Sincerely,

Wayne A. Schmidt
State Senate
37th District

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HELP ESTABLISH AN INTERNATIONALLY RECOGNIZED
DARK SKY SANCTUARY
 ON BEAVER ISLAND BY SIGNING AND RETURNING THIS LETTER OF SUPPORT

TO: International Dark Sky Association

RE: Application of Beaver Island Dark Sky Initiative for Dark Sky Sanctuary Designation for Beaver Island

FROM: *Janece Boyles-Visel*

DATE: *12-15-2020*

I am writing to support the Beaver Island Dark Sky Initiative's application for a Dark Sky Sanctuary on Beaver Island. The island is a 30 mile ferry trip off-shore in northern Lake Michigan. The deep dark of the island skies at night is unique and exceptional. Prime viewing areas are located all over the island and star gazing is a frequent pastime, especially in the summer. The initiative has organized numerous events to help with appreciating the display above the island. I'm pleased to add my support to the island's application.

Sincerely, *Janece Boyles-Visel* Address: *5475 Lakeshore Dr Ann Arbor, MI 48105*

Please sign above, print your name in the "from" box, add the date and your address and then return this form to Dark Sky Project, P.O. Box 245, Beaver Island, MI 49702. Thanks!

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 ON BEAVER ISLAND BY SIGNING AND RETURNING THIS LETTER OF SUPPORT

TO: International Dark Sky Association

RE: Application of Beaver Island Dark Sky Initiative for Dark Sky Sanctuary Designation for Beaver Island

FROM: *Carol Linzell & Bob Lathrop*

DATE: *Nov 15, 2020*

I am writing to support the Beaver Island Dark Sky Initiative's application for a Dark Sky Sanctuary on Beaver Island. The island is a 30 mile ferry trip off-shore in northern Lake Michigan. The deep dark of the island skies at night is unique and exceptional. Prime viewing areas are located all over the island and star gazing is a frequent pastime, especially in the summer. The initiative has organized numerous events to help with appreciating the display above the island. I'm pleased to add my support to the island's application.

Sincerely, *[Signature]* Address: *37625 Kings Hwy, BI 49782*

Please sign above, print your name in the "from" box, add the date and your address and then return this form to Dark Sky Project, P.O. Box 245, Beaver Island, MI 49702. Thanks!

*1168 Lakeshore Dr
 Gaylord MI 49735*

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 BEAVER ISLAND DARK SKY INITIATIVE

NORTHERN LAKE MICHIGAN ISLANDS COLLABORATIVE

November 10, 2020



Mr. Kevin Boyle, President
Beaver Island Association
Box 390
Beaver Island, Michigan 49782

Dear Mr. Boyle:

As non-state and non-tribal government member organizations of the Northern Lake Michigan Islands Collaborative (NLMIC), we are pleased to strongly support your proposal to obtain an IDA Beaver Island Dark Sky Sanctuary designation. We understand this designation will focus on protecting and preserving the night sky. Beaver Island is known for possessing exceptionally dark skies as a result of being geographically isolated in Northern Lake Michigan. Your proposed work builds on work identified earlier in the Beaver Island Master Plan and within the NLMIC project identification process. Protecting the nocturnal environment for scientific, cultural, educational, and public enjoyment is indeed worthy of support.

NLMIC began as a collaborative effort between the Michigan Department of Natural Resources (DNR) and several non-government organizations (NGOs) to successfully attack invasive plant species in the Beaver Archipelago that involved both public and private land. The Wildlife and Forestry Divisions of the DNR furthered the development of the Collaborative to include public stakeholder participation in policy development, decision-making, and policy implementation for approximately 26,000 acres of state-owned land on seven islands in northern Lake Michigan. Since 2015, the NLMIC has grown to 100+ people from multiple state departments, island townships, businesses, NGOs, and others, notably including two area tribes (Little Traverse and Grand Traverse bands).

Astro-tourism is a unique tourism sector, including resulting in year-round economic benefits. The Beaver Island Birding Trail and Water Trail have had positive effects both economically and at a conservation level. The Dark Sky Project seems like a perfect complement to these two trail efforts by showcasing the night sky opportunities to residents and visitors.

Studies by the American Medical Association on the negative human health impacts of light pollution document impacts related to cancer, diabetes, cardiovascular, as well as impaired daytime functioning. This initiative will reduce the negative human health effects related to light pollution and will also protect the island's wildlife such as toads, fireflies, pollinators, and migrating birds. Public education seminars on the impact of light pollution and discussions surrounding good outdoor lighting policies will support community objectives. Furthermore, by rehabilitating poor-quality outdoor lightening surrounding the proposed sites, areas will be made darker.

Mr. Kevin Boyle
Page 2
November 10, 2020

We believe the proposal outlines a scope of work that will significantly contribute to protecting the night sky of the Beaver Island, contribute to the local and regional prosperity, and contribute to the health of humans and wildlife. This correspondence is hereby adopted by the below Collaborative members who wish to provide support for the International Dark Sky Association initiative for Beaver Island, Michigan.

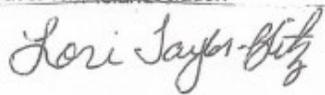
Sincerely,



Richard Mulvahill, Vice-President
Beaver Island Association



Marcy Dean, CEO
Beaver Island Preservation Association



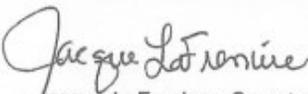
Lori Taylor-Blitz, Director
Beaver Island Historical Society



Roberta Welke, Chairperson
Cultural Resources Committee



Paul Cole, Executive Director
Beaver Island Chamber of Commerce



Jacque LaFreniere, Secretary
Beaver Island Wildlife Club



Lee Boisvert, Sexton
MKD, Garden Island Cemetery



Katherine McNamara, Supervisor
St. James Township



Seamus Norgaard
Beaver Island Forest Council



Doug Tilly, Supervisor
Peaine Township

cc: Matt Preisser, Rex Ainslie, Brian Mastenbrook, Jennifer Kleitch

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BEAVER ISLAND

HELP ESTABLISH AN INTERNATIONALLY RECOGNIZED DARK SKY SANCTUARY ON BEAVER ISLAND BY SIGNING AND RETURNING THIS LETTER OF SUPPORT

TO: International Dark Sky Association
 RE: Application of Beaver Island Dark Sky Initiative for Dark Sky Sanctuary Designation for Beaver Island
 FROM: Matthew Broder
 DATE: Dec. 12, 2020

I am writing to support the Beaver Island Dark Sky Initiative's application for a Dark Sky Sanctuary on Beaver Island. The island is a 30 mile ferry trip off-shore in northern Lake Michigan. The deep dark of the island skies at night is unique and exceptional. Prime viewing areas are located all over the island and star gazing is a frequent pastime, especially in the summer. The initiative has organized numerous events to help with appreciating the display above the island. I'm pleased to add my support to the island's application.

Sincerely,



Address:
30 Spring Glen Terrace
Hartford CT 06117

Please sign above, print your name in the "From" box, add the date and your address and then return this form to Dark Sky Project, P.O. Box 245, Beaver Island, MI 49782. Thank!

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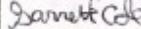
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TO: International Dark Sky Association
 RE: Application of Beaver Island Dark Sky Initiative for Dark Sky Sanctuary Designation for Beaver Island
 FROM: GARRETT COLE
 DATE: 12-1-20

I am writing to support the Beaver Island Dark Sky Initiative's application for a Dark Sky Sanctuary on Beaver Island. The island is a 30 mile ferry trip off-shore in northern Lake Michigan. The deep dark of the island skies at night is unique and exceptional. Prime viewing areas are located all over the island and star gazing is a frequent pastime, especially in the summer. The initiative has organized numerous events to help with appreciating the display above the island. I'm pleased to add my support to the island's application.

Sincerely,



Address:
Box 247, Beaver Island

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TO: International Dark Sky Association
RE: Application of Beaver Island Dark Sky Initiative for Dark Sky Sanctuary Designation for Beaver Island
FROM: *Mindy and Larry Dale*
DATE: *12/13/2020*

I am writing to support the Beaver Island Dark Sky Initiative's application for a Dark Sky Sanctuary on Beaver Island. The island is a 30 mile ferry trip off-shore in northern Lake Michigan. The deep dark of the island skies at night is unique and exceptional. Prime viewing areas are located all over the island and star gazing is a frequent pastime, especially in the summer. The initiative has organized numerous events to help with appreciating the display above the island. I'm pleased to add my support to the island's application.

Sincerely, *Mindy & Larry Dale* Address: *4865 Gallagher, Rochester, 48206*

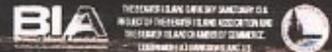
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TO: International Dark Sky Association
RE: Application of Beaver Island Dark Sky Initiative for Dark Sky Sanctuary Designation for Beaver Island
FROM:
DATE:

I am writing to support the Beaver Island Dark Sky Initiative's application for a Dark Sky Sanctuary on Beaver Island. The island is a 30 mile ferry trip off-shore in northern Lake Michigan. The deep dark of the island skies at night is unique and exceptional. Prime viewing areas are located all over the island and star gazing is a frequent pastime, especially in the summer. The initiative has organized numerous events to help with appreciating the display above the island. I'm pleased to add my support to the island's application.

Sincerely, *Jacqueline Laverne* Address: *27435 Pardeene Beaver Island MI*

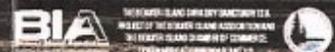
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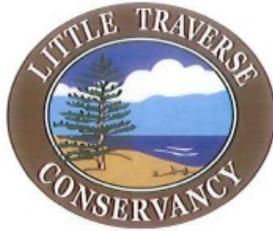
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October 30, 2020

Little Traverse Conservancy
Northern Michigan's Land Trust
3264 Powell Road
Harbor Springs, MI 49740-9469

Phone: 231.347.0991
Fax: 231.347.1276
Email: ltc@landtrust.org
Web: www.landtrust.org

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Mr. Kevin Boyle, President
Beaver Island Association
Box 390
Beaver Island, Michigan 49782

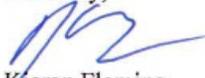
Dear Mr. Boyle:

As members of the Northern Lake Michigan Islands Collaborative (NLMIC), we are pleased to strongly support your proposal to obtain an IDA Beaver Island Dark Sky Sanctuary designation which we understand will be focused on protecting and preserving the night sky. Beaver Island is known for possessing exceptionally dark skies being geographically isolated in Northern Lake Michigan. Your proposed work builds on work identified earlier in the Beaver Island Master Plan and within the Northern Lake Michigan Islands Collaborative.

Studies by American Medical Association on the negative human health impacts of light pollution include cancer, diabetes, cardiovascular, as well as impaired daytime functioning. This initiative will reduce the negative human health effects related to light pollution and also protect the island's wildlife such as toads, fireflies, pollinators, and migrating birds. Public education seminars on the impact of light pollution and discussions surrounding good outdoor lighting policies will support community objectives. Furthermore by rehabilitating poor-quality outdoor lightening surrounding the proposed sites, areas will be made darker.

We believe the proposal outlines a scope of work that will significantly contribute to protecting the night sky of the Beaver Island, contributing to local and regional prosperity, and the health of humans and wildlife. This correspondence was adopted by non-state members and provides support for the International Dark Sky Association initiative for the island.

Sincerely,



Kieran Fleming
Executive Director

 printed on recycled paper



GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LANSING



DANIEL EICHINGER
DIRECTOR

November 24, 2020

Mr. Kevin Boyle, President
Beaver Island Association
Box 390
Beaver Island, Michigan 49782

Dear Mr. Boyle:

I am writing to indicate the support of Wildlife Division of the Michigan Department of Natural Resources (MDNR) for the application submitted by you for the Beaver Island International Dark-Sky (IDA) Sanctuary. We are pleased to support your proposal to obtain an IDA Beaver Island Dark-Sky Sanctuary designation which we understand will be focused on protecting and preserving the night sky.

We understand that light pollution has been identified as a key stressor to amphibians, fireflies, pollinators, migrating birds and bats. Through this initiative, a positive conservation effect at a landscape level can be achieved by working together. As the administrator of approximately 12,000 acres of state-owned lands on Beaver Island, we believe this designation is compatible with the intended use of this land, and any improvements or facilities that may be developed on lands managed by the MDNR will be compliant with the IDA Sanctuary requirements.

We recognize that you will work with islanders to protect and manage the night sky for the benefit of future scientific, cultural, and natural resources. Furthermore, we appreciate that Beaver Islanders also see these unique resources as a source of pride and that you intend to provide continual education to foster a greater appreciation and protection of the dark sky. Likewise, as part of this effort, we anticipate that you will assist with the implementation of the Management Plan for State-owned lands on Northern Lake Michigan Islands, and are pleased to know that St. James and Peaine Township Planning Commissions will work with private landowners, many of whom are adjacent to state lands, to improve lighting toward meeting dark sky standards.

We believe that by pursuing this designation, the adopted MDNR *Northern Lake Islands Management Plan* will meet many of its stated goals. That plan gives a “framework for continued conservation, use and enjoyment of these lands that are congruent with the Department's goals of protecting cultural and natural resources, providing recreational opportunities, and fostering economic prosperity”.

Yours in Conservation,

Rex Ainslie
Wildlife Regional Manager, Northern Lower Peninsula
989-280-9466

HELP ESTABLISH AN INTERNATIONALLY RECOGNIZED
DARK SKY SANCTUARY
 ON BEAVER ISLAND BY SIGNING AND RETURNING
 THIS LETTER OF SUPPORT

TO:	International Dark Sky Association
RE:	Application of Beaver Island Dark Sky Initiative for Dark Sky Sanctuary Designation for Beaver Island
FROM:	ROB AND DANA LUSCOMBE
DATE:	12-11-2020

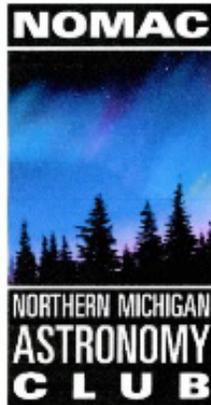
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Sincerely,

Rob and Dana Luscombe

COTTAGE - DONEGAL BAY
 Address:
 4012 AUBURN DR
 ROYAL OAK MI 48063

Please sign above, print your name in the "from" box, add the date and your address and then return this form to Dark Sky Project, P.O. Box 245, Beaver Island, MI 49782. Thanks!



Kevin Boyle
President, Beaver Island Association

Dear Mr. Boyle,

The Northern Michigan Astronomy Club heartily supports the Beaver Island Dark-Sky Committees' application for Sanctuary designation by the International Dark-Sky Association. Having participated in observing activities on Beaver Island, members of our club can attest to the fact that the observing sites on Beaver Island are some of the finest in Michigan's lower peninsula.

In addition, the Beaver Island Dark Sky Committee is a dedicated and active group that will be able to sustain the requirements for Sanctuary status.

Sincerely,

Rod Cortright, Vice President, Northern Michigan Astronomy Club
Nasa/JPL Solar System Ambassador

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TO: International Dark Sky Association
RE: Application of Beaver Island Dark Sky Initiative for Dark Sky Sanctuary Designation for Beaver Island
FROM: Tim & LuAnn @ Conroy
DATE: November 8, 2020

I am writing to support the Beaver Island Dark Sky Initiative's application for a Dark Sky Sanctuary on Beaver Island. The island is a 30 mile ferry trip off-shore in northern Lake Michigan. The deep dark of the island skies at night is unique and exceptional. Prime viewing areas are located all over the island and star gazing is a frequent pastime, especially in the summer. The initiative has organized numerous events to help with appreciating the display above the island. I'm pleased to add my support to the island's application.

Sincerely, Address:

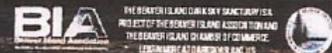
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TO: International Dark Sky Association
RE: Application of Beaver Island Dark Sky Initiative for Dark Sky Sanctuary Designation for Beaver Island
FROM: BARBARA SPENCER
DATE: 11/19/20

I am writing to support the Beaver Island Dark Sky Initiative's application for a Dark Sky Sanctuary on Beaver Island. The island is a 30 mile ferry trip off-shore in northern Lake Michigan. The deep dark of the island skies at night is unique and exceptional. Prime viewing areas are located all over the island and star gazing is a frequent pastime, especially in the summer. The initiative has organized numerous events to help with appreciating the display above the island. I'm pleased to add my support to the island's application.

Sincerely, Address: 33299 W. REDDING'S T B.F. 49782
Barbara Spencer

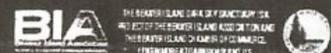
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ST. JAMES TOWNSHIP, BEAVER ISLAND
CHARLEVOIX COUNTY, MICHIGAN
Resolution 2020.11.11.02

Authorizing Support of Dark Sky Preserve Designation for Beaver Island

At a regular meeting of the St James Township Board, held at the St James Township Hall, located in St James Township, Michigan on November 11, 2020.

Present: McNamara, Gillespie, Cole, McDonough
Absent: Moore

The following resolution was made by McNamara and seconded by McDonough.

WHEREAS, St. James Township Board recognizes that the night sky is part of the cultural, educational, and scientific heritage of all humanity, which should be preserved and protected, and

WHEREAS, Beaver Island has over 12,000 acres of publicly held lands which present pristine, undiluted night sky viewing opportunities, and

WHEREAS, the night sky represents an important natural resource that contributes to the health and quality of life for residents, visitors and wildlife in Northern Lake Michigan, and

WHEREAS, Dark Sky Designation and related activities represent a significant opportunity for economic development within the region, and

WHEREAS, the above-mentioned Dark Sky Sanctuary lends itself to inclusion in the state's Dark Sky Preserve Legislation, and

WHEREAS, the township is committed to promoting dark sky friendly lighting, and

NOW, THEREFORE BE IT RESOLVED that the St. James Township board supports the creation of a Dark Sky Sanctuary on Beaver Island that includes designated sites on public lands; and,

BE IT FURTHER RESOLVED that the St. James Township board calls upon its State Representative and/or State Senator to introduce and support legislation that will secure this designation.

YES: McNamara, Gillespie, Cole, McDonough NO: N/A

RESOLUTION DECLARED ADOPTED

By: Julie Gillespie Date: 11-11-2020

The above signed, Julie Gillespie, hereby certifies that she is the duly elected and acting clerk of the Township of St James and further certifies that the foregoing resolution was duly adopted at a regular board meeting of the Township board held on November 11, 2020.

Beaver Island Dark Sky Sanctuary and the Preservation of Island Biota

Beth E. Leuck (Professor Emerita, Centenary College of Louisiana)

Edwin E. Leuck (Professor Emeritus, Centenary College of Louisiana)

We are professional biologists who have been summer residents on Beaver Island since 1985. Until 2012 we spent our time on Beaver Island at the Central Michigan University Biological Station located in Sand Bay on the east side of the island. While residing at the biological station, we taught undergraduate and graduate-level classes, conducted research on a variety of biological topics, led field trips for the Beaver Island Historical Society, and offered biological tours of the island to station visitors and dignitaries. We retired to our own vacation home on Sand Bay in 2012 and have remained active with research projects and conservation efforts on the island during the summer months.

Our intimate knowledge of the natural history of the island includes appreciation of the current dark sky conditions of the island. We enthusiastically support the efforts to formalize the outstanding night-time characteristics of the island skies through establishment of the Beaver Island Dark Sky Sanctuary, particularly because of the positive influence a dark sky has on the flora and fauna of the island. A burgeoning body of biological literature supports the need for dark skies to protect the integrity of biological processes that have naturally evolved. Research on ALAN (artificial light at night) has almost universally demonstrated deleterious effects on every type of organism studied (Gaston et al., 2015). For example, fish species have been shown to display riskier behavior (feeding in the open) when exposed to ALAN, which in turn leads to a higher chance of predation (Zapata et al., 2019). Many of the interior lakes on Beaver Island support species of game fish, and disruption of their behavior due to ALAN could negatively affect the economic value of fishing tourism on the island as well as the ecological integrity of the food web in each of the inland lakes.

The island also supports an extensive population of common milkweeds along roadways and in abandoned fields. Milkweeds are the only plants on which monarch butterfly caterpillars feed. Recently efforts to federally list the monarch butterfly as endangered were unsuccessful, but many conservation groups continue to push for protection for milkweeds and monarchs. Grubisic et al. (2018) have suggested that the precipitous worldwide decline of insects, including butterflies, may be exacerbated by ALAN which interferes with reproduction, feeding, and migration. Maintaining the current dark sky on Beaver Island will help the island's already robust monarch butterfly population, which in turn positively contributes to the species' numbers that are drastically decreasing in North America.

In addition to the common milkweed population, the island also contains populations of several threatened and endangered (T&E) plant species, as well as healthy populations of several temperate climate orchid species. Plants are also negatively affected by ALAN, especially during the growing season when the timing of leaf and flower development can be disrupted (Bennie et al., 2016). Because herbaceous plants on Beaver Island are already under severe pressure from predation and trampling by whitetail deer, any increase in ALAN on the island could introduce additional stress to the survival and reproduction of several T&E plant species. Current lighting conditions on the island protect these plants from physiological disruption and allow the timing of seed production to be optimal for germination and growth.

We could continue with other examples of how maintenance of a dark sky protects the biota of Beaver Island, but we hope that the aforementioned cases will suffice to demonstrate why, as biologists, we strongly support the Beaver Island Dark Sky Sanctuary. As a final comment, we wish point out that Beaver Island is a mostly intact ecosystem in no small part because of its prevailing dark skies. Currently ALAN researchers are calling for more studies into the effects of ALAN on communities and ecosystems (Gaston, et al., 2015). Perhaps in the future the island could serve as an experimental control for ALAN researchers who need a pristine, dark-night ecosystem to compare to their light-damaged experimental systems. Designating the island as a Dark Sky Sanctuary will aid in recognition of the island as a potential location for future ALAN research.

Literature Cited

Bennie J, Davies TW, Cruse D, Gaston KJ. 2016. Ecological effects of artificial light at night on wild plants. *Journal of Ecology* 104:611-620.
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Zapata MJ, Sullivan SMP, Gray, SM. 2019. Artificial lighting at night in estuaries-- implications from individuals to ecosystems. *Estuaries and Coasts* (2019) 42:309-330.
<https://doi.org/10.1007/s12237-018-0479-3>

DARK SKY ISLAND

A heavenly view like no other.

55 square miles of isolated darkness in the northern reaches of Lake Michigan.

Discover
BEAVER ISLAND

HELP ESTABLISH AN INTERNATIONALLY RECOGNIZED DARK SKY SANCTUARY ON BEAVER ISLAND BY SIGNING AND RETURNING THIS LETTER OF SUPPORT

TO: International Dark Sky Association
RE: Application of Beaver Island Dark Sky Initiative for Dark Sky Sanctuary Designation for Beaver Island

FROM: DON SPENCER

DATE: 11/9/20

I am writing to support the Beaver Island Dark Sky Initiative's application for a Dark Sky Sanctuary on Beaver Island. The island is a 30 mile ferry trip off-shore in northern Lake Michigan. The deep dark of the island skies at night is unique and exceptional. Prime viewing areas are located all over the island and star gazing is a frequent pastime, especially in the summer. The initiative has organized numerous events to help with appreciating the display above the island. I'm pleased to add my support to the island's application.

Sincerely,

Don Spencer

Address:

33299 M. REDDING ST.

B. T. 49782

Please sign, print your name in the "from" box, add the date and your address and then return this form to Dark Sky Project, P.O. Box 265, Beaver Island, MI 49782. Thank!

BEAVER ISLAND DARK SKIES

Beginning at sunset, deepening into evening's rosy dusk, Beaver Island delivers all the glories of the night sky on an unmatched canvas of black. The Milky Way, meteor showers, galactic events, satellite flares, the Northern Lights and more. All in an island atmosphere of quiet peace, little traffic, scenic areas, trails and waterways that mark your path to discovering the joy of relaxing under the stars.

You'll marvel at more than the stars.

Plan your trip at
beaverisland.org



BEAVER ISLAND DARK SKY SANCTUARY IS A PROJECT OF THE BEAVER ISLAND DARK SKY INITIATIVE
1000 BEAVER ISLAND DRIVE
BEAVER ISLAND, MI 49782



Date: 11/14/2020

Mr. Kevin Boyle, President
Beaver Island Association
Box 390
Beaver Island, Michigan 49782

Dear Mr. Boyle:

I am writing in support of your proposal to obtain an IDA Beaver Island Dark Sky Sanctuary designation!

I was privileged this summer to visit Beaver Island for the first time, and enjoy the hospitality, friendliness, and helpfulness of everyone I met in the 2+ weeks I spent there. Part of what drew me there, towing many optics along with my camping gear and kayak, was the fact I knew it would be DARK.

In the course of my stay, I met many people, including yourself. One of those people, Cynthia Johnson, got me involved with other astro-enthusiasts on the island. I'm pleased to have been able to help kick-start the restoration of a large community telescope, interact with and possibly help several local astro-enthusiasts, and even co-appear at a community event called "Stars and Guitars". It made an otherwise really good vacation great, and I largely blame Cynthia. I saw aurorae for the first time in nearly a decade, lying on my sleeping bag in St. James Campground!

Above all, it was DARK away from any light source. I broke out my large scope on any clear night, and shared views with many at the Donegal Bay Pavilion.

I am pleased to strongly support your proposal to obtain an IDA Beaver Island Dark Sky Sanctuary designation. Preservation of the night sky is important for many reasons, including economic, scientific, environmental, and recreational concerns. Beaver Island has exceptionally dark skies, largely due to its isolated location in Northern Lake Michigan. I understand your proposal builds on earlier work with the Beaver Island Master Plan, and within the Northern Lake Michigan Islands Collaborative. I'm aware this was a broad coalition of government, and indigenous concerns coming together in concert to help preserve the environmental heritage of the island.

Skies are dark year-round, and the economic benefits are as well. Studies have shown the negative environmental, medical, and economic impacts of light pollution. Thankfully, you have very little there, but even what there is can be mitigated with very little effort through public education. I agree The Dark Sky Project is a perfect complement, showcasing the night sky opportunities to residents and visitors. I understand The Beaver Island Birding Trail and Water Trail have had a positive effect economically, and at a conservation level. That took sustained effort – this will as well.

I support the proposal, and offer any assistance I might provide. I look forward to coming back soon!

Sincerely,

Anthony J. "Tony" Miller
aka Duke Skygawker of Astronomy Ventures
Member, Columbus Astronomical Society



October 21, 2020

Chair, Beaver Island Dark Sky Committee
Beaver Island Association
PO Box 390
Beaver Island MI 49782

I endorse the efforts of Beaver Island Dark Sky Project Committee to have a Beaver Island area designated as a Dark Sky Sanctuary by the International Dark-Sky Association.

Beaver Island is truly, the most unique island community in the United States for a variety of reasons including the natural and untouched environment with remarkable air and water qualities and stunning dark sky views.

With spectacular views of the night sky available in almost every corner of the island, and outlying area islands; Beaver Island is a rare gem offering many facets of the night sky to view. Open and safe beach and park areas and hundreds of acres of protected lands provide "once in a lifetime" views of the night sky.

As a developing tourist area that relies on tourism for economic development, it is important that the night sky resources on Beaver Island continue to be protected and highlighted under the auspices of the International Dark-Sky Association.

I fully support and pledge to help protect and promote via the Northern Islander Newspapers, this ongoing effort to gain approval and official designation as a Dark Sky Area.

Cynthia Hector-Johnson
Northern Islander Newspapers and Beaver Beacon
PO BOX 295
Beaver Island, MI 49782

Educational/Interpretational/Media-related Examples

Educational

Environmental literacy requires strategic development, leadership, and planning. By drafting a cadence of communication, planning and promoting educational events, and recognizing the community for their support, Beaver Island can proactively protect its dark sky asset while simultaneously ensuring plant, animal, and aquatic life are protected.

The Beaver Island Dark Sky committee has developed an influencer plan that includes ensuring that both the motivation and ability to protect the proposed Dark Sky Sanctuary is successful. This includes the individual, social, and structural communication and tools to participate and/or support the successful implementation of the plan.

Dark Sky Education: Changing and Influencing Behavior

Diagnose:

- Determine the **Desired Result**
- Determine the **Crucial Moment** when **Vital Behaviors** are necessary
- Identify resistance and barriers to the change using **6 sources of Influence**

Influence:

- Identify the desired behavioral change using **6 sources of Influence** linking to the **Vital Behaviors** and **Desired Results**

Develop the Plan:

- Address the needs within the **6 sources** to influence behavioral change
-

Influencer Model – Island Residents

Diagnose – Where/ What is the resistance

	Motivation	Ability
Personal <i>(Values & skills)</i>	<ol style="list-style-type: none"> Lacks understanding of the importance of Dark Skies Worries about current level of knowledge compared to others Afraid change will negatively impact living standards Lack of understanding of human health impact 	<ol style="list-style-type: none"> Believes it costs too much money to follow the guidelines No time to do the research to understand what lighting is acceptable Contact information is difficult to find Unable to interpret information at the "right" level that provides a benefit
Social <i>(Teams & Support)</i>	<ol style="list-style-type: none"> Social circles verbalize their own constraints and resistance Social circles do not have a core understanding of the threat to the environment and sustainability Does not believe that the environmental damage will negatively future generations Unable to easily obtain information/ education in a cost-effective manner 	
Structural <i>(Incentives & Environ.)</i>	<ol style="list-style-type: none"> Unable to participate in presentations due to timing/ daily schedule Unaware of local business initiatives that are supporting the philosophy and change to compliance Information is not presented or offered at the time of real estate purchase or lighting change 	<ol style="list-style-type: none"> Unable to access the BIDSS to experience the benefits Unable to participate in awareness/ viewing campaigns due to location of campaign Information is not available in locations most frequented by the individual

Crucial Moment/ Vital Behaviors

Crucial Moments	<ol style="list-style-type: none"> A new resident is building or a current resident is updating lighting A visitor or another resident asks about Dark Skies An announcement is made about an upcoming broadcast or event BI Community School has a scheduled event that currently does not include Dark Sky educational information A resident wants to introduce family to the proposed Dark Sky Sanctuary
Vital Behaviors	<ol style="list-style-type: none"> The new resident contacts their realtor, builder or former homeowner to ask about lighting choices BI Resident can provide information or readily direct the questions to the correct individual BI Resident recognizes the importance of Dark Skies to the environment and ecosystems and chooses to attend the event BI Educators reach out the Dark Sky committee asking for a presentation for the school BI Resident knows how and where to find information to plan their introduction

Results

- Dark Sky compliant lighting choices are made for new construction and renovation by choice beginning July 1st, 2021
- 70% Island residents can verbalize the threat of light pollution to the archipelago by December 31st, 2021
- 50% of Island residents participate in a Dark Sky event by December 31st, 2021
- Beaver Island Community School students can speak to Dark Sky principles
- Island residents know who to contact for information and education on the proposed Dark Sky Sanctuary

Influencer Model – Island Residence

Influence – Desired Changed Behavior

	Motivation	Ability
Personal <i>(Values & Skills)</i>	<ol style="list-style-type: none"> Feels confident in their knowledge of the benefits of dark skies Can communicate to the community and visitors about Dark Sky benefits & the value of BIDSS Is able to understand the benefit outweighs inconvenience or change Can speak to human health benefits of dark skies, the environment, and sustainability 	<ol style="list-style-type: none"> Cost benefits of compliant lighting is included in literature "Right size" communications and simplify presentations Publicize information frequently and in multiple mediums of communications
Social <i>(Teams & Support)</i>	<ol style="list-style-type: none"> Be a leader in their social circles, verbalizing their knowledge Be an educator in their social circles, discussing the threat to the environment and sustainability Wants future generations to experience the benefits Can readily access information necessary to create awareness without cost to the individual 	
Structural <i>(Incentives & Environ.)</i>	<ol style="list-style-type: none"> Can participate in community activities Is aware that local business are complying with Dark Sky compliant lighting recommendations Knows that realtors, construction companies, and planning commissions are available to answer question 	<ol style="list-style-type: none"> Can access BIDSS locations to experience Dark Skies Can participate in awareness/ viewing campaigns Information is available in locations most frequented by the individual

The Plan - Island Residents



Education: The primary success of the Influencer/ Change plan relies heavily on the education of three groups: residents, business owners, and students
Personal: Educate the public using the newspaper, brochures, website, and personal experiences. Publicize cost of compliant lighting and recognize the change
Social: Create confidence through education, personal experiences, and various communication mediums including print, webinars, and public presentations
Structural: Provide realtors, builders, and local business with educational information and encourage participation in compliant lighting changes

Influencer Model - Island Visitors

Diagnose - Where/ What is the resistance

	Motivation	Ability
Personal <i>(Values & skills)</i>	<ol style="list-style-type: none"> Is on vacation and does not feel like "learning" anything Believes that their actions will not negatively impact an entire island Afraid that "work" is involved Does not hold the personal belief that preservation is important 	<ol style="list-style-type: none"> Does not know how or where to contact Dark Sky administration Cannot find receptacles, clearly marked paths, or viewing areas Does not understand the literature that is available
Social <i>(Teams & Support)</i>	<ol style="list-style-type: none"> Doesn't want to ruin an experience by suggesting to remain on trails with durable surfaces Believes that it's "okay" to bend the rules for the sake of the people in the group such as taking "only 1 flower" or removing "only 1 rock" Does not have a clear understanding of expectations surrounding environmental protection 	
Structural <i>(Incentives & Environ.)</i>	<ol style="list-style-type: none"> Is not introduced to environmental standards prior to coming to the island Limited information is available for distribution to visitors Information is not presented or offered at the time of travel to or arrival on the island Pre-travel to the island does not include an introduction to environmental protection or "Leave No Trace" 	<ol style="list-style-type: none"> No receptacles are present in BIDSS locations No information is offered for distribution at travel points Information is not available in locations most frequented by visitors

Vital Behaviors

Results

Crucial Moments	<ol style="list-style-type: none"> Something needs thrown away Individual(s) unable to traverse a certain trail or path and want to travel off durable surfaces Individual(s) want to start a campfire at a dark sky location or pick flowers/ vegetation Individual(s) notice possible damage/ destruction of an area Someone notices a barrier/constraint to protecting the environment Individual(s) arrive on Beaver Island via ferry or plane The experience by a visitor has left a lasting, positive impression 	<ol style="list-style-type: none"> No increase of waste is recorded in the proposed BIDSS location or across the island No damage to natural habitats or wildlife areas are found at the proposed BIDSS location or across the island Visitors are witnessed following the environmental principles of "Leave No Trace" Visitor's individual behaviors support environmental protection Visitor's are recognized for contributions that protect/ defend the fragility of Beaver Island ecosystems and wildlife
	Vital Behaviors	<ol style="list-style-type: none"> Visitors use the appropriate receptacle to discard The choice of not to displace a barrier or go "off-path" but to use only durable surfaces Campfires are only started in appropriate places and site alterations are avoided 5) Reports are filed with the appropriate administrators to address damage/ destruction Information is accessed to understand island expectations A review is posted sharing a visitor's experience of proposed BIDSS

Influencer Model – Island Visitors

Influence - Desired Changed Behavior

	Motivation	Ability
Personal <i>(Values & Skills)</i>	<ol style="list-style-type: none"> Information is readily available in multiple forms, written in an easy to understand format Statistics of health benefits to human, animal, and plant life are used in print media Easy steps to protect the island assets are clearly communicated 	<ol style="list-style-type: none"> Contact information is displayed at proposed BIDSS site Signage is present that clearly indicates pathways and trails to be used Receptacles or other amenities are available to discourage inappropriate disposal of waste
Social <i>(Teams & Support)</i>	<ol style="list-style-type: none"> In social circles, can verbalize the importance of reducing damage/harm by staying on durable surfaces In social circles, understands the larger impact that one small decision can have Can readily access information necessary to create awareness without cost to the individual 	
Structural <i>(Incentives & Environ.)</i>	<ol style="list-style-type: none"> Information on the proposed BIDSS and environmental protection are viewed during travel to the island Announcements are made onboard prior to leaving Charlevoix on the Ferry Video in businesses and visitor areas flash the principles of "Leave No Trace." 	<ol style="list-style-type: none"> Receptacles or other amenities are available to discourage inappropriate disposal of waste Information is available at both airlines and the boat company Announcements are made onboard prior to leaving Charlevoix on the Ferry Video in businesses and visitor areas flash the principles of "Leave No Trace."

The Plan - Island Visitors

Personal



Social



Structural



Education: The primary success of the Influencer/ Change plan relies heavily on the education of vacationers and visitors

Personal: Educate vacationers and visitors using brochures, website, and social media . Broadcast the 7 principles of Leave No Trace.

Social: Create confidence through education and various communication mediums including print, webinars, and public presentations. Make access to information easy and simplify content of the communication.

Structural: Provide appropriate signage, contact information, and receptacles in heavily traversed areas. Promote environmental literacy in conjunction with local businesses.

St James Twp. is redoing lighting ordinances around the marina as they are insistent on IDA lighting. We believe this is a wise lighting management approach, setting an example for the residents of St. James and visitors to the island.

IDA provides educational information to members. Currently, cards, posters, rack cards, information, and brochures, currently available at the Chamber and the Community Center. IDA information will now be included in these locations.

Radio and other Media Promotions

- The NorthernIslander Newspaper has published requests for letters of support for the BIDSS and carries a regular Dark Skywatch Column.
- Beaver Island District coordinated a series of speaker events in 2019 with NASA Solar Ambassadors as well as a reading series, and several dark sky events, including a session with Mary Stewart Adams, Night Sky Storyteller.
- WVBI airs Mary Stewart Adams' Story Teller's Night Sky, a weekly feature that connects ancient mythology and modern science to events in the night sky. WVBI also features Dark Sky events both its on air (broadcast four times each weekday) and online Community Calendars.
- St. James Pavillion owners have shown willingness to hold dark sky events year-round, providing a screened enclosed building with access to restrooms and seating area, and campfire spot.
- Beaver Island Dark Sky Project is a promotional Facebook Group that consistently promotes events and issues of concern to dark sky viewers. Bill Markey initiated this group and continues to monitor the page.
- The Chamber and BIA issue press releases about Dark Sky activities on the island that generate interest and stories in statewide media.



Michigan's Beaver Island seeks international dark sky designation

Updated Nov 25, 2019; Nov 25, 2019

By Emily Bingham | ebingham@mlive.com

BEAVER ISLAND, MICH. -- Sitting some 30 miles from the ferry docks in Lake Charlevoix, Michigan's remote Beaver Island has long been rich with an increasingly rare resource: Dark, unpolluted night skies.

Now, a [group is hoping to spread the word](#) the island's incredible stargazing -- by seeking to designate the entire island as an international dark-sky sanctuary.

"Everybody that I know that comes here interested in astronomy is just absolutely amazed at how dark it really is," said William Markey, an astronomy enthusiast who has lived on the island for nearly 40 years. "We really are the darkest skies in Michigan."

Markey's love for Beaver Island's night skies led him to become the volunteer administrator for a Facebook group called Beaver [Island Dark Sky Project](#): An unofficial group gathering research and support to apply for the dark-sky sanctuary designation from the International Dark-Sky Association.

A dark-sky sanctuary differs from a dark-sky park in that it is an exceptional distinction reserved for the planet's darkest, most remote, and often most ecologically sensitive places.

Currently there are only 10 such sanctuaries in the world, and only four in the United States. So far only one location in Michigan has been granted any designation from the IDA: Headlands [International Dark Sky Park](#) Mackinaw City.

Tapping into the interest in dark skies, the Beaver Island Chamber of Commerce is currently working with Little Traverse Conservancy to create a publicly accessible dark-sky viewing area at the island's 116-acre [Little Sand Bay Nature Preserve](#). According to chamber director Paul Cole, that viewing area could be open as early as next year.

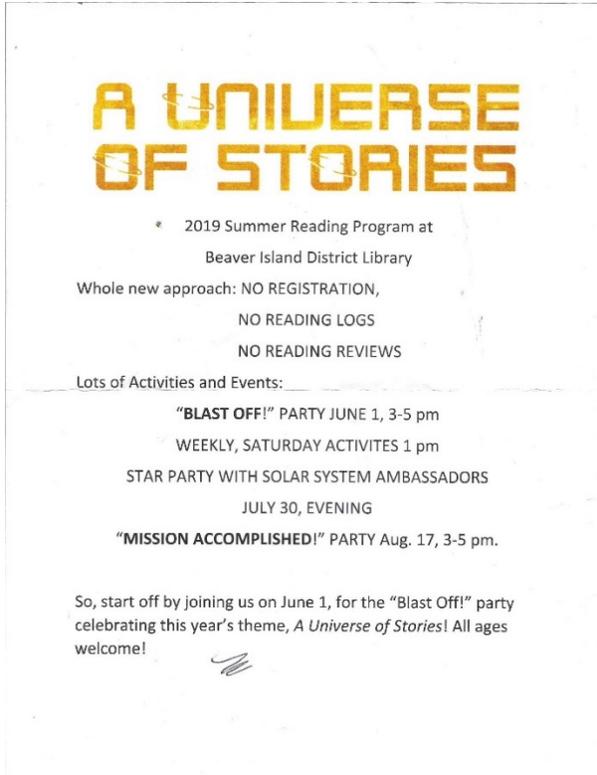
Applying for official dark-sky status from the IDA is a lengthy and complicated process -- the earliest the Beaver Island group could apply would be the fall of 2020. Markey the plan is for the group to evolve into a nonprofit -- and in the meantime, he said he and others are hoping to continue to gather support from like-minded lovers of the night sky. "We're looking to develop and we're recruiting," Markey said. "We're looking for people with telescopes, people with cameras."

"The future is unknown, but there's immense interest," he said.

Note: The article included an online slideshow of Beaver Island Dark Skies photos.

Raising Awareness through Event Promotion

We also raise awareness through the creation of posters promoting Events. Here are examples of event posters from live events in recent years.



Join us for an evening of Stargazing at Donegal Bay Pavilion July 30th, 9 p.m.

Solar System Ambassadors will lead participants in locating stars and planets.

Bring your own telescope or use one there. Telescope workshop will be held on site for those wishing to discover everything their personal telescopes offer!

Everyone welcome---kids too!

Sponsored by the Beaver Island District Library and the Dark Sky Project



STARS & GUITARS!

A STELLAR DARK SKY PROJECT EVENT @ PORT ST JAMES DONEGAL BAY PAVILLION

THURSDAY, SUNSET TIME TIL AFTER DARK



FEATURING: DUKE SKYGAWKER (TONY MILLER) ON TELESCOPE & ERIC NASSAU ON UKULELE & GUITAR COME SING ALONG!



STAR GAZING IS A SOCIAL-DISTANCE EVENT

CONTACT CYNTHIA JOHNSON 231-350-8792



DONATIONS ACCEPTED & SUGGESTED TO BENEFIT THE ARTISTS AND THE DARK SKY PROJECT. OUR MISSION IS TO CREATE AWARENESS ABOUT LIGHT POLLUTION AND TO OBTAIN AN OFFICIAL DARK SKY DESIGNATION FROM THE INTERNATIONAL DARK SKY ASSOCIATION! FIND OUT MORE AT IDA.ORG

EVENTS LIKE THIS SUPPORT OUR EFFORTS AND SHOW OUR INTENT TO CREATE AWARENESS ABOUT DARK SKIES.

SEE OUR BEAVER ISLAND DARK SKY PROJECT FACEBOOK PAGE!



Bring a chair or blanket and hang out in healthy dark skies to hear music and observe up close, or just far away, planets, moon, stars and maybe a meteorite or satellite or two!

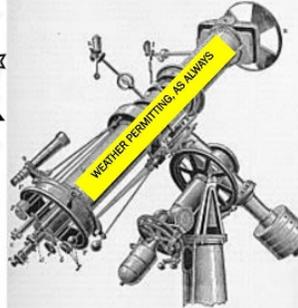


Figure 21: Rod Courtright, NASA Solar Sky Ambassador, and Michigan Astronomy Club member leading a telescope workshop, organized by the Beaver Island District Library.

Public Outreach

Past Events

- Dark Skies Presentation by William Markey: Community Center – 15 attended
- Star Party with Mary Stuart Adams: Donegal Bay – 50+ attended
- Astronomer Telescope Workshop: Donegal Bay – 12 telescopes and 20 people attended.
- NASA Anniversary Talk Workshop for kids: Library
- Dark Sky Booth at Sustainability Fair: The Sustainability Fair includes Dark Sky Preservation content at their events and on their website to promote awareness.
- Presentation at NLMIC: Boyne Mountain Convention Center – Pam Grassmick and Cynthia Johnson presented information about the proposed Sanctuary – 25 NLMIC members attended. In 2019, NLMIC voted as a group to support dark skies preservation in the archipelago.

Statewide Promotion

Dark Skies Rack Card: Distributed to Michigan Travel Centers and Northwest Michigan Travel Info Racks. Also available at mainland Beaver Island transit terminals and in travel info racks on Beaver Island.

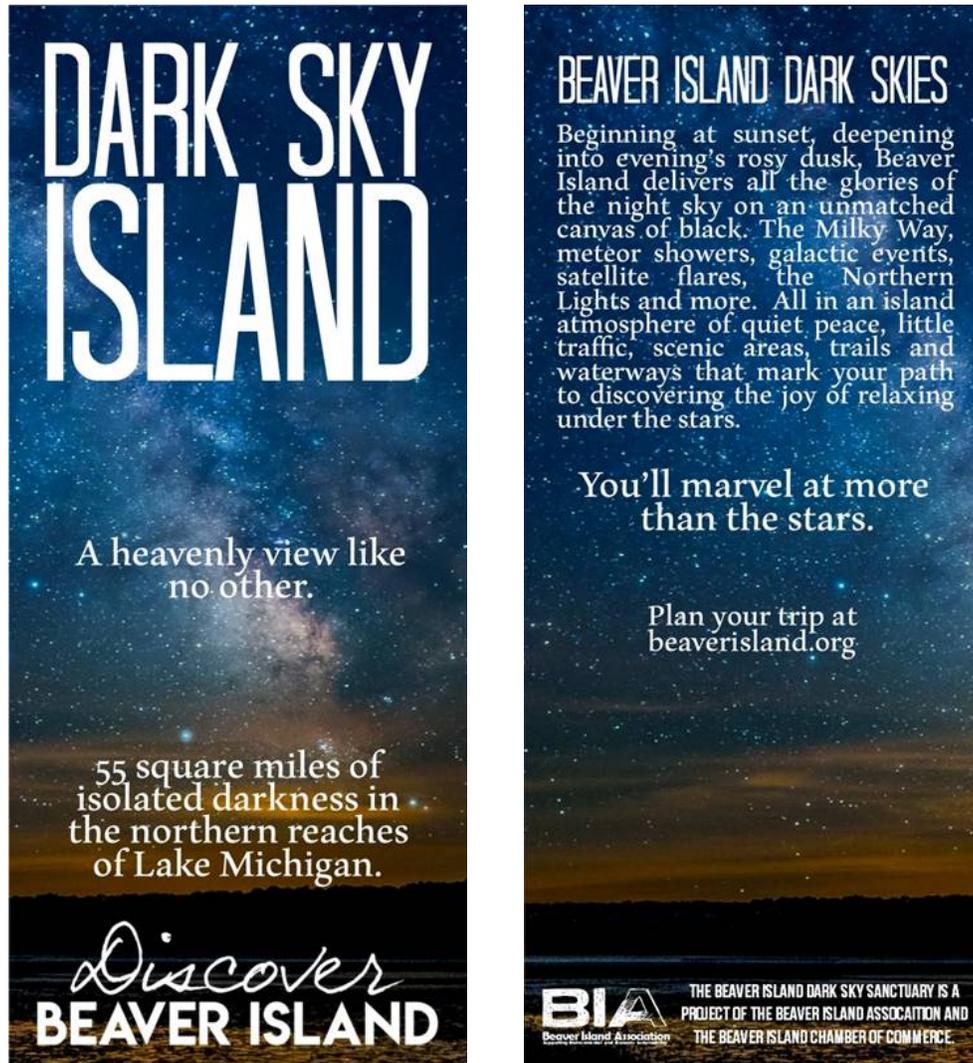


Figure 22: Dark Sky Island Rack Card

The website referenced in the Rack Card is up and running with additional content being developed. It is planned that the application will be made available as an app with mapping and reference functions available to users offline. The website is part of a family of websites that provide information about trails on the island (including the Water Trail, Birding Trail, History Trail, Children's Discovery Trail, Biking and Hiking Trails and Auto Trail). All of these trail sites now or will promote the BIDSS.

Future Outreach

- Robert Parrish Presentation – Beaver Island District Library

- Presentation at Peaine Township meeting by Robert Parrish and Dark Sky – Peaine Township Hall
- Presentation at St. James Township meeting by Robert Parish and Dark Sky Group – St. James Township Hall
- Presentation at Beaver Island Community School by Robert Parish and Dark Sky Group
- Presentations to Charlevoix Community organizations (Council on Aging, Charlevoix Community Foundation, Charlevoix Chamber of Commerce)
- Presentation on Beaver Island TV
- Beaver Island Chamber of Commerce is inserting a Dark Sky Attraction section in the 2021 Visitor’s Guide and plans to continue to feature the BIDSS in future editions. The Visitor’s Guide is available at Michigan Travel Centers distributed to thousands each year.



Figure 23: NEOWISE Comet as seen from Bonner’s Landing, West Side Beaver Island, looking Northwest - Photo by Taffy Raphael

Other Media

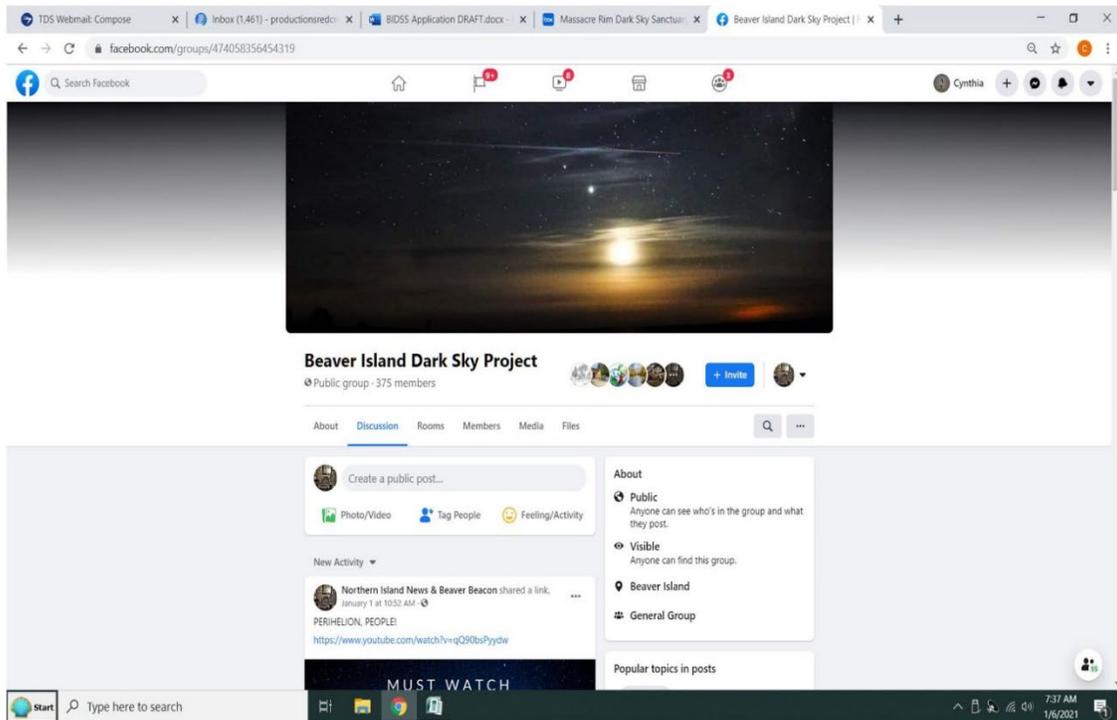


Figure 24: Social Media

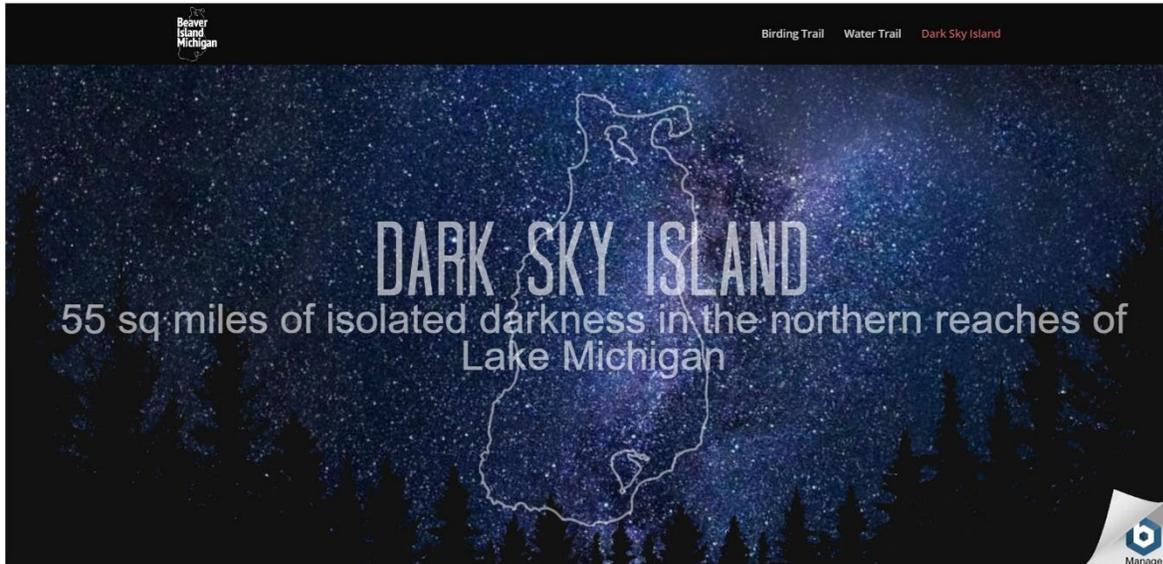


Figure 25: <http://darkskyisland.org>

References

Peaine Township Master Plan

http://www.peainetwp.org/2017%20Master%20Plan/WEB_Beaver%20Island%20Master%20Plan%20Book6_12.pdf

St. James Township Master Plan

<http://cms5.revize.com/revize/stjamestownship/Eco%20Steering/Beaver%20Island%20Master%20Plan%202006.pdf>

Management Plan
for State-owned Lands on Northern
Lake Michigan Islands
Michigan Department of Natural Resources
Wildlife Division
Revised February 2017



Conserving the Beaver Island Archipelago:

https://www.rivercare.org/local/upload/file/Beaver_Island_Final_Report_web.pdf

Information concerning indigenous peoples and their connection to the lands and skies of the archipelago came from:

Beaver Island Historical Society Archives and Displays

Beaver Island Historical Society, Beaver Island, MI 49782

Native Skywatchers and the Ojibwe Giizhig Anung Masinaaigan – Ojibwe Sky Star Map

St. Cloud State University, St. Cloud, Minnesota 56301

Indigenous Astronomy

Michael Wassegijig Price

Dedication

To the Odawa Nation, who arrived on Beaver Island Archipelago 2200 years ago, the universe was created by Glitche Manitou manifesting everything we know and those unseen things and then birth it into being. Each part of Manitou's creation supported the other and maintained balance: the four legged – the animals, those beings.



The Beaver Island Dark Sky Committee believes in and, through the creation of the BIDSS, intends to promote awareness about the cultural importance of the Odawa Nation in relation to Beaver Island. The spirit of the Gizhebaa Giizhig is revealed in Beaver Island's "Stone Circle". Thirty-nine stones forming a 397-foot circle was found on the western side of Beaver Island. As the site was explored, Native American elders from the surrounding areas recalled stories of a stone calendar located on Redding Trail, below Angeline Bluff, near Peshawbestown, which is a historic Native American village. The site has a large stone with unknown markings in the center of the site, with other stones seemingly arranged around it. The stones and boulder arranged around it also have carving, which appear to be sheaths of feathers. Research found that the stones connect to star positions and were aligned to the midsummer solstice. The pattern of the stones is like that of a Native American medicine wheel. It is mostly accepted that the site had a high significance and was used as an important, ceremonial site for Native Americans who once inhabited Beaver Island.



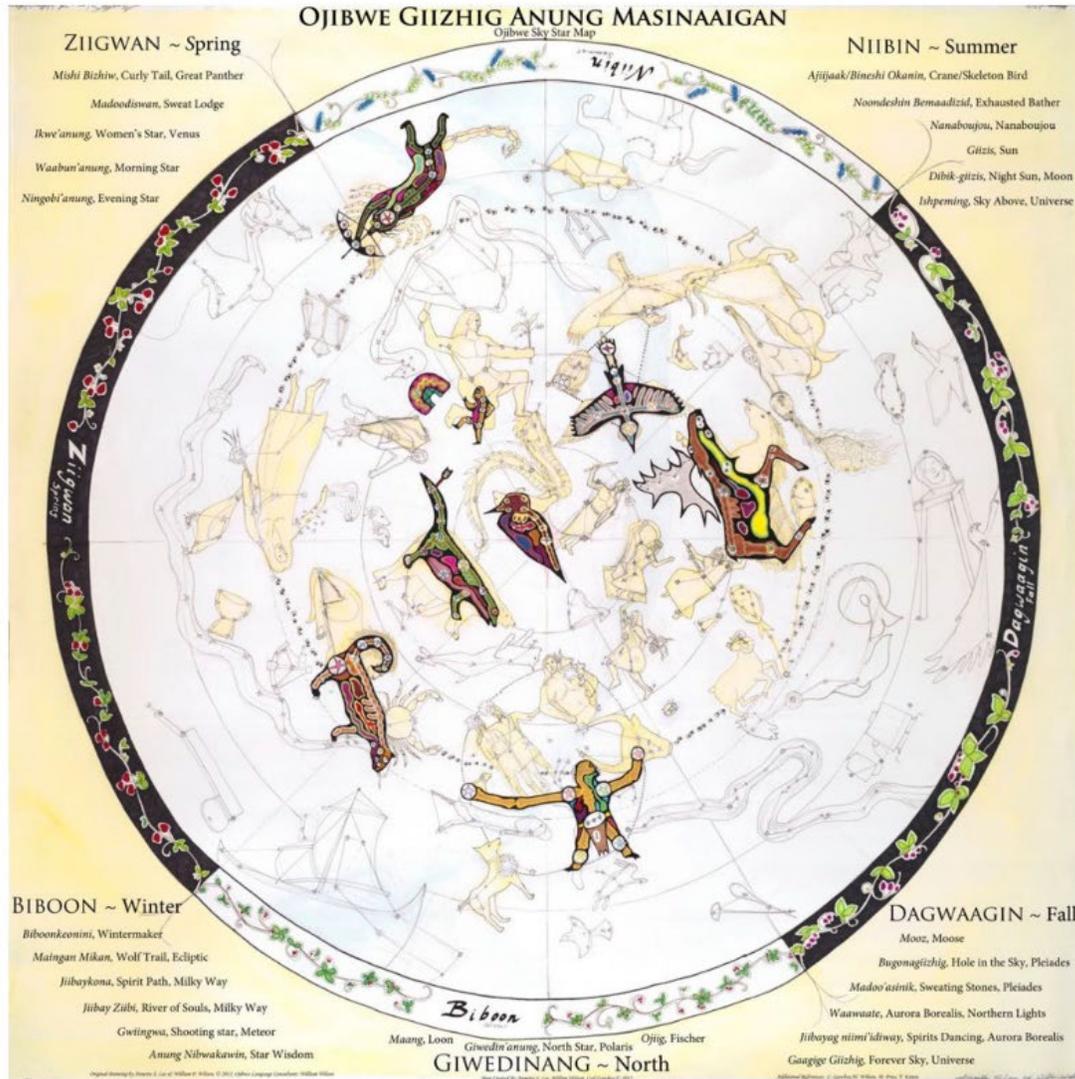


Figure - *Ojibwe Giizhig Anung Masinaaigan*, Created by A. Lee, W. Wilson, C. Gawboy, 2012

"*Ojibwe Giizhig Anung Masinaaigan - Ojibwe Sky Star Map*", was created by A. Lee, W. Wilson, C. Gawboy, ©2012. The map was designed so that the *Giwedin'anung*, North Star, Polaris, is at the center of the map. This reflects the motion in the night sky – the North Star-Polaris appears to be a 'motionless point' about which all other stars in the sky appear to rotate around counter-clockwise (CCW) as viewed from the Northern Hemisphere.

Moving outwards from center, Ojibwe constellations of each of the four seasons are painted in woodlands x-ray style by W. Wilson. Brighter Greek constellations are shown in whispers of light yellow. Dimmer Greek constellations are visible in pen or simply pencil. Seasonal medicinal plants are displayed on the border in a floral Ojibwe style beadwork pattern.

Figure 26: *Ojibwe Giizhig Anung Masinaaigan – Ojibwe Sky Star Map*