2014

KBIC Wildlife Stewardship Plan

Wiikwedong Mizhinawesiiwendaawasowinibii'igan

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KBIC Natural Resources Department

12/18/2014

Council Approved December 18, 2014
NRD Report No. 14.1218

Gidanamikaagoo!

Welcome to our Wildlife Stewardship Plan (WSP). We are Ojibwewanishinaabe meaning "original human" but also known as the Keweenaw Bay Indian Community (KBIC), an Ojibwe nation. Our approach to this stewardship plan is as a caretaker and nurturer (steward) of a mutually beneficial relationship between our natural communities and our people. This is a unique document that considers the ecology of wildlife and seeks mutual human and wildlife benefits rather than seeking only maximum human benefit.

This document is also unique in that we strive to incorporate Anishinaabe knowledge, beliefs, and values by utilizing input through a Traditional Ecological Knowledge focus group and by utilizing other local knowledge and publications. We also strive for accuracy in content and methods by seeking the advice of a Scientific Advisory focus group of native and non-native wildlife and habitat specialists, outside reviewers, and results from KBIC field surveys of wildlife and habitat. We incorporated community values by referring to results from KBIC mail in surveys designed specifically for the drafting of this plan and from past hunter surveys.

The Wiikwedong Mizhinawesiiwendaawaasowinibii'igan - 2014 in addition to being a working plan, is vital as a document because it contains Ojibwe language names of local species which reinforces the value we place on our language. Please note that this is a living document and we seek to continue to add further cultural wisdom and information from KBIC community and elders as it is found and/or collected.

The ***Vision*** for the KBIC Wildlife Stewardship Plan is: **To support, honor, and respect mutual relationships between thriving native fish, wildlife, plant, and human communities by maintaining, enhancing, or restoring ecologically diverse networks of healthy wildlife populations and habitat.**

This WSP is intended to be used as a long term guiding document that identifies priorities and desired actions to be completed as funds and other resources become available. Ultimately, we would like to see all actions within this plan eventually implemented, however, we realize logistics associated with funding, human resources, technical expertise, specialized equipment, and long term maintenance are all factors that affect the realistic timeline for objectives to be achieved. We have focused on the following priorities: 1) benefits to the resource, 2) cultural importance, 3) support of other long-term KBIC plans, 4) stepping forward as a stewardship model for state and regional plans, and 5) requests for funding sources.

The WSP is an adaptive management strategy that may be updated or modified at any time as deemed appropriate by KBIC Natural Resources Department and Tribal Council. Ultimately, we hope to implement much of this plan over the next ten years as time, resources and the Creator allow.

Miigwech,

Pamela Nankervis, KBIC Wildlife Biologist
Mary Hindelang, Contract Ecologist

ACKNOWLEDGEMENTS

We gratefully acknowledge the recommendations of the critique and review provided by Earl Otchingwanigan which include Ojibwe language corrective recommendations, Ojibwe cultural perspective, and enhancement of plan language.
Mii yo'ow ezhi-daangigwanetamaan, niin sa[1]*, Earl Otchingwanigan, O'ow sa noongom giizhigak Manidoo-giizisoons midaasogonagizi ashi bezhig 2014.*
[1] This is actual wording the Headmen spoke when signing the 1854 Treaty which figuratively means "I sign this by way of doodem and my mark," but as literal is much more meaningful ***"I touch the feather to this, so be it me"*** , on this day of 11th December 2014.

I cannot express enough gratitude to the Traditional Ecological Knowledge and Scientific Advisory committees and following people who were instrumental in the development, writing and draft reviews of this Wildlife Stewardship Plan:

Administration for Native Americans, Grant fund provider
Rob Aho
Barb Barton, MDOT
Doreen Blaker, KBIC, TEK
Bob Doepker, MI DNR, SAG
Joe Dowd, KBIC, TEK
Miles Falck, GLIFWC, TEK and SAG
Valoree Gagnon, MI Tech Univ, TEK
Mary Hindelang, Contract Ecologist and co-author
Erin Johnston, KBIC
Jerry Jondreau, KBIC, SAG
Eleanor Moede, KBIC, TEK
Evelyn Ravindran, KBIC, TEK
Brian Roell, MI DNR
Mark Romanski, U.S. National Park Service, SAG
Kyle Seppanen, KBIC
Lori Ann Sherman, KBIC
Judy Smith, KBIC, TEK
KBIC Tribal Council
KBIC Culture Committee
Community members that attend the public presentations and participate in community surveys
It is through community and professional contributions that make this stewardship plan an exceptional example of traditional knowledge blended with scientific knowledge while holding true to Anishinaabe community values.

Miigwech

Pamela Nankervis, Wildlife Biologist
ANA Project Leader

"We gather our minds together to send our greetings and thanks to all the beautiful animal life of the world, who walk about with us. They have many things to teach us as people. We are grateful that they continue to share their lives with us and hope that it will always be so." R. Wall Kimmerer 2013

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KBIC WILDLIFE STEWARDSHIP PLAN

Vision: To support, honor, and respect mutual relationships between thriving native fish, wildlife, plant, and human communities by maintaining, enhancing, or restoring ecologically diverse networks of healthy wildlife populations and habitat.

1. Introduction

Who We Are:

We are Ojibwewanishinaabe meaning "original human" but also known as the Keweenaw Bay Indian Community (KBIC), an Ojibwe nation. We have approximately 3,623 enrolled members (October, 2014) and are located in Baraga County of Michigan's Upper Peninsula along the shores of Lake Superior. Our families share social ties through a tribal-wide network of totemic clans.
Traditionally, the Ojibwe **Odoodemiwag (Clan System)** was created to provide leadership and structure in order to care for these needs. There were seven original clans given duties to provide the structure needed to care for the people (Benton-Banai 1988:74-78, Benton-Banai's original spellings intact below).

> The **Ah-ji-jawk (Crane) and the Mahng (Loon) Clans** were given the power of Chieftainship. By working together, these two clans gave the people a balanced government with each serving as a check on the other. Between the two Chief Clans was the **Gi-goon (Fish) Clan**. The people of the Fish Clan were the teachers and scholars. They helped children develop skills and healthy spirits. They also drew on their knowledge to solve disputes between the leaders of the Crane and Loon Clans. The **Mu-kwa (Bear) Clan** members were the strong and steady police and legal guardians. Bear Clan members spent a lot of time patrolling the land surrounding the village, and in so doing, they learned which roots, bark, and plants could be used for medicines to treat the ailments of their people. The people of the **Wa-wa-shke-shke (Deer) Clan** were gentle, like the deer, elk, and moose or caribou for whom the clan is named. They cared for others by making sure the community had proper housing and recreation. The Hoof Clan people were the poets and pacifists avoiding all harsh words. The people of the **Wa-bi-zha-shi (Marten) Clan** were hunters, food gatherers and warriors of the Ojibwe. Long ago, warriors fought to defend their village or hunting territory. They became known as master strategists in planning the defense of their people. The **Be-nays (Bird) Clan** represented the spiritual leaders of the people and gave the nation its vision of well-being and its highest development of the spirit. The people of the Bird Clan were said to possess the characteristics of the eagle, the head of their clan, in that they pursued the highest elevations of the mind just as the eagle pursues the highest elevations of the sky.

The seven original clans have expanded into over twenty different clans according to region. The duties and responsibilities of the different clans within the system of government remain and the Clan System continues to build on equal justice, voice, law and order and reinforcement of teachings and principles of a sacred way of life.

Throughout the WSP you will find cultural teachings through stories that signify the relationship between native people, wildlife and the natural world around us which is the sacred way of life. These teachings are not just a way to teach but are also a way to honor other beings with which we share this earth. Most stories are of Anishinaabe origin, some however are not and the origin of such teachings are stated. We want to continue to collect more Ojibwe cultural knowledge and add to the cultural content of this document as we journey into the future.

A crucial part of the Anishinaabe way of life is the sustainable harvest of plants and animals. KBIC harvesting practices are protected by a land cession treaty between the Chippewa and the federal government in the 1842 Treaty of La Pointe which reserves our specific rights to fish, hunt, and gather on ceded territories (on and off reservation) (Appendix 1). We continue to practice subsistence and commercial harvesting as it has been passed between generations. All KBIC enrolled members are entitled to Tribal hunting, fishing and trapping licenses which allow holders to harvest certain wildlife species as defined in the Title Ten, Hunting, Fishing, Trapping and Gathering Tribal Code of Law.

Seasons and Harvesting Yesterday and Today

We have always lived by the seasons and our surroundings. Our ancestors relied on the environment to survive and their knowledge regarding their surroundings was extensive. To this day, we continue to rely on many of these teachings for hunting and gathering. Prior to modern day comforts, our Anishinaabe relatives traveled on foot within a loosely defined territory throughout the year to find and utilize resources needed to provide food and shelter (Nieves-Zedeño et al. 2001). Our ancestors acquired and preserved enough food during the summer to support themselves through harsh winters without modern conveniences of today. By late fall, women, children and elders had built up stores of wild rice, maple sugar, and dried fish and game. We continue to store these foods (although typically more canning/freezing than drying) on a seasonal basis and look forward to sharing large bounties with friends and loved ones.

Historically, bands would split into family units and traveled to winter hunting camps, which passed down within the family unit. We continue this tradition during deer season to gather at smaller scale hunting camps today. During the winter the men and women cleared snow, collected wood, built wigwams, and traveled their territory to trap and hunt large game. Although we now live in permanent residences rather than wigwams, men continue to clear snow, gather wood, trap and hunt game. Women and men continue to learn how to weave, sew, and repair fishing nets. In spring, like the bands of our ancestors, we are ready to set up maple sugar camps. Maple syrup is a sweetener that can be stored and later used to flavor tea as well as stews, other main dishes, and desserts. Spring was also the time to make birch bark canoes for our ancestors. Today we continue the tradition only now we usually make birch baskets, stands of mature birch trees seem to be harder to come by these days. By May, the bands of our ancestors would reunite close to rivers and lakeshores in large villages for the summer, where time was spent fishing, gathering plants, and some gardening; very much how we live off the land today doing similar subsistence activities.

August continues to be the best time for collecting medicinal plants, picking berries, and gathering honey just as our ancestors did. Late summer is the time for harvesting and drying the

wild rice that was once a staple of the Ojibwe diet. In early fall, men still like to go duck hunting and trapping and families look forward to returning to winter camps now referred to as "deer camp". The seasonal cycle for modern day Anishinaabe repeats similar to that of Mishomas (Grandfather) and Nokomis (Grandmother).

> …long ago when the earth was young, all the beings of Creation knew who they were and what was expected of them. There were those who lived in the outer air, including the *bineshiinyag* (the birds) and the winged ones who fly around the earth. There were those who lived in the waters, such as the *giigooyag*, the fish and the *mishiikenyag*, the turtles. There were those who lived beneath the earth, those who lived in the ground, and those who burrowed beneath the earth for periods of time. There were also those who lived on the earth. All the beings of the Creation knew that they were supposed to take care of one another, for all parts of Creation are interconnected and dependent on one another to keep the balance of the earth. (Wendy Makoons Geniusz 2009)

Where We Live:

KBIC is located on the L'Anse Indian Reservation in Baraga, Marquette, and Ontonagon Counties in Michigan's Upper Peninsula on Lake Superior. The entire L'Anse reservation encompasses nearly one third of the area of Baraga County and small portions of Ontonagon and Marquette County (Appendix 2).

The Treaty of September 30, 1854, between the Lake Superior Chippewa and the United States Government established the L'Anse Reservation. The L'Anse Reservation includes 59,027 acres and is both the oldest and largest reservation in the state of Michigan (ITCM 2011). The entire L'Anse reservation encompasses nearly one third of the area of Baraga County and small portions of Ontonagon and Marquette County. Due to land sales, Tribal ownership within the Reservation boundaries has been reduced significantly, resulting in the "checkerboard" of trust, allotted, and private land holding. The non-trust land is owned by individuals, corporation, businesses, municipalities, and the state and federal government. KBIC has unrestricted jurisdiction for land management on approximately 19,000 (about 1/3) of the total 59,027 acres. The remaining two-thirds of land within the Reservation boundaries are also within the jurisdiction of the tribe but access may be restricted to varying degrees by requiring permission from allottees, Bureau of Indian Affairs, or private owners in order to implement land management activities.

Why and How We Developed the Wildlife Stewardship Plan:

Anishinaabe have been provided a great gift from the Creator. All animals were placed on earth to help the Anishinaabe. Nanaboozhoo, first man, learned and interacted directly with the animals and his stories continue to teach us important lessons of why things are, how to do things, and how we should seek to coexist with nature, wildlife, and one another (Harlan Downwind, Personal Communication). Therefore, we strive to include these values into the

Stewardship plan along with more recent information gathered directly from our natural environment and the community.

The KBIC Natural Resources Department and Natural Resource Committee typically made wildlife and habitat recommendations to Tribal Council using general, non-specific guidelines provided in a KBIC Integrated Resource Management Plan (IRMP), or on an ad-hoc case-by-case basis following discussion. It was often without the benefit of baseline data or community input. It was recognized through this process that a more comprehensive wildlife management plan was warranted.

This Plan was developed with input regarding needs and priorities identified by the KBIC Community through mail surveys, wildlife baseline information, other KBIC planning documents, and various State, Federal and Regional plans. Direct assistance with development was also provided from two focus groups, a Traditional Ecological Knowledge Committee composed of four tribal elders and/or community members as well as a Scientific Advisory Group composed of four interagency biologists and ecologists.

A Wildlife and Natural Resources Survey was mailed to 824 KBIC members in February 2013 to gain knowledge and understanding of KBIC tribal members' uses, values, and opinions concerning wildlife, natural resources, and environment as well as policies particular to those concerns. A total 264 members (32%) responded to the survey. The survey was designed to assist in identifying values and needs regarding wildlife and natural resources to be considered during the development of this WSP. Specific topics addressed were: *Use and Reliance of Various Natural Resources, Values and Management Options for Specific Wildlife Species,* and *Culture and Ojibwe-based Values and Opinions about KBIC Natural Resource Policies.* Pertinent details regarding results of the survey are included under various species specific sections. The full report, KBIC Wildlife and Natural Resources Survey Report, summarizes all responses and can be found on the KBIC NRD website under publications.

Two public meetings were held in 2013 to present the results of the Wildlife and Natural Resources survey and offered more opportunity for community input and discussion about use, values, stewardship options and cultural significance of wildlife and natural resources.

A KBIC Hunter Survey is distributed every three or four years to tribal members that purchase KBIC hunting/trapping permits. Questions on the survey focus mainly on wildlife harvest and were conducted in years 1991, 1992, 1995, 1998, 2001, 2005, and 2009, with reports following each Survey. Results from these surveys are used to gauge hunter success and opinions about various species specific regulations. Reports from these surveys were also consulted during the drafting of this Plan. Hunter survey reports can be found on the KBIC NRD website under publications.

Baseline wildlife and habitat inventories of KBIC wetlands and KBIC upland and riparian areas were conducted between 2007 and 2011. Twenty-eight wetland and fifty upland and riparian sites were inventoried for wildlife and habitat. Wildlife inventory included breeding bird surveys, mammal track and sign, as well as remote camera survey for furbearer and carnivore species. See Appendix 3 for locations of wildlife study site locations. Habitat surveys included plant species,

coarse woody debris, basal area of trees, and tree canopy cover inventories. Results were presented at several public meetings and several professional conferences. Pertinent species specific results from these studies are included in species summaries within the WSP.

KBIC planning documents were used as guiding documents during the development of this WSP. Specific plans and documents we relied upon include:

- KBIC Integrated Resource Management Plan (IRMP) (update in progress)
- KBIC Tribal Strategic Plan
- KBIC Wolf Management Plan (Nankervis 2013)
- 2013 KBIC Wildlife and Natural Resources Community Survey Report (Gagnon and Nankervis 2013)
- BIA Forest Management Plan for KBIC Trust Land***s***
- KBIC Land Use Management Plan (in progress)
- KBIC Wetland Management Plan (in progress)

Other guiding documents utilized were State and Regional plans such as:

- Michigan Wildlife Action Plan
- Michigan Sustainable Soil and Water Quality Practices on Forest Land
- Michigan Bear Management Plan
- Michigan White-tailed Deer Management Plan
- Michigan Wolf Management Plan
- Lake Superior Lakewide Action and Management Plan (LAMP) Lake Superior Biodiversity Conservation Strategy
- Great Lakes Water Quality Agreement
- North American Waterfowl Management Plan
- Upper Mississippi River and Great Lakes Region Joint Venture

2. Wildlife Stewardship Goals, Objectives and Strategies

A) WSP Vision

To support, honor, and respect mutual relationships between thriving native fish, wildlife, plant, and human communities by maintaining, enhancing, or restoring ecologically diverse networks of healthy wildlife populations and habitat.

B) Overall Wildlife and Habitat Goals

1) To approach the implementation of this stewardship plan as caretaker and nurturer (steward) of a mutually beneficial relationship between our wildlife, natural communities and our people, incorporating centuries of Anishinaabe knowledge, beliefs, and values.

2) To care for wildlife and habitat in an ecologically sound manner that allows for sustainable use of hunting, fishing, and gathering.

3) To restore degraded habitat and any declining or at-risk populations of wildlife, fish, or plants.

4) To enhance habitat conditions for expanding wildlife, fish, and plant populations.

5) To protect ecologically diverse, rare, and culturally important wildlife species and habitat against loss or degradation.

6) To preserve healthy, diverse conditions of streams, lakes, wetlands, fields, and forests for maximum sustainability of wildlife, fish, and plant populations for generations to come.

C) Overall Wildlife Objectives and Strategies

Wildlife Objective 1: Increase knowledge of wildlife populations, health and habitat use within and around KBIC lands

Wildlife Strategies for Objective 1:

- Conduct ongoing monitoring and assessment programs to monitor the health and status of wildlife populations and their habitats
- Conduct research on specific species for recommendation of stewardship options
- Work with partners to align monitoring methodology to better collaborate on population assessments and Species of Greatest Conservation Need Status in Michigan (MDNR SGCN 2006)
- Review and revise tribal management plans and annual harvest proposal based on monitoring results
- Ask Community members to share wildlife knowledge and cultural memories as a baseline to compare changes in ecological conditions and traditional use

Overall Wildlife Objective 2: Increase community awareness of cultural and ecological importance of wildlife on the land

Wildlife Strategies for Objective 2:

- Provide public access to existing information about local wildlife through presentations, publications, and the NRD website.
- Seek additional input on knowledge and values by surveying Community members, including: original treaty between wildlife and first people; wildlife and plants as our original teachers; cultural stories of traditional respect and use; mutually beneficial relationships with wildlife and plants.
- Incorporate traditional stories and ways into KBIC plans, public media, and presentations
- Develop species specific education and outreach materials
- Work with partner tribes and agencies to develop and distribute educational materials
- Provide information at public events, on the KBIC NRD website and in newsletters

Wildlife Objective 3: Monitor wildlife harvest rates and adjust harvest quotas accordingly to provide pro-active protection of sustainable game species populations

Wildlife Strategies for Objective 3:

- Develop an annual KBIC harvest report
- Collect and analyze annual hunter harvest data
- Compare Tribal harvest trends to State and Regional harvest trends
- Summarize and share harvest results with KBIC community annually
- Update harvest regulations in a pro-active manner

Wildlife Objective 4: Minimize conflict between wildlife and people

Wildlife Strategies for Objective 4:

- Educate the community on methods to reduce the risk of wildlife conflict and preventing harm to humans or private property
- Train field personnel on depredation investigations and how to resolve them and make recommendations to reduce complaints
- Provide timely and professional responses to conflicts on an individual basis
- Encourage land use and development to provide un-fragmented blocks of forest lands for travel and use for large mammals
- Promote access to publicly-owned lands and privately-owned lands that are enrolled in the Commercial Forest Reserve (open to public hunting) to distribute harvest pressure. See "Where Can I Hunt?"

Note: See specific stewardship and monitoring actions under each individual wildlife species

3. Species Specific Stewardship and Monitoring

3.1 Large mammals

Large Mammal Goal: To maintain self-sustaining populations of large mammals to preserve ecological balance of predator prey relationships.

Large Mammal Objective 1: Increase knowledge of large mammal populations and habitat use on and around KBIC lands.

Strategies:

- Conduct ongoing monitoring programs
- Conduct research on specific species for recommendation of stewardship options
- Work with partners to align monitoring methodology to better collaborate on population assessments
- Review and revise tribal management plans and annual harvest proposal based on monitoring results

Objective 2: Maintain or increase habitat connectivity to ensure dispersal routes that are relatively free from human disturbance

Strategies:

- Collaborate with partner agencies on corridor and contiguous forest block improvement and connectivity
- Evaluate habitat conditions and ensure Best Management Practices are followed.
- Enhance or restore habitat through management of invasive species and restoration of native and declining species

Large Mammal Objective 3: Develop an annual KBIC harvest report
Strategies:

- Collect annual hunter harvest data
- Compare Tribal harvest trends to State and Regional harvest trends
- Update harvest regulations in a pro-active manner

Large Mammal Objective 4: Increase public awareness of cultural significance
Strategies:

- Educate about the original treaty between wildlife and first people in that wildlife and plants were original teachers; continue to learn from this knowledge base
- Seek and share cultural stories of traditional respect and use
- Continue to seek input and values from surveying community
- Incorporate traditional stories and ways into KBIC plans, public media and presentations

Large Mammal Objective 5: Increase public awareness of ecological importance of large mammals
Strategies:

- Develop species specific education and outreach materials
- Work with partner tribes and agencies to develop and distribute educational materials
- Provide information at public events and on the KBIC NRD website

Large Mammal Objective 6: Minimize conflict between large mammals and people
Strategies:

- Train field personnel on depredation investigations and how to resolve them and make recommendations to reduce complaints.
- Provide timely and professional responses to conflicts on an individual basis
- Encourage land use and development to provide un-fragmented blocks of forest lands for travel and use for large mammals
- Promote access to publicly-owned lands and privately-owned lands that are enrolled in the Commercial Forest Reserve (open to public hunting) to distribute harvest pressure. See "Where Can I Hunt?"

3.1.1 Canids (WOLF, COYOTE, FOX)

a) Ma'iingan (WOLF) (Canis lupus)

Ma'iingan Relationship with First Peoples:
We have always been spiritually connected to Wolf. According to the Anishinaabe creation story, original man was given the task to name every place and thing on earth by the Creator. He asked for a companion and the Creator provided the wolf to be his travelling companion. Upon returning from their journey together they were ordered to always live apart but to be forever linked in brotherhood. They were to experience similar social pressure of being feared, respected and misunderstood by the people that would later join them on earth. What happens to the Anishinaabe will happen to Ma'iingan and vice versa (Benton-Banai 1988).

Ma'iingan Brief Description:

The gray wolf is the largest member of the *Canidae*, or dog family and is physically adapted as a large predator in cold and temperate climates. The dense under fur in their winter coats is protected by longer, water-resistant guard hair and their long legs and sturdy paws make them well adapted to travel. The nearly constant urge to travel appears to be for seeking prey. Wolves travel as part of regular hunting activity and during the summer months to shift pups from one rendezvous site to another. Wolves tend to travel more in the evening and night during warm months but are active throughout the day during the winter (Mech 2007). The wolf is a top predator in the ecological food chain. The primary prey animals for wolves locally are white-tailed deer, beavers, and small mammals.

As of 2013, there are approximately seven known packs of wolves near the L'Anse Reservation, of which three packs appear to be using land within the boundary on a regular basis. A total of 14 wolves were killed in the first state authorized wolf hunting season within the wolf management unit that includes the Baraga side of the L'Anse Reservation. The fact that wolves are no longer on the federal endangered species list and officially designated as a game animal by the State of Michigan makes them vulnerable to over harvest. It is imperative that KBIC continue to monitor and manage wolves in a culturally sensitive manner in order to ensure their continued existence.

Wolves remain protected within the KBIC Tribal Code under Endangered Species and Protected Animals Tribal Code 10.531. A Resolution (KB-1902-2012) was passed by KBIC Tribal Council that opposes any sport hunting and/or trapping of wolves in Michigan to preserve the ecological balance of predator-prey and protect the sanctity of Ma'iingan for the Anishinaabe. Despite this protected tribal status, the 2013 community survey results were split with 36% of

respondents feeling that wolves should be offered complete protection and 37% of respondents feeling that wolves should be allowed to be hunted as a game animal. A KBIC Wolf Management Plan (Nankervis 2013) was approved by Tribal Council in January of 2013.

Ma'iingan Habitat:
The two most important components for wolves to thrive in an area are abundance of large mammals and minimal interference by humans (Kurta 1995). It is a delicate balance of predator-prey further complicated by snow conditions and human induced habitat alteration particularly through logging in local areas of the Upper Peninsula (MDNR 2012). In winter, a very critical season for Michigan's deer, logging provides downed tops of trees for food and early stages of forest growth. Areas containing mature cedar or hemlock are often referred to as "deer yards" where deer concentrate in large numbers for extended periods of time to feed and avoid harsh wind chill conditions. These winter concentration of deer provide areas with high deer densities where wolves can survive during the winter (personal observation by Pamela Nankervis, KBIC Wildlife Biologist, Nankervis et al. 2000). Ultimately, decades of studies have shown that top predators such as wolves typically keep deer numbers in check so that over-browsing and disease are less problematic for deer over the long term. Most deer killed by wolves are less fit by being very young, old, sickly, starved or injured although they also kill some animals in prime health (Mech 2007). Their predatory role offers indirect protection of adequate deer habitat from over-browsing thus potentially encouraging greater biodiversity within the environment at some localized level.

Ma'iingan Threats:
- Conflicts with humans – predation issues, automobile accidents
- Persecution
- Habitat alteration and fragmentation
- Disease – canine parvovirus, mange, distemper, etc.
- Decreases in prey species such as white-tailed deer (i.e. winter kill, disease) and small mammals (i.e. loss of coarse woody debris)

Ma'iingan Stewardship Actions:
As defined in the KBIC Wolf Management Plan, the mission for KBIC is to maintain a healthy, self-sustaining population of wolves within KBIC Home Territory thus preserving the cultural and ecological benefits for the next seven generations and beyond. To achieve this mission we intend to:

- Establish and maintain active partnerships to ensure the most effective management and monitoring protocols possible including GLIFWC and MDNR 2008 Wolf Management Plan (MDNR 2008)
- Protect suitable and sustainable winter habitat for white-tailed deer, the wolf's primary food source, year-round.
- Maintain or increase active levels of inventory and population monitoring
- Provide public education regarding wolf ecology and behavior
- Minimize wolf-related conflicts with Tribal Members and the general public

b) Wiisagi-ma'iingan (COYOTE) (Canis latrans)

Wiisagi-ma'iingan Relationship with First Peoples:
Coyote is intelligent, resilient, sociable, cooperative, and faithful as a partner and parent. Perhaps it is Coyote's remarkable traits and adaptability that inspires its place in Ojibwe stories playing many roles including trickster, inventiveness, mischievousness, and evasiveness. The spirit of Coyote can make you do things you may normally not do; he inspires mischievous behavior (Harlan Downwind, Personal Communication).

Wiisagi-ma'iingan Brief Description:
The range of Coyote now encompasses most of North America (which is the only continent where they are native) from Panama to Alaska except for the northernmost regions of Canada -- the most extensive range of any carnivore in the Americas. Coyotes are one of the few animals that have enlarged their range since human encroachment began (Bekoff and Gese 2003). Coyotes are much more tolerant of human activities than their cousin Wolf and are often seen near farm buildings and edges of towns. Coyotes, thrive in areas where wolves have been extirpated. However, coyotes are elusive and avoid contact with humans by being more active after dusk and before daylight and they are usually only seen at a distance.
Before European settlement, the coyote was not present in most of the Great Lakes region but farmlands, clear cuts, and broken forests of the present are highly suitable as coyote habitat in the north. Coyotes perform some beneficial tasks for humans by keeping rodent and small mammals often considered as pests in check, and have long been valued as furbearers for their beautiful pelts (Kurta 1995). Within the KBIC L'Anse Reservation, coyotes appear to be very abundant. There are no formal population estimates for coyotes in the State of Michigan. Coyotes were detected at 26 study sites compared to 19 sites for wolf during a wetland wildlife inventory between 2007 and 2009. Of fifty upland and riparian study site locations between 2010 and 2011, coyotes were detected in 45 sites compared to only 15 sites for wolves. Because of the greater abundance of coyotes in the environment, it is likely that coyotes account for more depredation on natural and domestic prey than wolves (Libal et al. 2013). However, wolves are judged more harshly than coyotes when it comes to affecting availability of game such as white-tailed deer, grouse and snowshoe hare for tribal members. Studies that gather accurate population estimates of coyotes and how they compare to wolves are needed to help educate the public about predator-prey relationships, forest ecology, and to provide a more accurate representation of the ecological roles of both coyotes and wolves.

Wiisagi-ma'iingan Habitat:
Coyotes' preferred habitats are brushy areas, prairies, and wooded areas; they least prefer unbroken forested tracks. Coyotes are opportunistic and feed on almost any wild mammal including shrews, squirrels, voles, mice, rabbits, hares, muskrats, porcupines, deer and moose. Preliminary results of a new study indicate that coyotes killed more adult deer and more fawns than wolves, bobcats or bears (Libal et al. 2013). They hunt as individuals, with their partner, or as a family unit, including immature young. They usually take mammals smaller than themselves

but will cooperate when attacking larger game and also scavenge off of large fresh carcasses. Most of their diet is mammals but they will also eat birds, snakes, frogs, fish, insects, and fruits especially in the fall. Their success as a species is most likely related to their wide dietary adaptability (Litvaitis and Harrison 1989.). In areas where coyotes overlap with other carnivores such as foxes and bobcats, coyotes limit the smaller predator number and distribution through competitive dominance in their ability to use more food types and more habitat types (Fedriani et al. 2000). While some coyotes may be nomadic and transient, others will occupy a smaller distinct home range where food is abundant and defend it especially during breeding and pup rearing.

Adult coyotes have few natural predators; only gray wolves, black bears, and cougars are capable of killing coyotes. As their recovery expands in the UP, gray wolves will kill coyotes and disrupt their territories when competing for food in areas where they overlap; restoring and maintaining strong populations of wolves and other large predators may help to balance coyote populations. Managing for better wolf habitat such as dense forested land and uninterrupted habitat may favor wolves as coyotes are less tolerant of unbroken forested tracts. Occasionally coyotes lose their wariness of humans due to food becoming available to them either intentionally or unintentionally and habituation most likely is the cause of this unusual behavior in coyotes. Landowners can practice preventive techniques to reduce aggressiveness and depredation by coyotes, especially by removing food sources such as carcasses from their land. Humans provide the most effective influence for coyote abundance through management strategies that include hunting and trapping.

Wiisagi-ma'iingan Threats:

- Competition with other carnivores
- Conflicts with humans – predation issues and automobile collisions
- Persecution
- Disease including canine parvovirus, mange, distemper etc.
- Decreases in prey species such as white-tailed deer (i.e. winter kill, disease) and small mammals (i.e. loss of coarse woody debris)

Wiisagi-ma'iingan Stewardship Actions:

- Establish and maintain active partnerships to ensure the most effective stewardship and monitoring protocols possible
- Seek to determine true coyote population and reproduction levels
- Initiate, maintain or increase active levels of inventory and population monitoring
- Provide public education regarding coyote ecology and behavior
- Minimize coyote-related conflicts with Tribal Members and the general public

c) Waagosh (FOX) Red fox (Vulpes vulpes), and gray fox (Urocyon cinereoargenteus)

Waagosh Relationship with First Peoples:

Fox accompanies the 3rd level Midewin into the Lodge. The spirit Fox is known for being sly. He can trick you into believing things in order to escape blame. Fox is very knowledgeable about his environment and therefore he is a difficult animal to hunt (Harlan Downwind, Personal Communication).

Waagosh Brief Description:
Both red fox and gray fox are widely distributed and are found in all parts of Michigan (Geffen et al. 1992). In many places, red fox are more abundant in areas of open countryside near shrub cover and forest-field edges. Locally however, the tree-climbing gray fox, typically found in woodlands may have a slight advantage over red fox on and near the L'Anse Reservation. Areas that have high density of coyotes may displace red fox due to direct or indirect competition. Gray fox most likely persist with coyote because of their ability to escape into the trees (Chamberlain and Leopold 2005). KBIC upland scent station inventories detected gray fox in 16% of sites and red fox in 14% of sites with little overlap.

> Another man gave Winabojo a present and said, "I have come to ask for unfailing success and that I may never lack for anything." Winabojo turned him into a fox, saying "Now you will always be cunning and successful." Densmore 1979

Fox has a long history of association with humans and is one of the most important furbearing mammals, highly valued for its dense, soft, silky fur. Foxes are highly mobile and can cover large areas to find food and shelter. They often use dens or burrows for shelter and for raising young; many fox dens are from excavated woodchuck or badger holes. Outside of the breeding season, red fox will simply curl up under brush piles for shelter whereas gray fox will readily climb trees to rest, evade predators, or search for prey. They use their acute hearing and sense of smell for locating prey including small mammals, birds, and invertebrates; they scavenge on carrion and eat fruits and nuts especially in the fall (Kurta 1995). The cunning fox is commonly found in Native American stories.

Waagosh Habitat:
Red fox prefer open landscapes with reliable cover nearby, using forest-field edges, wooded borders of streams or lakes, and brushy fence-lines. They avoid dense forest stands but commonly move in when logging opens the canopy. They occasionally colonize fringes of towns and large parks, cemeteries, and golf courses. Gray fox are residents of deciduous forests and where woodlands and farm fields are well mixed, including wooded swamps. They avoid cultivated fields and open meadows (Feldhamer et al. 2003).

Waagosh Threats:
- Predation
- Disease
- Human induced mortality
- Habitat degradation

Waagosh Stewardship Actions:
Due to their adaptability in food and habitat needs, stewardship strategies focus on preventing habitat degradation. Occasionally foxes lose their wariness of humans due to food becoming available to them.
- Maintain adequate distribution of forest openings and fields
- Monitor populations
- Educate the public on how to avoid unwanted behavior

- Retain coarse woody debris, snags, and downed logs for protective cover and den sites

3.1.2 Felids (BOBCAT, LYNX, COUGAR)

Felids Relationship with First Peoples:
Wild cats are very good at blending into their environment, being stealthy and silent. They typically live very solitary lives and survive by using stealth and power. Cats teach us to discover the silence, and to become more perceptive of our surroundings for a heightened sense of spiritual awareness. Silence is a holy state of consciousness and speaks words of Gitchee Manitou (Takatoka 2014).

a) Gidagaa-bizhiw (BOBCAT) (Lynx rufus)

Gidagaa-bizhiw Brief Description:
Bobcat is the smallest of our wild cats and is widely distributed in North America from the southern fringe of Canada far into Mexico. They are gradually expanding their range northward as the boreal forest areas become fragmented. Bobcat populations have increased throughout the majority of their range since the 1990s and are higher than once thought (Roberts and Crimmins 2010). Their distinctive spotted coat, prominent cheek ruff, and short tail provide this carnivore with excellent camouflage. Bobcats are opportunistic taking almost any prey available including snow shoe hares, rabbits, rodents, insects, fish, birds, reptiles, and amphibians in their nightly search for food, changing resting spots almost daily (Fedriani et al. 2000). Bobcats compete with fishers for shared prey like grouse, hares, squirrels, and rodents. Bobcats are predators of fishers, particularly female fishers and young (Gilbert and Keith 2001). Coyotes and bobcats share a variety of habitat types (Litvaitis and Harrison 1989). Bobcat is solitary and territorial and marks its territory with urine and feces and scratching posts. The pelts of bizwih have long been valued in traditional Ojibwe culture.

During KBIC wildlife surveys utilizing remote camera scent stations baited to attract bobcats with cat specific scented lure, bobcats were detected at 3 of 28 (10%) wetland sites and 11 of 50 upland sites (22%). Cats are very secretive, cautious and difficult to detect. They did appear to be attracted to the scent and virtually ignored the meat scraps that were available at scent stations. Bobcats were more easily detected using track/sign methods. Tracks of bobcat were detected at 15 of 28 wetland study sites (54%) and 18 of 50 upland/riparian sites (36%). According to respondents from the community survey, 64% like knowing that bobcat live in the area and 47% have seen a bobcat in the Upper Peninsula.

Gidagaa-bizhiw Habitat:
Bobcat prefers large tracts of mixed deciduous/coniferous woods and broken country as well as wooded swamps and riparian forests with escape cover under rocky ledges, brush piles, or tree cavities. Ledges are an important terrain feature especially in courtship behavior. Bobcats need foraging cover as they hunt in semi-open areas. They often lie next to a game trail or sit motionless in a tree and ambush any animal that presents itself. Prey abundance, protection from

severe weather, availability of rest and escape cover, and freedom from human intrusion are key factors in habitat selection (Kurta 1995).

Gidagaa-bizhiw Threats:

- Predation – young are occasionally taken by foxes, coyotes, and owls
- Human induced mortality including hunting and trapping
- Habitat alteration
- Climate change
- Loss of escape cover and den sites
- Decreases in prey species

Gidagaa-bizhiw Stewardship Actions:

Habitat stewardship strategies for bobcat focus on maintaining and enhancing a mosaic of cover types with early to mid-successional stages and conifers in bogs and swamps. Maintaining cover close to physical features like rocky ledges and corridors to enhance movement are essential. Bobcats often use recently logged areas and farmland because they often provide food and cover for prey species. Preferred winter habitat is thick northern white cedar and black spruce swamps.

- Retain coarse woody debris, snags, cavity trees and downed logs that provide escape cover and den sites
- Increase escape cover and den site availability by leaving behind slash piles especially near edges and water sources
- Encourage habitat that supports snow shoe hare and small mammals
- Work with partners including MDNR to monitor populations and monitor trapping levels to ensure adequate population of bobcats
- Educate the community on distinguishing bobcats from lynx, cougars, and domestic cats

b) Bizhiw (LYNX) (Lynx canadensis)

Bizhiw Brief Description:

Lynx is a beautiful, short-tailed cat with very broad furry feet, tail tip black all around, and black tufts of hairs on the ears that distinguish it from the similar bobcat (Kobalenko 1997). Lynx inhabit the northern part of North America and at one time lived throughout the Great Lakes basin, but human development and logging have induced a northward movement of lynx into uncut boreal forests (Beyer et al. 2001). Lynx are occasionally sighted in upper Michigan which is the southernmost edge of its range, but their numbers are low and evidence of breeding has not been documented recently. Canada lynx were listed as a threatened species in the contiguous US in 2000 and since then, harvesting lynx is no longer legal in any state except Alaska. Most likely Michigan's Upper Peninsula functions as occasional dispersal habitat for lynx (Linden et al. 2011). Recent advances in genetics have documented that hybridization between Canada lynx and bobcats has occurred in the wild, which may further limit the recovery of this threatened species (Homyack et al. 2008, Schwartz et al. 2004). On the KBIC community survey, many respondents stated they believe lynx live in the surrounding forest of the UP, although the last verified records of lynx in Michigan were in 1966 and 1983 (McKelvey et al. 2000). About half (47%) of the respondents felt they could identify a lynx in the forest and they would support enhancing or protecting habitat for snow shoe hare, the primary prey for lynx.

Bizhiw Habitat:
Lynx avoid disturbed areas preferring mature coniferous forests with thick litter, ferns, rotting logs, and woody debris, including cedar swamps, fir and spruce stands, and upland hemlock (Slough 1999). Lynx is a solitary, nocturnal hunter and often spends its whole life in the same spacious defined area if food is available. It scent- marks its territory and respects the boundaries of other lynx, unlike bobcats (Kobalenko 1997). Lynx climb well and are specially adapted for cold climates by having large feet that allow them to navigate well in deep snow. Lynx feed primarily on snowshoe hares but also take squirrels, voles, muskrats, deer fawns, and occasional upland game birds or waterfowl.

Bizhiw Threats:

- Hybridization with bobcats
- Habitat alteration
- Human hunting and trapping
- Climate change
- Loss of escape cover and den sites
- Decreases in prey species

Bizhiw Stewardship Actions:
Stewardship efforts for lynx focus on enhancing and protecting areas that can better support lynx and their primary prey, snowshoe hare. Vigilant monitoring for lynx is essential using remote cameras, tracks, and sign surveys. Careful measurement, recording, and photographing of key characteristics will help in educational efforts to distinguish lynx from bobcats and suspected lynx-bobcat hybrids (Zielinski and Kucera 1998).

- Enhance snow shoe hare habitat
- Monitor for their presence and report to State and Federal partners when detected and where
- Retain coarse woody debris, snags, cavity trees and downed logs that provide escape cover and den sites
- Increase escape cover and den site availability by leaving behind slash piles especially near edges and water sources
- Educate people on how to discern between bobcat and lynx to avoid incidental take (USFWS 2003 http://dnr.wi.gov/topic/trap/documents/avoidlinx.pdf)

c) Muwin or mishibizhiw (COUGAR) (Puma concolor)

Muwin Relationship with First Peoples:
One of Cougar's Ojibwe names is Muwin which can be interpreted as "animal that makes my legs shake." Mishibizhiwe is the water panther, a powerful mythological creature something like a cross between a cougar and a dragon. It is a dangerous monster who lives in deep water and causes men and women to drown.

Muwin Brief Description:
Cougar is a large, slender, agile cat native to the Americas ranging from the Canadian Yukon to the tip of South America; its grace and power have been widely admired and revered by the indigenous people of the continent. An adaptable generalist species, secretive and solitary by nature, the cougar is an excellent stalk-and-ambush predator taking a wide variety of prey. They

avoid humans and are primarily nocturnal and crepuscular but are occasionally seen in the daytime (Bryant and Page 2005). Cougars were native to Michigan but were extirpated from this state around the turn of the century. Recently cougar sightings have become more numerous and the Michigan DNR has confirmed photos or tracks of cougars on approximately 30 occasions in Upper Peninsula counties, stating that these animals are believed to be young individuals dispersing from populations in the Dakotas (MDNR 2014). In December of 2013 a cougar was illegally killed in Schoolcraft County, confirmed by the MDNR Natural Resources law enforcement. On the KBIC community survey, half of the respondents expressed liking the possibilities of cougars living in the surrounding forests, but the other half reported that they would be afraid to go into the forest if they knew one was in the area. The State of Michigan has been slow to acknowledge the presence of cougar in the U.P. but evidence of cougars has been detected on tribal lands and most respondents believe that cougars are living and reproducing here. Cougars were not detected at any of the KBIC remote camera scent stations during wildlife surveys. Tracks and sign were detected on and near the L'Anse reservation on several occasions between 2007 and 2013.

Muwin Habitat:

Cougars have the largest range of any wild terrestrial mammal in the Americas enabled by their adaptability to virtually all habitat types. Cougars prefer dense underbrush cover and rocky ledges for stalking but also use open areas. They are territorial and survive at low densities with large home ranges, depending on abundance of prey, vegetation, and terrain. No other animals prey on mature cougars, but conflicts sometimes occur with other predators and scavengers at kill sites. Although they are large and efficient predators, they often yield to wolves or black bears in overlapping range (Bartnick et al. 2013). As an obligate carnivore, it will eat any animal it can catch, and feeds exclusively on meat to survive; its primary prey is deer (Iriarte et al. 1990). It stalks through brush and trees from rocky ledges or covered areas and pounces on prey for the kill. Cougars are now protected in most of their range in the east and their adaptability and large home range will greatly benefit from enhancing travel corridors (Beier 1993).

Muwin Threats:

- Persecution
- Loss of habitat and fragmentation
- Over hunting
- Decreasing prey species
- Competition with other carnivores

Muwin Stewardship Actions:

Wildlife corridors and sufficient undisturbed range areas are essential for the success of cougars in a region. Establishing and maintaining a viable population requires protection of the species and enhancement of habitat needs, and attention to human/cougar conflict concerns (Oregon

DFW 2006). Camera surveys and track and scat surveys are necessary for detecting these elusive animals with large home ranges. Recent population simulations indicate that as few as one to four animals per decade could immigrate into a small population, the probability of population persistence increased markedly. Thus a corridor for immigration will benefit a small population in an area where further loss of habitat will occur (Beier 1993). Ensuring a stable population of white-tailed deer will also benefit cougar.

- Monitor population and habitat use as they are detected
- Work with partners to investigate and confirm sightings
- Provide large tracts of relatively undisturbed contiguous forest and corridors
- Educate about ecology and behavior
- Minimize human conflict
- Maintain adequate deer populations to sustain wild carnivores and human hunters
- Protect and enhance mesic conifer winter complexes for deer

3.1.3 Makwa (BLACK BEAR) (*Ursus americanus*)

Relationship with First Peoples:
Black bears are an important clan animal in Anishinaabe culture. Traditionally Bear Clan served as police force and were known for their knowledge of medicinal plants. There are many Bear Clan members within KBIC, therefore few bears are harvested due the tradition of not hunting your clan animal. Bears are important figures in many Ojibwe teachings.

How Bear Got a Short Tail
There was a time that Bear had a very long bushy tail. He was very proud of his tail, and all the animals knew it. One day in the winter when the lakes had frozen, but before the winter sleep, Bear was walking along the lakeshore. As he was walking, he came upon Otter sitting near a hole on the ice with a pile of fish. He asked Otter how he got those fish. Instead of telling Bear how he dove down to get them, he decided to trick Bear. Otter told Bear that he put his tail into the ice hole and wiggled it around and when the fish bit onto his tail, he pulled them up. Bear asked to use his fishing hole, so Otter, laughing behind Bear's back, said "I have enough fish. Use my fishing hole as long as you like." Bear carefully poked his tail into the ice hole and wiggled and waited, wiggled and waited. Bear waited until the sun began to set, but not one fish nibbled on his tail. At last he decided to go home but his tail had frozen into the ice. His tail was stuck tight. Finally after pulling with all his strength, he ripped off over half his tail. Now you know why Bear has a short tail.

> Bear Clan served as police force of the people. Because of the large amount of time spent patrolling through nature, they became known for their knowledge of plants that could be used as medicine. Benton-Banai

Makwa Brief Description: Black bear once lived in most of the forested habitat of our continent, but since European settlement their range is greatly reduced, and in Michigan their range is limited to the upper and northern lower peninsula. Black bears are solitary animals except during breeding season and females who travel with cubs or yearlings. They are omnivorous and opportunistic feeders who alter their activity patterns seasonally in response to available food in diverse habitats including lowland hardwoods and conifers and shrub dominated wetlands, lacking disturbance by humans, for escape and resting cover (Kurta 1995). About one-quarter of a bear's diet is animal matter including invertebrates, small mammals, carrion, and an occasional deer fawn or moose calf.
Bears frequent wetlands especially in spring, feeding on plants such as skunk cabbage, sedges, grasses and browsing on buds of small trees in early spring; fruits and berries are important during summer and fall, and hard mast from oaks, beech, hickory and hazelnut become important in the fall as bears put on fat to prepare for entering dens for the winter in their unique form of dormancy (Rogers et al. 1986.). Because of their close association with wetland habitat, the yellow warbler is known as a companion to the bear in Ojibwe cultural teachings.

> They would melt bear grease and they would mix in spruce and something from the pine tree. That's why you can smell pine sometimes in that medicine. Barbara Nolan (in Dibaajimowinan 2013)

Black bears were detected at all 28 wetland scent stations (100%) and at 42 of 50 (84%) of all upland scent stations. It was common to see mothers with twins and triplets, rarely there was only one cub. In the KBIC community survey, a majority of people expressed that they valued having bears live nearby (83%) and that there is an important relationship between bears and the Ojibwe people (80%). Some respondents (31%) expressed that being one of the clan animals, bears should be protected and not hunted on tribal lands and 44% of respondents disagreed.

Makwa Habitat:
Diverse forests are prime bear habitat as they provide the variety of cover and food sources that bears require for meeting their seasonal needs. Bears tend to use a mixture of vegetation cover types including deciduous lowland forests and coniferous swamps, mature and early succession upland forests, wetlands, and some degree of forest openings consisting of grasses and forbs (Carter 2007, Ternent 2005). Home ranges of different bears often overlap especially in areas of high quality food sources, but individuals usually avoid each other and coexist (Rudolph 1999.). Bears can tolerate a fragmented landscape, provided some forested areas exist especially along riparian zones, and they take advantage of human-related foods such as agricultural crops, orchards, apiaries, and birdfeeders. As winter approaches, bears will excavate a simple den under stumps or brush piles or use a ready-made cavity in a hollow tree away from human disturbance.

Makwa Threats:
- Human impacts through hunting, vehicle collision, nuisance animal control, development
- Habitat alteration
- Loss of snags, downed logs, and coarse woody debris (i.e. den sites and sources of insect larvae)
- Climate change

Makwa Stewardship Actions:
Bear stewardship should focus on creating, enhancing, and maintaining habitat components that provide adequate food and cover requirements (Hirsch 1989). Bears are valued by hunters and non-hunters alike, therefore it is important to encourage a balance of recreational opportunities for community members while at the same time minimizing conflicts with humans (MDNR 2009b).

- Monitor bear population and habitat use to provide for the long-term viability bear populations
- Provide foraging, rest and escape cover through diverse age-classes of healthy forest including old growth evergreen forests, regenerating young forest, and protection of swamps, marshes and riparian corridors
- Maintain or increase when possible hard mast trees such as oak, beech, and hazelnut
- Encourage/enhance soft mast species of berry producing trees, shrubs, and ground cover
- Retain or increase coarse woody debris, snags, cavity trees and downed logs

3.1.4 Cervids (WHITE-TAILED DEER, MOOSE, ELK)

Cervids Goal: Maintain or increase self-sustaining populations of cervids

Cervids Objective 1: Preserve or enhance habitat to support cervids throughout the year
Strategies:
- Encourage best management practices for increasing mesic conifer stands
- Strive to create or enhance winter complexes that provide proper protection from harsh winter elements (conifer) in close enough proximity to prime feeding locations (early succession, multi-age aspen, and riparian)
- Protect or enhance corridor connectivity for seasonal migration

Cervids Objectives 2: Respond to disease issues in ungulates
Strategies:
- Monitor for diseases from hunter harvested ungulates
- Share information with tribal, state and federal partners regarding disease incidents as they are detected
- Work with partners to plan for swift response and cooperation in the event of disease outbreaks in ungulate species

Cervids Objective 3: Educate the public about common wildlife diseases
Strategies:
- Educate public on reporting wildlife diseases
- Work with partners on distributing educational materials about ways to prevent the spread of wildlife disease

a) Waawaashkeshi (WHITE-TAILED DEER) (Odocoileus virginianus)

Waawaashkeshi Relationship with First Peoples:
Deer are highly valued for their presence on the land, as sources of food for subsistence, and for deer skins and bones for clothing and ornamentation. According to Ojibwe legend, deer were once the fiercest of predators. They had sharp teeth and claws for hunting down prey. Deer had plans to kill Anishinaabe. Chipmunk overheard and was seen leaving by the deer who chased him down and tried to kill him so he could not warn the people. Chipmunk got away but was scratched by the deer claws leaving him forever with three stripes. Wynaboozhoo gathered all the deer together and took away their teeth and claws. He scolded them; they were placed on earth to help the Anishinaabe, not harm them. He made them into peaceful animals with their only protection being speed (Harlan Downwind, Personal Communication).

Waawaashkeshi Brief Description:
White-tailed Deer (WTD) are a highly adaptable wide-ranging mammal abundant in the Great Lakes region where deer hunting has been a long cultural tradition for the Ojibwe as a resource for food, clothing, and tools (Busiahn and Gilbert 2009). Extensive logging of the climax coniferous forest of the north in the late nineteenth century opened the forest environments and created meadows, woodlands, and farmland where deer thrive. That, in addition to the extirpation of most large predators, like wolves, resulted in huge increases in deer populations. In some areas, high densities of deer may cause forest degradation and affect plant succession by deer consuming early-succession plants, acorns, and eastern hemlock seedlings and allowing invasions of exotic plant species (McShea 1997, MDNR 2009a). Deer are highly selective herbivores that take advantage of the most nutritious foods that are in season, foraging mostly at dawn and dusk while slowly walking. The most limiting factor for deer in northern areas are the harsh winter temperatures and heavy snows during which deer rely on traditional locations in low-lying areas with dense cover where they "yard-up" in large groups. KBIC community survey respondents (2013) indicated their support to enhance and protect critical habitat for the white-tailed deer population on the reservation lands (78%) and feel that there are currently plenty of deer for KBIC hunters (74%).

> Grandfather always took his tobacco with him while looking for those deer. That is what he had to do and he would ask the deer to give up his life for him.
> Barbara Nolan
> (in Dibaajimowainan 2013)

Waawaashkeshi Habitat: White-tailed deer are generalists and can adapt to a wide variety of habitats. Although generally considered forest animals, during the snow-free period, deer rely on small openings and edges where they graze on grasses, sedges, ferns, lichens, mushrooms, herbs, leaves, and hard mast (Kurta 1995). During the winter their preferred foods include northern white cedar (*giizhik*), red and sugar maple, yellow birch, aspen, oak, and ash. They compete with humans for cultivated crops like apples, corn, and root crops during summer and fall. Their diet varies according to season and nutrients that are seasonally available. In winter, deer browse

largely on buds and twigs of maple, dogwood, aspen, willow, sumac, and coniferous trees, particularly white cedar. The single most limiting factor for deer is lack of quality winter habitat (Busiahn and Gilbert 2009). The quantity and quality of deer wintering complexes are declining due to inappropriate timber harvesting practices for maintaining suitable habitat conditions for overwintering deer. Stewardship efforts will focus on maintaining or enhancing mature eastern hemlock and northern white cedar cover in deer wintering complexes while emphasizing food production in adjacent uplands (Waller and Alverson 1997). Habitat fragmentation is a related problem wherein quality deer yards may exist with suitable feed nearby, but they are intersected by roads or surrounded by clear cuts.

> When my father killed those deer, he used practically everything when he was able to, the buckskin, all the flesh, and also brains when my father tanned hides. Leon Valliere (in Dibaajimowainan 2013)

Waawaashkeshi Threats:

- Predation: Although predation of healthy adults does take place, coyotes, wolves, cougars, bobcats, bears, and feral dogs most often take fawns and sick adults
- Auto collisions: Collisions with cars are more often to occur in November and May when deer lose much of their usual cautiousness
- Loss of habitat and habitat fragmentation: One of the most limiting factors for deer is quality wintering habitat and access to contiguous land with food and thermal cover
- Disease: Including CWD which formerly was considered a “western disease” but now must be considered a threat in eastern states as well. Deer are the natural hosts for brain worm which can be transmitted to moose (Nankervis et al. 2000), and deer ticks that can transmit Lyme Disease to humans
- Over harvest: Skewed sex ratios should be considered, ideally we should strive for 1:1 sex ratio

Waawaashkeshi Stewardship Actions:

Habitat stewardship for deer focuses on quality areas for food, water, shelter, and safety with consideration of seasonal habitat requirements including feeding, birthing grounds, and travel corridors. Deer stewardship can be viewed as a balance between enough deer to meet tribal needs, but not so many as to diminish the health of forest plants and co-inhabitants. This is consistent with the tribal view of the forest as providing many different types of resources for harvest.

- Provide ample early successional regenerating aspen stands for spring and summer browse
- Maintain, protect and/or enhance winter complexes of mature mesic conifer (eastern hemlock and northern white cedar) near early succession upland feeding areas
- Maintain or enhance forest openings for spring and summer feeding
- Encourage and maintain hard mast species of oak and hazelnut
- Monitor the health of white-tails from hunter harvested deer
- Monitor tribal hunter success and include in annual harvest report

- Work with partners on research of white-tail population fluctuations, mortality and migration to improve habitat for deer but include considerations for overall ecosystem health (MDNR 2009)

b) Mooz (MOOSE) (Alces alces)

Mooz Relationship with First Peoples:
Moose have had a long history in the home territory. Stories of the indigenous people and records of the early explorers indicate that moose were abundant in Michigan's Upper Peninsula throughout the past. Rock art documents a relationship of humans with moose and wolves. Moose is a symbol of courage and determination. Those who follow Moose see life situations with clarity and can see into the beyond. Moose antlers protect them in battle and represent the tree of knowledge. This teaches us to shield ourselves with truth and spiritual understanding (Takatoka 2014).

Mooz Brief description:

Of all the animals in the Ojibwe ceded territories, moose are by far the largest and are one of the most charismatic. Stories and pictographs of indigenous people and records of the early explorers of this region indicate that moose were abundant in Michigan's Upper Peninsula (UP) throughout the past (Hindelang 2007). However, as the northern forests were logged, and settlers cleared the land, moose habitat was nearly destroyed, and moose virtually disappeared from most areas of the state by the late 1800s. During the last century, natural forest growth and succession and forest management practices have transformed areas within the Lake Superior watershed into good moose habitat (Kurta 1995). In the winters of 1985 and 1987, moose were trans-located from Ontario by the Michigan DNR to an area in the central UP in a reintroduction effort called Moose Lifts I and II. Since 1985, biologists monitored the moose population and residents have had the opportunity to enjoy the return of moose to the ecosystem. Moose core range in the UP is in the west central region where growth rate increased after the reintroductions but slowed between 2009 and 2013 (estimated 450 animals in 2013), and a proposed moose hunt in the UP has been on hold through 2014. The moose is designated as a species of special concern in Michigan (MDNR 2006). In the KBIC wildlife survey, community members highly valued the presence of moose and 87% would like to see more. For many, moose are considered the symbol of northern wilderness areas. Locally, moose have been observed near wetlands in summer months within the L'Anse Reservation boundaries and were detected mostly by track/sign in 7 of 28 (25%) wetland study sites.

Mooz Habitat:
Moose occupy a wide variety of habitats including boreal and northern forests with early successional stages of shrubby growth and immature trees; moist areas with marshes, alder-willow thickets, and aquatic feeding areas; and mature forests for thermal shelter in summer and winter (Franzmann and Schwartz. 2007). Essential habitat components for moose include: young forest stands of aspen, maple, birch, and willows for spring feeding; isolated safe sites for predator evasion during calving; high quality aquatic areas in rivers, lakes, and marshes for

summer feeding which provides critical abundance of nutritious foods; mineral licks; and mature forest stands that provide winter browse of twigs and buds with shelter from extreme snow and temperature in the winter (Franzmann and Schwartz 2007).

Mooz Threats:

- Climate change - Michigan's Upper Peninsula is at the southernmost limit of moose's range and warming winters may greatly affect the persistence of moose in this area.
- Brainworm (*Parelaphostrongylus tenuis*) is a common parasite in white-tailed deer that causes little harm to deer but causes paralysis and death in moose (Nankervis et al. 2000)
- Winter Ticks (*Dermacentor albipictus*) spend the entire winter on most moose (south of 60 degrees north latitude) and cause blood loss, itching, inflammation, and hair loss resulting in late winter die-offs related to nutrition and weather.
- Liver Fluke (*Fascioloides magna*) are large flatworm parasites found in white-tailed deer that can severely damage the moose
- Loss of essential aquatic, forested, and wetland habitat

Mooz Stewardship Actions:

Habitat stewardship strategies for moose focus on enhancing, protecting, or creating essential habitat for food, water, shelter, and space. Aquatic habitats are extremely important for moose for drinking water, aquatic plant nutrients, thermoregulation, and insect relief. Preservation, enhancement, and creation of wetlands are essential for maintaining adequate moose habitat.

- Manage for early succession trees and shrubs, alder and willow thickets near shallow lakes and marshes for essential spring and summer forage
- Maintain or enhance mature mixed conifer winter habitat particularly in higher elevations where fewer deer reside
- Maintain healthy aquatic habitat and preserve beaver dams in forested areas
- Balance aspen age class distribution to ensure a sustainable supply of browse especially near closed canopy conifer swamps
- Retain large percentages of mesic conifer during forest harvest activities
- Underplant with mesic conifer species on suitable sites without a seed source
- Monitor moose population numbers and mortality and work with partners to ensure a healthy and self-sustaining population
- Monitor moose health
- Evaluate moose habitat quality including browse availability and aquatic plant inventory in and around the core moose area

c) Mishewe (AMERICAN ELK; WAPATI) (Cervus elaphus)

Mishewe Relationship with First Peoples: Elk have long been valued for their meat and their hide and teeth for ornamentation and ceremonial use. The name wapiti is from the Shawnee and Cree word waapiti, meaning "white rump". Elk are known for their stamina, strength and

sensitivity to signs of danger. Elk teaches us to be more observant of subtle energies and to stand strong with pride but to be on guard against becoming egotistical (Takatoka 2014).

Mishewe Brief Description:

Elk are one of the largest members of the deer family and live both in the Old World and the New World. This magnificent animal once roamed over most of the United States but hunting and habitat destruction severely reduced its range, and it disappeared from Michigan by 1880. Today the only substantial population of elk in Michigan is in the northern lower peninsula from a release of wild stock from the west (Beyer 1987). Elk are grayish brown on the back and sides, and darker on the head, neck, legs, and belly. There is a distinct buff-colored rump patch surrounding a short white tail and a dark shaggy mane hanging from the neck and chest. Male elk have large antlers which are shed each year and consist of a single cylindrical beam that curves up and back over the shoulder, bearing many tines. Both male and female elk have upper canines. Males engage in ritualized mating behaviors during the rut, including posturing, antler wrestling (sparring), and bugling, a loud series of vocalizations which establishes dominance over other males and attracts up to 20 females in a harem which he tightly controls. After the mating season, harems break up and elk congregate in large winter herds with males and females (Kurta 1995).

Mishewe Habitat:

Elk range in forest and forest-edge habitat, feeding on grasses, plants, leaves, and bark. They generally avoid dense unbroken forests, preferring open meadows or woodlands interspersed with grassy clearings. Elk feed mainly at night and near dawn and dusk; during midday they bed down and chew their cud. In spring and summer, they graze on tender young grasses and various forbs, such as dandelion, aster, hawkweed, violet and clover. Mushrooms are especially sought (Kurta 1995). In autumn, elk become more of a browser taking twigs and bark from white cedar, wintergreen, hemlock, sumac, maple, and basswood but prefer to graze rather than browse. In mid-winter, they find windswept patches and paw through crusted snow to reach the grass below (Peek 2006).

Mishewe Threats:

- Elk are susceptible to a number of infectious diseases, (i.e. Chronic Wasting Disease) some of which can be transmitted between wildlife and livestock
- Fawns and old adult elk fall prey to gray wolf, coyote, lynx, bobcat, and black bear
- Meningeal worm, a parasitic nematode infects the tissues surrounding the brain, causing some mortality
- Poaching is a serious threat to small elk herds of the Great Lakes region
- Habitat alteration

Mishewe Stewardship Actions:

- Work with GLIFWC, MDNR, and other partners to explore habitat suitability in the Upper Peninsula (MDNR 2012b)
- Manage lands for a sustainable elk population in balance with the habitat where suitable

- Maintain or enhance mature mixed conifer winter habitat near early succession forest and grassy clearings

3.2 Furbearers

Furbearers Goal: Maintain or increase populations of furbearers

Furbearers Objective 1: Increase knowledge of furbearer species abundance and habitat use within the home territory of KBIC.
Strategies:

- Conduct ongoing monitoring programs
- Conduct research on specific species for recommendation of stewardship options
- Work with partners to align monitoring methodology to better collaborate on population and health assessments

Furbearer Objective 2: Develop an annual KBIC harvest report
Strategies:

- Collect annual hunter harvest data
- Compare Tribal harvest trends to State and Regional harvest trends
- Update tribal harvest quotas based on monitoring results and population trends

3.2.1 Waabizheshi (AMERICAN MARTEN) (*Martes americana)*

Waabizheshi Relationship with First Peoples: American marten are an Ojibwe warrior clan animal. People of the marten clan are protectors of the community and are fearless hunters (Harlan Downwind, Personal Communication). The marten is also an important furbearer species for Tribal trappers.

Waabizheshi Brief description: Marten are currently distributed throughout the Upper Peninsula with a low population in the Northern Lower Peninsula. Extirpated from Michigan by 1930, marten were reintroduced in several locations between 1956 and 1981 (Williams et al. 2007, Skalski et al. 2011). Marten trapping became legal again in 2000 and populations have been fairly stable however, since 2007 numbers of total marten registered with the MI Department of Natural Resources in Ontonagon, Baraga and to some degree in Marquette Counties have declined despite the number of trappers increasing (MI trapping reports MDNR 2012a, Skalski et al. 2011). Tribal trapping records show a similar trend (per KBIC trapping data). The state has reduced the trapping limit to one of either fisher *or* marten to address the lower trend in trapping success. KBIC Tribal trapping regulations are being reviewed and will most likely lower marten limits as well. On the KBIC community survey, a majority of respondents expressed that martens (and fishers) should be monitored to avoid over trapping, but many people were not familiar with their ecology and history of reintroduction efforts and would like more education and information about this interesting animal. American marten were detected in 9 of 28 (32%) wetland scent stations and 30 of 50 (60%) upland scent stations.

Waabizheshi Habitat:
Marten require large tracts of unfragmented forests with mature forest conditions critical for their foraging and reproductive success (Wittmer and Powell 2008). Marten primarily feed on small mammals (red squirrels and other rodents) common in areas with high volume of coarse woody debris (Cumberland et al. 2001). They require large cavity trees for den sites and raising young (Powell 1993). Large tracts of mature forest with a high conifer component and dense canopy cover are the preferred habitat conditions for marten.

Waabizheshi Threats:
- Fragmentation caused by forest practices and development
- Loss of coarse woody debris, standing snags, live cavity trees and downed logs
- Loss of mature mesic (balanced moisture) conifer within forest stands
- Overharvest
- Reduced prey availability

Waabizheshi Stewardship Actions:
- Enhance and maintain large contiguous tracts of mature mixed conifer-deciduous forest stands using group or gap selective harvest in forest treatment areas
- Consider underplanting on suitable sites where seed source of conifer is lacking
- Manage for late successional conifer dominated stands and corridors between stands
- Monitor trapping records and adjust harvest regulations in a pro-active manner as needed to maintain a stable or increasing population
- Track and monitor marten populations on the reservation and Ceded Territories
- Participate with partners to update habitat suitability models and stewardship recommendations
- Retain coarse woody debris, snags, cavity trees, and downed logs. Leave at least three large diameter (≥18") live trees to serve as future den trees, snags or logs per acre of forest harvest

3.2.2 Ojiig (FISHER) (*Martes pennanti*)

Ojiig Relationship with First Peoples:
Fisher is a great hunter, known by Ojibwe for his determination and bravery despite his relatively small size. Along with Marten, Fisher is a warrior clan that acts as a community protector (Harlan Downwind, Personal Communication). One Ojibwe story says that Fisher ended a long never-ending winter and rescued all the summer animals held captive in skyland where sky meets the land. The sky people struck Fisher and he began to fall back to earth. But Fisher never struck the earth, instead Gitchee Manitou honored him for his bravery and placed him as a constellation with the stars. Birds come back every spring when Fisher rises high in the night sky. The birds know it is time to leave as Fisher slowly descends towards the horizon in autumn.

Ojiig Brief Description:
Fisher, an exclusively North American species, once ranged throughout the Great Lakes basin but deforestation and over-trapping led to its near-extinction in the last century. Now the fisher occurs in a narrow band stretching across Canada and northern US including the UP of Michigan (Kurta 1995). Successful restocking and reintroduction efforts since the 1950s are responsible for

the current population, partly in response to a dramatic increase in porcupine abundance and the resulting forest damage in the absence of fisher predation (Williams et al. 2007). By the 1990s fishers colonized most of the upper peninsula of Michigan, restoring an extirpated species for its aesthetic, ecological, and economic value. Members of the weasel family generally have long, thin bodies with high surface-to-volume ratios, which result in higher energetic costs for day-to-day life relative to many other mammals. Their prey includes hares, squirrels, rodents, and birds; fishers are the major predator of porcupines (Weir and Corbould 2007). Fishers were detected at 54% of wetland scent stations and 48% of upland sites. Like marten, fisher harvest numbers have also decreased considerably, which has prompted the state to decrease trapping limits to one of either fisher *or* marten (MI trapping reports MDNR 2012a). On the KBIC community survey, a majority of respondents expressed that fishers (and martens) should be monitored to avoid over trapping, but many people were not familiar with their ecology and history of reintroduction efforts and would like more education and information about this interesting animal.

Ojiig Habitat:
A wide-ranging forest carnivore, fisher prefers the interior of dense forests and avoids open areas. Female fisher select den sites in cavities of large, diseased, and decaying trembling aspen and balsam poplar often 20 to 30 feet high (Gilbert et al. 1997). Tree size, damage, and decay play critical roles in the suitability of habitat for fisher reproduction and lack of suitable trees for den sites may contribute to their decline in reproductive success (Weir et al. 2012). Male fishers have a large home range that overlaps several females but rarely other males. Fisher and marten will segregate spatially in shared landscapes more than by habitat selection alone and fisher will displace marten (Fisher et al. 2012). Both use woody debris for escape and cover, but fisher do not burrow under the snow as often as marten.

Ojiig Threats:
- Decline in conifer and older age forests with closed canopy of mature trees, cavity trees, snags, and coarse woody debris
- Habitat fragmentation and lack of safe movement corridors
- Predation – nearly all predation occurs in the spring by bald eagles and bobcats
- Climate change
- Overharvest
- Reduced prey availability

Ojiig Stewardship Actions:
Fishers rely on many aspects of forested ecosystems for their survival and reproductive success. Conifer and older age forests including mature hollowed out aspens with heart rot are essential for denning and rearing young (Wier et al. 2012, Gilbert et al. 1997). Fishers use ground sites of complex large woody debris and some animal burrows in winter with insulating snow for rest and thermal cover. Fishers avoid habitat with little overhead cover and establish home ranges that provide protection from adverse weather and predators when resting and rearing young (Fisher et al. 2012, Gilbert et al. 1997). They also need protective corridors for safe movement between habitat needs with overhead cover, vertical escape trees, and dense shrubby ground cover (Fisher et al. 2012).

- Work with partners including GLIFWC and MDNR to monitor populations and harvest numbers to ensure viable populations of fisher on the Reservation and within Ceded territories
- Enhance and maintain large contiguous tracts of mature mixed conifer-deciduous forest stands
- Manage for late successional conifer dominated stands and corridors between stands
- Monitor trapping records and adjust Tribal harvest regulations in a pro-active manner as needed to maintain a stable or increasing population
- Participate with partners to update habitat suitability models and stewardship recommendations
- Retain coarse woody debris, snags, and cavity trees. Leave at least three large diameter (≥18") live trees to serve as future den trees, snags or logs per acre of harvest forest.

3.2.3 Zhingos (WEASEL) *Mustela spp.*

Zhingos Relationship with First Peoples: Weasels have long been valued for their white winter fur by native traditional dancers and trappers. Weasels are associated with initiation into the Midewiwin medicine society. The spirit Weasel teaches a warrior how *not* to behave; not to kill for the thrill (Harlan Downwind, Personal Communication). Weasel skins are often used for medicine bags or to adorn regalia. Some consider weasels markers of the cycles of seasons or of life and death because of their seasonal color change.

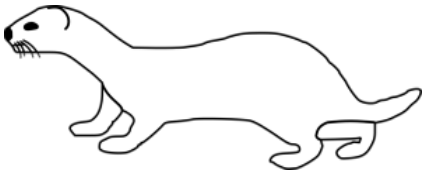
Zhingos Brief Description: The mustelid family contains weasels and also many other not so weasel-like mammals including wolverine, badger, fisher, marten, mink, and otter. Most mustelids have long, thin bodies, long necks, and short legs; each foot has five toes with nonretractile claws. Most members of this group are meat-eaters, but many also eat invertebrates, fruit, carrion, and honey. They are agile, quick, often aggressive, and are efficient predators capable of capturing and killing prey as large as they are (Kurta 1995).

The three species of Zhingos in our area that most people think of as weasels are least weasel (*Mustela nivelas rixosa*), short-tailed weasel or ermine (*Mustela ermine*), and long-tailed weasel (*Mustela frenata*). It is sometimes difficult to tell these weasels apart. The least weasel is of coarse the smallest of the three and is the smallest carnivore in the world at about one inch in diameter and 7-8 inches long including its tail (1-2 inches). Short-tailed weasels (ermine) are 9-13 inches long including a 2-3 inch tail, and long-tailed weasel are the largest at 11-17 inches long including a 3-6 inch tail. Other than the length of their tails, the difference between the short and long-tailed weasels is in their feet. Ermine have white feet all year long. Long-tailed weasels only have white feet in the winter. Weasels turn white in the wintertime to camouflage themselves from becoming prey to other predatory species by blending in with the snow. Long-tailed weasels and ermine have a black tip to their tail, even in their all white winter phase. This differentiates them from the smaller least weasel, which doesn't have a black-tipped tail except for a few dark hairs. Twice a year these weasels shed their fur, once in the spring and again in the fall. They shed in response to changes in day length. The coat of animals in northern populations

is white in the winter and brown in the summer, while those in southern populations are brown year round (Sheffield and King 1994). Weasels help keep in check the populations of many species of rodents that are potentially harmful to agriculture. Many ermine die from a parasitic worm that infects the nose. Eventually the worm causes holes to form in the skull and puts pressure on the brain, causing death. Shrews are believed to carry this parasite (Kurta 1995).

Zhingos Habitat:

Lease weasels are habitat generalists found in pastures, riparian edges, open fields, and sometimes mature forests. Long-tailed weasels occupy forest-field edges, brushy and wooded areas, and marshy borders near water in spruce or sphagnum bogs. Ermine also prefer woodlands near rivers, marshes, shrubby fencerows, and open areas adjacent to forests or shrub borders. Although weasels live primarily on the ground, they climb trees and swim well. Tree roots, hollow logs, stone walls, and rodent burrows are used as dens. Dens are usually below ground and weasels line their nests with dry plant material and fur and feathers from prey. Side cavities of burrows are used for storing food and for waste. Weasels use abandoned burrows rather than making their own (Kurta 1995). All three weasels are known for their big appetites and it is common for a weasel to kill more animals than it can eat. This behavior is crucial for their survival. Weasels have high energy demands and fasting for more than one day is detrimental. So when winter comes or prey is no longer plentiful, stockpiling food is a survival necessity. Although their diet is primarily voles, they are able to take prey such as rabbits, rats and snakes. The long-tailed weasel has even been known to kill small woodchucks and animals of that size (Sheffield and King 1994).



Zhingos Threats:

- Fragmentation caused by forest practices and development
- Loss of coarse woody debris, snags, hollow logs, cavity trees and tree roots for dens
- Susceptible to diseases and parasites such as parasitic nematodes in the sinuses
- Predation by larger carnivores
- Reductions in prey availability

Zhingos Stewardship Actions:

- Enhance and maintain woodlands near rivers and adjacent open areas
- Protect and enhance marshy areas and bogs with plenty of coarse woody debris
- Monitor trapping records and adjust harvest regulations in a pro-active manner as needed to maintain a stable or increasing population
- Track and monitor weasel populations on the reservation and Ceded Territories
- Participate with partners to update habitat suitability models and stewardship recommendations
- Retain or increase coarse woody debris, snags, cavity trees and downed logs. Leave at least three large diameter (≥18”) live trees to serve as future den trees, snags or logs per acre of harvest forest.

3.2.4 Zhigaag (STRIPED SKUNK) (*Mephitis mephitis)*

Zhigaag Relationship with First Peoples:
Skunk is one of several North American animals whose name has Native American origins. It is not known exactly which tribe first taught colonists the word for "skunk," since the names are extremely similar in many different northeastern Algonquian languages (*skonks* in Mohegan, *squnck* in Wampanoag, *zhigaag* in Ojibwe). In an Ojibwe legend, *Aniwye* or *Mishi-zhigaag* was a giant man-eating skunk who killed people by breaking wind at them, causing them to become sickened and die, thus explaining why skunks spray. *Mishi-zhigaag* was defeated by the hero Great Fisher (*Ojiig*) and is often said to have been turned into an ordinary skunk by *Ojiig*. In other stories, skunks are admired for their stalwart self-defense, defending themselves and their families from threats or taking justifiable revenge on other animals who have behaved badly. It is an honor to wear a skunk hide. Only those that have proven themselves in battle were allowed to wear the skunk hide (Harlan Downwind, Personal Communication).

Zhigaag Brief Description:
Skunks were originally grouped in the *Mustelidae* family (weasels, otters, badgers, and their relatives) because of the physical similarities including a squat body, strong claws for digging, enlarged anal glands, and musty anal secretions. But skunks have even larger anal glands, and instead of a duct that secretes scent markings, skunks spray their scent from nipples in the anal gland that can be precisely aimed and controlled. This and other morphological differences and skunk DNA indicated that skunks did not belong in the *Mustelidae* family, and should rather be classified as their own family, which is now named *Mephitidae*, after a word meaning “stink” (Dragoo and Honeycutt 1997).

Striped skunks are one of the most abundant and recognizable mammals in North America. They can be found in Canada, throughout the United States, and into northern Mexico. Their characteristic fur pattern is a white strip that starts at the forehead and splits into a V shape as it travels down the skunk’s back. Skunks are born hairless, but their stripes are visible from birth. The length and width of stripes varies with each individual. There are also some skunks that are completely black or completely white. Part of what has made striped skunks such a successful species is their ability to eat almost anything—insects, small mammals and birds, vegetables, fruits, eggs, crustaceans, grasses, and carrion. They will even raid and clean up human garbage. Skunks are one of the primary predators of the honeybee, relying on their thick fur to protect them from stings. The skunk scratches at the front of the beehive and eats the guard bees that come out to investigate. Most predatory animals of the Americas, such as wolves, foxes and badgers, seldom attack skunks, presumably out of fear of being sprayed. The exception is the great horned owl, which, like most birds, has a poor-to-nonexistent sense of smell (Kurta 1995).

Zhigaag Habitat:
Skunks can be found in a number of habitats, including woodlands, grasslands, agricultural lands, and populated communities. The skunk has increased its range with the cutting of forests

throughout North America. The skunk is crepuscular, searching for food at dawn and dusk, feeding on mice, eggs, carrion, insects, grubs, and berries. At sunrise, it retires to its den, which may be in a ground burrow, or beneath a building, boulder, log, debris or rock pile. While the male dens by itself, several females may live together. The striped skunk does not hibernate but instead goes into a dormant or semi-active state in a den where a dozen or more skunks may huddle to conserve heat. Outside the breeding season, males are solitary and try to build fat reserves while females defend their maternity dens (Kurta 1995).

> It is an honor to wear Skunk hide. Only those that had proven themselves in battle were traditionally allowed to wear Skunk hide. Harlan Downwind, Personal Communication

Skunks are mild-tempered, mostly nocturnal, and will defend themselves only when cornered or attacked. Even when other animals or people are in close proximity, skunks will ignore the intruders unless they are disturbed. Skunks use spray only as a last resort defense. They will stomp their feet, flee, growl, or hiss before spraying. They will spray immediately if they are pursued, startled, or threatened by dogs or predators at close range. Skunks are beneficial to farmers, gardeners, and landowners because they feed on large numbers of agricultural and garden pests such as rodents and insects.

Zhigaag Threats:

- Domestic dogs
- Human related mortality including road kills, trapping, shooting, and death by farm chemicals or machinery
- Disease such as rabies and distemper (an ill skunk is more likely to have distemper than rabies, but animals who look sick should be avoided and reported)
- Food abundance and available diet greatly affect reproductive success
- Predation

Zhigaag Stewardship Actions:

- Educate landowners about living in harmony with skunks using habitat modification such as covering window wells and porch openings, disposing of garbage properly
- Retain or increase coarse woody debris, snags, downed logs and cavity trees
- Provide brush piles and downed logs in areas lacking coarse woody debris

3.2.5 Amik (AMERICAN BEAVER) (*Castor canadensis*)

Relationship with First Peoples:
Beavers have long been valued as furbearers and important cultural animals by the Ojibwe of the Great Lakes region. Beaver spirit is never defeated with his industrious drive and unbelievable resolve and tenacity. One teaching about how beaver got his tail is a lesson that shows us to be humble and appreciative. Beaver was boasting to the birds and muskrat about his beautiful fluffy tail. He kept asking them, “Don’t you wish you had a tail like mine?” but the animals were not envious and found beaver to be acting rude. Beaver decided to cut down the largest tree he could find to further impress the others, but he didn’t chew it at the correct angle and when it fell, it landed on his tail. He pulled and pulled until finally his now flattened and hairless tail came free. Beaver was sad and cried loudly until he heard the voice of the Creator. “Why are you crying?”

asked the Creator. “A tree has crushed my beautiful tail, now no one will like me!” cried the beaver. The Creator told him that a beaver is liked for his kindness and wisdom, not for his tail. He also told him how he could use his new tail to help him swim more rapidly. “And when you want to signal a message to a friend, all you have to do is slap your tail on the water.” The beaver was very happy to hear this good news. When the other animals saw his flattened tail they were all shocked! But beaver said, “It is better this way!” From that day on, the beaver never bragged about his tail.

Amik Brief Description:

Beaver is a large semi-aquatic rodent known for building dams on rivers and streams to create still water for floating woody foods and building materials for their lodges. Through their industrious labor, they have engineered ecosystem habitats that benefit not only beavers but a wide variety of other mammals, birds, amphibians and reptiles. Historically, beavers occupied most of North America in vast numbers but were severely depleted by extensive land clearing and fur trapping; current stewardship has allowed many populations to recover. With their webbed hind feet, dexterous forefeet, broad scaly tail, and waterproofing fur oils, beavers are well adapted to northern aquatic environments (Kurta 1995). They do not hibernate but reinforce their lodges with sticks and logs for food and insulation under the snow and ice (Smith et al. 2011).

> My meat will cure the Anishinaabe. I too eat this way, by eating bark of medicine trees, and go about gathering water lily. So when they eat my flesh, this is how they cure themselves. Nancy Jones
> (in Dibaajimowinan 2013)

Amik Habitat:

A beaver prefers slow moving waters bordered by young forests of aspen, willow, alder, birch, maple, and cherry trees. They are herbivores eating bark, leaves, and twigs of woody plants and also sedges and aquatic vegetation. Beavers maintain and defend territory for feeding, mating, and raising young; they invest much energy in their home territory and are intolerant of intruders. With their impressive front teeth of hard orange enamel, they are capable of felling trees used in lodge and dam construction and their heavily clawed front feet enable them to excavate burrows and canals. They provide important dens for other mammals including river otters and their ponds create standing dead wood beneficial for many animals and plants (Severud 2011). They act as a keystone species shaping the landscape and keeping wetlands healthy and flowing; they may also play a role in impacting climate change through landscape-scale carbon storage in beaver meadows relative to adjacent uplands (Wohl 2013). But some consider their aggressive manipulation of landscapes a nuisance for landowners and trout stream health.

Amik Threats:

- Overharvest by trappers
- Habitat alteration
- Climate Change
- Predation

Amik Stewardship Actions:
Stewardship strategies for beaver focus on maintaining an adequate population of beavers for ecological, aesthetic, cultural, and trapping values. Beaver should be recognized as a key species for healthy riparian and wetland habitat. Consideration must be given to other conservation priorities such as trout stream ecology and nuisance beaver behavior when indicated (Trani and Chapman 2007).

- Monitor beaver population and habitat use
- NRD Staff shall seek training on removal of beavers for watershed connectivity and health
- Enhance narrow, low gradient streams with abundant alder, aspen, birch, maple and willow within a 100' of streams or water bodies
- Restore or enhance riparian hardwoods and conifer

3.2.6 Wazhashk (MUSKRAT) (*Ondatra zibethicus*)

Wazhashk Relationship with First Peoples:
Muskrats have long been valued by the Ojibwe for their fur and cultural significance. They exhibit a unique winter ecology attribute of high tolerance to carbon dioxide in their burrowing habits and under-ice foraging (MacArthur 1984, 1986) allowing them to survive low oxygen environments in burrows and swimming underwater for long periods of time. Observations of this ability were likely noted by Ojibwe because in the creation story, Muskrat dives to the bottom of the sea to bring up mud from which the Earth is created after other animals have failed in the task. Muskrats still do their part today in remembering the Great Flood; they build their homes in the shape of the little ball of Earth and the island that was formed from it (Benton-Banai 1988).

> The Great Flood
> Look! Muskrat has something in his paw. Wynaboozhoo opened muskrat's tiny paw, and there in a tiny ball, was a piece of Earth. Muskrat had sacrificed his life so that life could begin anew on the Earth. Benton-Banai 1988

Wazhashk Brief Description:
Muskrat is one of the larger rodents in the Great Lakes region and inhabits most of our continent north of Mexico. It has glossy dark brown fur and a naked scaly tail which is laterally compressed, like no other mammal in our area. Its tail, partly webbed hind feet, and bristly toes make it an agile semi-aquatic forager that prefers shallow slow-moving or standing water. Muskrats can be active any time of day, although they are most active at dawn and dusk, feeding on aquatic vegetation such as cattail, water lily, and rushes, and also small amounts of fish, frogs, turtles, and crayfish (Kurta 1995).

Wazhashk Habitat:
Muskrats utilize ponds, lakes, swamps, and marshes with constant water levels, shallow enough for aquatic plants to grow but seldom freezing all the way to the bottom. Muskrats inhabit wetlands in a variety of habitats and climates and play an important role in wetland ecology through grazing, burrowing, and lodge construction (Higgins and Mitsch 2002). They build

lodges of mud and vegetation which they replace every day to plug the entrances. Muskrats follow well used trails in swamps and marshes and after freeze-up, they follow the same trails under the ice. In winter, they make a hole in the ice and push up vegetation from the marsh bottom to keep it open as a resting place and breathing hole. These houses are often swept away in spring and rarely last more than a single season, so they are constantly reconstructing them. Cooperative partnerships with beavers exist in winter, sharing dens, thermal cover, and food (Marinelli and Messier 1993). Muskrats are prolific breeders. Their populations cycle and, where they are abundant, they are capable of altering the type and abundance of vegetation in a wetland, enhancing habitat for some other mammals, birds, and insects (Mitsch et al. 1998, Wilcox and Meeker 1992).

Wazhashk Threats:

- Habitat loss
- Overharvesting
- Wetland pollution and toxins
- Human induced mortality
- Climate Change

Wazhashk Stewardship Actions:

Stewardship and monitoring activities for muskrat focus on maintaining healthy wetlands.

- Create, restore and/or maintain healthy wetland complexes
- Monitor pollution in wetlands
- Monitor harvest numbers

3.2.7 Nigig (NORTHERN RIVER OTTER) (Lutra [also Lontra] canadensis)

Nigig Relationship with First Peoples:

Otter is valued for its fur and cultural significance for the Ojibwe. Pelts are often sewn into medicine bags and used in sacred first stages of initiation into the Midewin lodge. Otter teaches us independence and self-reliance but also to laugh and enjoy life to its fullest (Takatoka 2014).

> Nigig shouted to the people that he would show them the true Four Directions so that they could live in harmony. Nigig is the one today that accompanies the newcomers into the Midewin Lodge. Benton-Banai 1988

Nigig Brief Description:

The river otter, with its slender body and short legs typical of the weasel family, is larger than any other mustelid in the Great Lakes area except the badger. Sleek and playful nigig is an important clan animal in Ojibwe culture and is a figure in many traditional stories. Waterproof fur, a thick muscular tail, and five fully webbed toes on each foot, make the northern river otter well adapted to its semi aquatic life. Otter are making a steady comeback through recovery and reintroductions after their range was greatly reduced by pollution, over-trapping, and habitat loss in the twentieth century (Kurta 1995). This mammal requires clean deep water in streams, ponds, or lakes with banks for subterranean dens. Being at the top of the aquatic food chain, river otters are highly susceptible to pollutants and bioaccumulation of toxins (Ropek and Neely 1993); they are considered a reliable indicator of

ecosystem health (Basu et al. 2005). Because of their mobile and aquatic nature, Otter were detected at only 7 of 28 (25%) wetland study sites using both remote camera and track/sign.

Nigig Habitat:
Northern river otters use a wide variety of aquatic habitats including mixed hardwood swamps, wetlands, rivers, shorelines, sloughs, and canals. Their preferred habitat is selected by water quality, availability of abundant food, and adequate denning sites (Melquist and Hornocker 1983). Otters feed primarily on slow moving fish and other aquatic vertebrates and invertebrates; they will occasionally opportunistically take small mammals or waterfowl. They forage mainly at night, throughout the entire year, on land or in water. They are physically adapted for water but they run well with a loping gait on land; they take advantage of their sleek shape to "toboggan" on muddy banks, grassy slopes, and snow.

Nigig Threats:
- Pollution in aquatic environments
- Degradation of riparian, bottomland forests, and wetland environments
- Disease including canine parvovirus, rabies, and parasites
- Overharvest

Nigig Stewardship Actions:
- Protect and enhance wetland and riparian areas and maintain water levels where possible
- Provide vegetative cover and structural diversity near wetlands and shorelines
- Considering the close association between otters and American beavers, stewardship plans should consider the two species together as their habitat often overlaps (Trani and Chapman 2007)
- Otters benefit from creation of den sites and provision of fish made possible by beaver impoundment of streams
- Monitor population and harvest trends. Otters can cause damage to fish hatchery and fishing operations, seen as competitors by some people, and can be a challenge for stewardship.

3.2.8 Zhaangweshi (MINK) (Neovison [also Mustela] vison)

Zhaangweshi Relationship with First Peoples:
Fur of the American mink has been long valued by Ojibwe trappers, especially their winter fur which is long, dense, and soft. Mink was a trickster in one Ojibwe story. Mink started a fight between two fish, the Pike and the Muskie by telling them how the other was insulting them. The Pike and Muskie fought while the mink acted as the referee. The fish ended up killing each other and mink felt he had the last laugh. He took the fish and boiled and dried them, he piled the fish eggs next to him and fell asleep. Some Ojibwe came by and saw mink lying there with the fish. They stole the fish and replaced the eggs with rocks. When mink woke up he licked up the fish eggs from the ground, but broke his teeth on the rocks. He realized someone had played a trick back on him. http://www.mpm.edu/wirp/ICW-141.html

Zhaangweshi Brief Description:
The American mink, a nocturnal semi-aquatic mammal native to North America, is a carnivore that feeds primarily on fish, rodents, frogs, and birds. It is a stealthy predator of muskrats and with its long streamlined body is able to chase and kill muskrats by swimming and capturing

them in their own burrows. Mink are also bred on farms, relieving some of the impact on natural populations from fur trapping in the past two centuries (Kurta 1995). Like the river otter, mink bio-accumulate mercury, PCBs, and other pesticide toxins in their tissues which may affect their survival and reproductive success (Basu et al. 2005). Occasionally, dispersing young mink will be taken by larger carnivores or owls, but they have few natural predators other than humans. Mink were detected at 10 of 28 (36%) wetland study sites mainly by track/sign.

Zhaangweshi Habitat:
Mink frequent ponds, streams, and lakes with protective brushy or rocky cover nearby. They forage on small mammals, fish, birds, and insects and usually stay within close proximity to water. Mink mark and vigorously defend their home territory especially against other mink of the same sex, but male and female ranges overlap. Mink and river otters compete for the same diet and habitat, and competition with otters for fish sometimes causes the mink to seek more land-based prey (Bonesi et al. 2004). Mink are found in wooded areas and are capable climbers, agile bounders, and excellent swimmers and divers. They rest and find thermal cover in underground burrows in river banks that they dig or take over from another animal. They are active in the winter when they prey primarily on muskrats in their den or underwater (Linscombe et al. 1982).

Zhaangweshi Threats:
- Over trapping
- Toxins and pollution in their food supply
- Loss of habitat
- Human induced mortality
- Pollution of aquatic environments

Zhaangweshi Stewardship Actions:
Maintaining and enhancing wooded areas and fields near streams and lakes is the primary focus in providing suitable mink habitat. Monitoring and remediating toxins and pollutants in mink habitat will benefit all of the aquatic habitat inhabitants. Mink can cause damage to fish hatchery and fishing operations, seen as competitors by some people, and can be a challenge for stewardship.
- Enhance wooded areas and fields near streams, wetlands and lakes
- Monitor existing pollutants in wetlands
- Monitor trapping numbers and adjust quotas accordingly

3.2.9 Misakakojiish (AMERICAN BADGER) (*Taxidea taxus*)

Misaa'gaakojiish Relationship with First Peoples:
The Ojibwe name for Badger means bitter/terrible troublemaker. Badgers are also portrayed as hardworking, cautious animals or protective parents among various tribes within the United States. Among Pueblo tribes, badgers are considered one of the six directional guardians. Tribes with Badger Clans include the Hopi and Pueblo tribes of New Mexico.

Misaa'gaakojiish Brief Description:
The American badger is a stocky, medium sized member of the weasel family with short powerful legs and massive claws on the forefeet. This shaggy, muscular carnivore with a short

flattened rudder-like tail is fiercely territorial and defensive; it will release a skunk-like scent if challenged and will attack if cornered. Badgers have a set of strong dense muscles around their neck and throat so they are not easily grabbed by predators. They are very secretive and seldom seen, hunting mostly in darkness and spending their days in underground burrows. They rarely use the same burrow on consecutive days in warm weather. During winter, they den for days at a time decreasing body temperature, seldom eating, and survive the winter using stored body fat and short foraging episodes. Badgers are important contributors to ecosystem communities often creating dens and burrows for other mammals (Kurta 1995). They have been observed to have mutually beneficial associations with coyotes combining their skills of capturing animals with coyotes chasing prey and badgers digging them out of burrows (Minta et al. 1992). Locally, badgers are associated with specific soil conditions conducive to burrowing. Badgers were detected in two wetland study sites and two upland locations during KBIC wildlife inventories. Tracks/sign of badger have been detected in several other areas on and near the reservation where proper soil conditions exist.

Misaa'gaakojiish Habitat:
Extensive forest clearing in the Great Lakes region allowed the badger to expand its range northward and eastward to areas with soft soils and abundant rodent prey. They consume a variety of foods including voles, mice, ground squirrels, snakes, eggs, ground-nesting birds, and carrion, sometimes burying food for later use (Michener 2004). Badgers prefer grasslands, fields, and farmland and rarely are found in wooded habitats. They are adept at digging impressive burrows using their claws and teeth to excavate deep long tunnels in soft soils. Badgers hunt primarily in grassy openings, often digging to catch prey, and they make use of objects to plug holes of prey to trap them (Michener 2004).

Misaa'gaakojiish Threats:
- Collisions with automobiles
- Trapping
- Shooting by farmers and landowners
- Loss of habitat
- Decreased food availability

Misaa'gaakojiish Stewardship Actions:
Stewardship for badger habitat focuses on maintaining open grass areas or more open forested areas for hunting prey. Locally badgers can be spotted at night on the grassy sides of the road making them vulnerable to vehicle collisions.
- Monitor badger population and habitat use
- Increase, enhance, and/or maintain open grassland areas especially in areas with suitable soil types for burrows
- Encourage small mammal populations for adequate food base
- Retain coarse woody debris, snags, downed logs and cavity trees

3.2.10 Misaabooz (SNOW SHOEHARE) (*Lepus americanus*)

> When they look at me and my fur, they will get warm from it. Anishinaabe will know how to use my gift, like sometimes when they get a skin rash. They will use my rabbit fur, my hide.
> Nancy Jones
> (in Dibaajimowainan 2013)

Misaabooz Relationship with First Peoples:
Snowshoe hares have long been valued by the Ojibwe for food and furs. Their modern day presence and increase in population size is desirable to community members according to the 2013 community survey about values of wildlife and natural resources.

Misaabooz Brief Description:
The snowshoe hare inhabits most of Canada and the northern United States and is very well adapted to the snowy north in heavily forested areas with dense understory. It has the name of "snowshoe" because of its large hind furry feet which prevent it from sinking into deep snow and protects the feet from freezing temperatures. It is also referred to as "varying hare" because its fur changes from rusty brown in summer to a white thick insulating coat in winter for camouflage. Hares are crepuscular to nocturnal, spending their days in shallow depressions under thickets, and are active year round foraging at dawn, dusk, and night time (Kurta 1995). Research in recent years has indicated that with climate change, the number of days that the color of white hares are mismatched with the snowless background will increase predation and increase risk for this threatened species (Mills et al. 2013). Snowshoe hare is designated as a species of special concern in Michigan (MDNR SGCN 2006). Hares have a large list of predators including lynx, foxes, coyotes, birds of prey, and for young hares, red squirrels. Population densities vary widely with peak densities occurring every ten to eleven years; shortages of hares were mentioned in historical documents of the 18th and 19th centuries by Ojibwe trappers (Krebs et al. 2001).

Misaabooz Habitat:
Unlike the Eastern Cottontail (mizhwe) (*Sylvilagus floridanus*), snowshoe hares avoid habitat dominated by humans and prefer heavy coniferous and mixed woods, especially low-lying stands of cedar and spruce and dense softwood under stories. Snowshoe hare utilize regenerating deciduous species for food in close proximity to young conifer regeneration. The presence of cover is extremely important for habitat quality as they remain in dense cover during the day in shallow depressions, called "forms", scraped out under vegetation and venture out to nearby openings to feed at night (Litvaitis et al. 1985). In summer, they prefer succulent green vegetation, such as new leaves of blueberries, horsetail shoots, fireweed, grasses, clover, dandelion, and young leaves of aspen, willow, and birch. Winter foods include bark, twigs, buds of woody plants, and needles of conifers. Saplings with narrow stem diameters are important in deep snow with adequate height to be available browse. Snowshoe hares, unlike other species, will opportunistically eat meat, feeding on carcasses or stealing meat from traps for extra protein in their mostly herbivorous diet.

Misaabooz Threats:

- Habitat loss and fragmentation
- Climate change
- Predation
- Over harvesting

Misaabooz Stewardship Actions:

Hare populations require dense, brushy habitat to thrive and it is especially important for young hares. Protection from predators and harsh weather conditions is critical for survival and successful reproduction. Overwintering success increases with quality of cover; heavy cover of about 3 meters tall provides protection from avian predators and of about 1 meter tall from terrestrial predators (Litvaitis et al. 1985).

- Leave downed treetops and brush piles following forest maintenance activities for browse and escape cover
- Encourage heavy shrubby brush cover 1-3 meters tall for adequate overwinter protection and browse

3.2.11 Esiban (RACCOON) (Procyon lotor)

Esiban Relationship with First Peoples: In some stories Esiban is portrayed purely as a mischief-maker, while other stories focus on Raccoon using his cleverness and dexterity to escape from danger or acquire food. The fur of raccoons is valued for winter clothing, but also tails are used for ornament.

Esiban Brief Description:

> Raccoon were sent by the Creator to help us to protect the lakes and the rivers. Raccoons are good helpers. Harlan Downwind

The Common Raccoon is a nocturnal stout-bodied mammal with a bushy tail marked with five or more circular bands of light brown fur alternating with darker rings. Its grayish coat mostly consists of dense underfur which insulates against cold weather. Two of the raccoon's most distinctive features are its extremely dexterous front paws and its black facial mask across an otherwise white face. Raccoons are noted for their curiosity and intelligence; studies show that they are able to remember the solution to tasks for many years and are capable of surviving in remote wilderness, farm woodlots, and urban areas. Raccoons are highly adaptable omnivores being choosy when food is abundant but will eat almost anything organic when hungry (Kurta 1995). Their diet consists of about 40% invertebrates, 33% plant foods, and 27% vertebrates. Raccoons often dabble for underwater food near the shoreline and often pick up the food item with their front paws to examine it and rub the item, sometimes to remove unwanted parts. This gives the appearance of the raccoon "washing" the food. In the northern parts of their range, raccoons go into a winter rest, surviving on stored fat from autumn feeding, reducing their activity drastically as long as a permanent snow cover makes searching for food impossible.

Esiban Habitat:

The original habitats of the raccoon were deciduous and mixed forests, but due to their adaptability they have extended their range to mountainous areas, coastal marshes, and urban areas, where some homeowners consider them to be pests. In the Great Lakes basin, raccoons live near wooded areas, often near a stream or pond and are more abundant in hardwood stand than in pure coniferous forests (Kurta 1995). Although they have thrived in sparsely wooded areas in the last decades, raccoons depend on vertical structures to climb when they feel threatened. Tree hollows and rock crevices are preferred by raccoons as sleeping, winter, and litter dens. If such dens are unavailable or accessing them is inconvenient, raccoons use burrows dug by other mammals, dense undergrowth, or tree crotches for rest and safety. Since amphibians, crustaceans, and other animals found around the shore of lakes and rivers are an important part of the raccoon's diet, lowland deciduous or mixed forests abundant with water and marshes sustain the highest population densities.

Esiban Threats:

- Loss of suitable feeding and denning habitat
- Raccoons are susceptible to a number of pathogens and diseases including distemper which is the most frequent cause of natural mortality in raccoons
- Raccoons are one of the primary carriers of the rabies virus in the United States, and are classified as a rabies vector species (Rosatte et al. 2006)
- Persecution

Esiban Stewardship Actions:

- Maintain and enhance lowland deciduous or mixed forests near ponds, lakes, and rivers to provided adequate habitat for raccoons
- Retain coarse woody debris, dense undergrowth for cover, and standing trees for escape
- Educate the community to report and stay away from sick animals with unusual behavior or appearance including aggression, fighting with dogs, ataxia, vocalizations, and illness
- Participate in local and regional efforts for control and surveillance of rabies in raccoons
- Provide information for the community on how to live in harmony with raccoons to avoid them scavenging on personal property

3.3 Small Mammals (SQUIRREL, CHIIPMUNK, PORCUPINE, MOUSE, ETC.)

Small Mammal Goal: Maintain self-sustaining populations of small mammals for optimal balance of predator-prey

Small Mammal Objective 1: Provide benefits to small mammal populations when implementing habitat Stewardship projects

Strategies:

- Preserve or increase coarse woody debris, snags, downed logs and cavity trees
- Provide rock piles and brush piles

Small Mammal Objective 2: Increase understanding of small mammal ecology and Stewardship needs

Strategies:

- Gather baseline data on species diversity, abundance and species-habitat associations
- Work with partners on predator-prey studies

3.3.1 Zhagashkwaandawe (NORTHERN FLYING SQUIRREL) (*Glaucomys sabrinus*)

Zhagashkwaandawe Relationship with First Peoples:
Squirrel is fast at everything he does and remains in constant motion three of four seasons of the year. Squirrel teaches to get busy with your life and stop waiting for good things to happen. He reminds us that good things come from honest labor. We must gather our energies for important tasks in life and honor the future by preparing for change (Takatoka 2014)

Zhagashkwaandawe Brief Description:
Northern Flying Squirrel is a beautiful nocturnal, secretive, gliding, arboreal mammal with silky gray and cinnamon brown fur and white-tipped belly hairs. They do not fly in the same sense as birds or bats but they have a fleshy membrane (patagium) from the wrist of the foreleg to the ankles of the hind leg that enables them to glide once launched into the air. Their tail is furred, flattened, long, and rounded at the tip acting as a rudder when gliding. While they are graceful and efficient gliding long distances from tree to tree in the air, they are clumsy walkers on the ground and prefer to hide rather than run to evade predators (Vernes 2001). Northern flying squirrels have excellent senses of hearing, smell, touch, and vision with large black eyes which they use during low light activity, and long whiskers common to nocturnal mammals (Kurta 1995). The northern flying squirrel dwells in forests of the northern US and Canada but the southern flying squirrel (*Glaucomys volans*) has rapidly expanded its range northward and is now found to overlap in some ranges like the UP after a series of warm winters (Myers et al. 2009). Northern Flying Squirrel is designated as a species of special concern in Michigan (MDNR SGCN 2006). There is now evidence of hybridization of these two species suggesting that climate change may create conditions for "hybrid zones" (Garroway et al. 2009). Flying squirrels share nests and live in groups of adults and juveniles, especially important for warmth in winter to regulate body temperatures (Cotton and Parker 2000). Northern flying squirrels do not hibernate or enter dormant states and are strictly nocturnal, with most of their activity in the first few hours after sunset and before sunrise foraging on the ground or in trees (Smith 2007).

Zhagashkwaandawe Habitat:
Northern flying squirrels thrive in boreal, coniferous, and mixed forests of the north, nesting in holes in trees, preferring large-diameter trunks and dead trees. Tree cavities high off the ground created by woodpeckers are often chosen as nest sites in spruce, fir, and hemlock and are made of twigs and bark and softened with feathers, fur, leaves and conifer needles. Northern flying squirrels prefer habitats with higher precipitation, closer distance to a stream, northwest aspect,

high basal area of snags and a higher density of live trees and snags than randomly available habitats (Hough and Dieter 2009).
Northern flying squirrels prefer to eat truffles (fungi) of various species, the underground versions of mushrooms which resemble small potatoes. Truffles rely on animals eating them (mycophagy) to distribute their spores, instead of air currents like mushrooms. Flying squirrels are very effective at disseminating the spores of the fungi they eat and contribute to the abundance of truffles in the ecosystem. They are able to locate truffles by olfaction, by the presence of coarse woody debris, and by spatial memory. They also eat lichens, mast crops, insects, bird eggs and nestlings, carrion, buds, and flowers, and they are known to cache food in tree cavities (Malamuth and Mulheisen 1999). Flying squirrels were often detected at remote camera stations and appeared to be eating insects but we did not tally their numbers.

Zhagashkwaandawe Threats:

- Habitat destruction through logging and human development
- Pollution
- Climate change and displacement by southern flying squirrel
- Predation by owls, hawks, marten, fisher, coyotes, and domestic cats

Zhagashkwaandawe Stewardship Actions:
Northern flying squirrel needs are primarily food and suitable natal dens with cover from predators. The quality of its home forest also depends on abundance of fungi in summer and lichens in winter and it is vulnerable to anthropogenic and climate change disturbances (Odom et al. 2001, Weigl 2007).

- Maintain adequate densities of large trees, snags, cavity trees, coarse woody debris and downed logs for dens, escape cover and fungal growth
- Promote and preserve areas of old growth forest

3.3.2 Agongos (EASTERN CHIPMUNK) (*Tamias striatus*) & Agongosen (LEAST CHIPMUNK) (*Tamias minimus*)

Agongos Relationship with First Peoples:

How the Chipmunk Got His Stripes -
Long ago deer were fierce predators. They had sharp teeth and claws for hunting large prey. Deer had plans to kill Anishinaabe. It was Agongosen that overheard their plan. The deer chased him and tried to kill him so he could not warn the people. Agongosen got away but was scratched by the deer claws leaving him forever with three stripes. The Creator forever changed the deer into peaceful animals armed only with speed to escape.

Agongos Brief Description:
Eastern chipmunks are small rodents with grayish to reddish brown fur and a distinguishing yellowish to reddish patch on their rumps with white underparts. Their sides and back have five dark stripes; the longest stripe occurs along their midline. Between their dark lateral stripes, there is a narrow white band. Light and dark stripes occur on their face around their eyes and they have small round ears. Their tail is hairy, but not bushy and is somewhat flattened. Their forefeet have four toes and their hindfeet have five. Eastern chipmunks have large cheek pouches located

on either side of their mouth. The stripe along their body distinguishes them from all other rodents except **Least chipmunks** which occur together with eastern chipmunks in the northern Great Lakes region. However, least chipmunks' stripes extend to the base of their tail, whereas, eastern chipmunks' stripes stop before their rump patch. Eastern chipmunks are noticeably larger than least chipmunks, which helps to distinguish between the two species. Least chipmunks are somewhat common across the Upper Peninsula though some evidence exists that their range may be constricting northward, which may be the result of climate change. Least chipmunks are designated as a Michigan species of special concern (MDNR SGCN 2006). Chipmunks are generally smaller and not as elaborately striped as *mayaagi ajidamoo,* **Thirteen-lined ground squirrel** (*Spermophilus tridecemlineatus*) whose range overlaps in some areas of the Upper Peninsula. Along its back and sides, *mayaagi ajidamoo* has six longitudinal bands that are gray to tan in color alternating with seven dark brown stripes that have a series of tan rectangles within. An increase in abundance of the Eastern chipmunk, potentially due to temperature increase, may result in increased competition and population declines for least chipmunks (Kurta 1995).

Agongos Habitat:
Eastern chipmunks are ground-dwelling mammals that inhabit open deciduous forests where cover is readily available in the form of stumps, logs or rocky outcrops. Their prime habitat is mature beech-maple forests, but they will occupy bushy areas and coniferous forests, however, swampy sites are avoided. Least chipmunks are found throughout the boreal and temperate forests of North America. However, least chipmunks prefer more open areas such as forest edges and openings and readily use clear cuts. They are also commonly found near rock cliffs, river bluffs, and open jack pine stands (MDNR 2005). Dietary staples include fruit, seeds, and nuts, supplemented with insects, earthworms, slugs, bird’s eggs and mushrooms. Food is transported within cheek pouches located on either side of the mouth. Eastern chipmunks demonstrate food caching behavior throughout the year, but are particularly active in the early autumn to prepare for winter. Eastern chipmunks scatter-hoarder and will leave caches throughout their home range or in one of the rooms their burrow. They do not have the fat stores to hibernate, but instead enter periods of torpor and arise frequently to feed off cached food. During mild winter weather they may forage above ground. Least chipmunks are active only from April until October and with the onset of cold weather, retire to an underground burrow for the winter. Least chipmunks are predators of pest insects and may play a role in seed or pollen dispersal (Kurta 1995).
Agongos Threats:

- Habitat alteration
- Predation by wild mammals, raptors, birds, and domestic house cats, feral cats, and dogs
- Climate change
- Invasive plants and animals
- Human induced mortality (i.e. road kill, extermination from buildings)

Agongos Stewardship Actions:

- Conduct surveys for small mammals to assess populations and preferred habitat
- Maintain standing snags, downed logs, and coarse woody debris to provide homes and food sources

- Maintain forest openings and edges with adequate forage and cover
- Manage for plant, shrub, and tree species that provide adequate fruit, seeds, and nuts
- Work with partners including MDNR to monitor and maintain a viable populations (MDNR 2005)

3.3.3 Gaag (PORCUPINE) (Erethizon dorsatum)

Gaag Relationship with First Peoples: Porcupine are often hunted or trapped for their meat, and their quills are valued for decorative use on fabric, baskets, and leather (Orchard 1916).
Why the Porcupine has Quills - Long, long ago, Porcupine had no quills. One day, Porcupine was out in the woods. Bear came along and would have eaten Porcupine, but he managed to get up a tree where the Bear couldn't get him. The next day Porcupine was out again and he went underneath a hawthorn tree, and he noticed how the thorns pricked him. He broke some branches off and put them on his back, then he went into the woods. Along came Bear and he jumped on Porcupine, who just curled himself up. The Bear left him alone because the thorns pricked him so much.
Wenebojo was watching them. He called to Porcupine and asked "How did you think of that trick?" Porcupine told him that he was in danger when Bear was around. Then Wenebojo took some thorns and peeled the bark off of them until they were all white. Then he got some clay and put it all over Porcupine's back and stuck the thorns in it. Wenebojo used his magic to make it into a proper skin, and told Porcupine come with him into the woods. When they got there, Wenebojo hid behind a tree. Wolf came along and saw Porcupine and jumped on him, but the new quills pricked at him and Wolf ran away. Bear was also afraid of the quills and Porcupine was safe. That is why Porcupines have quills. (Adapted from Laidlaw, 1922.)

Gaag Brief Description:

The Common Porcupine or North American Porcupine is a round-bodied near-sighted slow moving mammal that is indigenous to the Americas. In the Great Lakes region, porcupine is the largest rodent next to the beaver (Roze 2009). Its basic body color is brown to black and guard hairs have bands of yellow. It has a chunky body, a small face, a short stubby tail, and a spiny coat made of hollow quills that occur from head to tail on the dorsal surface that defends it from predators. Each quill is a modified hair tipped with microscopic barbs pointing toward the base. When approached by a threat, a porcupine faces away from its enemy and raises it spines in a threatening gesture and lashes out with its quill-studded tail. It does not “throw” its quills but they easily detach when the barbed tips come in contact with the soft flesh of predators and are very difficult to remove once lodged in an attacker. A single porcupine has about 30,000 quills measuring up to 3 inches long. The quills are normally flattened against the body unless the animal is disturbed (Kurta 1995). A group of porcupines is called a “prickle”. To avoid predation, porcupines often climb trees at the first sign of danger, since most of their natural predators cannot pursue them once they're arboreal and with its dangerous quills, the porcupine is often avoided as prey. Due to their agility and aggression, adult male fishers are particularly adept porcupine hunters by attacking its spineless belly.

Gaag Habitat:
The common porcupine is a generalist herbivore. Feeding happens primarily at night because of changes in plant and leaf chemistry at night. Nitrogen is a crucial nutritional resource need of porcupines and they take advantage of the added nutrients available during the night-time metabolic processes of plants. They eat leaves, herbs, twigs and green plants like clover, and roots, flowers, fruits, seeds, and nuts as they are available (Roze 2009). Porcupines often climb trees to find food and live in deciduous and coniferous woodlands with particular liking for stands of aspen, pine, and hemlock. They have long claws and textured feet that enable them to climb and grip trees while feeding. In summer, they often spend the day resting alone high in a tree, generally solitary and nocturnal. In winter, they do not hibernate but they seek refuge in a cave, decaying log, tree stump, or hollow trees foraging close to home at the same den site, and have the ability to withstand and tolerate very cold temperatures (Kurta 1995). Their winter diet consist of conifer needles, buds, and the soft inner bark of trees such as white pine, hemlock, sugar maple, and birch. They are considered by some to be a pest because of the damage that they often inflict on trees and wooden and leather objects.

Gaag Threats:

- Loss of essential habitat for foraging and denning
- Predation by fishers
- Road kill mortality
- Persecution

"Porcupine is known to be a good protector. When the porcupine spirit is with you, no one can bother you." Harlan Downwind

Gaag Stewardship Actions:

- Creation of snags provides homes and food sources
- Conserve and enhance hemlock-hardwood-pine forest
- Retain or increase coarse woody debris, tree stumps, cavity trees and hollow logs

3.3.4 Akakojiish (WOODCHUCK or GROUNDHOG) (*Marmota monax*)

Akakojiish Relationship with First Peoples: The word woodchuck is from the Ojibwe word *otchig*. In one Ojibwe story, the woodchuck was told to work only in the summertime; in the winter he could sleep.

Akakojiish Brief Description:

The groundhog, or woodchuck, is by far the largest member of the squirrel family in the Great Lakes area. It has a chunky body on short, powerful legs well adapted for digging. Their dark-colored tail is short and their dorsal guard hairs are yellowish to reddish brown, tipped with white, giving them a frosted appearance. Their ears are low and rounded and their feet are black. These rodents live a feast-or-famine lifestyle and gorge themselves all summer to build up plentiful reserves of fat. After the first frost, they retreat to their underground burrows and snooze until spring, drawing their sustenance from body fat. While hibernating, the animal's heart rate plunges, and its body temperature is not much warmer than the temperature inside its burrow (Kurta 1995)
.

Akakojiish Habitat:

Groundhogs originally lived in open forests but have adapted to human intrusion, thriving in farmland with grassy pastures, small woodlots, and brushy fence lines. Though they are usually seen on the ground, they can climb trees and are also capable swimmers. These rodents frequent the areas where woodlands meet open spaces, like fields, roads, or streams. They excavate a burrow in well-drained soil and in the daytime forage along well-defined paths radiating out from the entrance. Here they eat grasses and plants as well as fruits and tree bark. Groundhogs can decimate a garden plot while voraciously feeding during the summer and fall seasons. Humans hunt the woodchuck for food. In Michigan, woodchuck may be taken year-round with a valid small game hunting license (MDNR 2014). When frightened, woodchucks emit a shrill whistle and that's why they are called "whistle pigs" in some areas.

Akakojiish Threats:

- Loss of essential habitat for foraging and denning
- Predation by fishers, fox, bobcats, black bears, and hawks
- Slow moving mammals killed while crossing roads or licking salts from pavement edges
- Persecution

Akakojiish Stewardship Actions:

- Retain or increase coarse woody debris, snags, and downed logs
- Conserve and enhance hemlock-hardwood-pine forest

3.4 Apakwaanaajiinh (BATS) (8 species) (*Vespertilionidae spp*.)

Apakwaanaajiinh Relationship with First Peoples:

One morning long ago, as the sun rose high it got too close to earth and became entangled in the top of a tree. The harder the sun fought to escape, the more entangled he became. Dawn did not come that morning. Animals didn't notice for quite some time until finally, so much time had passed that birds and animals knew something was wrong. The animals went out to search for the sun but it was the squirrel that had an idea. "Maybe Sun is caught in a tall tree," he said. He found Sun in the east in the top of a very tall tree. Sun pleaded for help so the small brown squirrel climbed the tree and began to chew the branches off that held the sun. The closer he came to Sun, the hotter the squirrel became until his fur was burnt and his tail was burnt. "Help me," said Sun. "Don't stop now. Soon I will be free." The squirrel eventually chewed branches free of Sun who rose up into the sky. Squirrel was burnt and blind and could not move. "Little Brother, " Sun said. "You have helped me. Now I will give you something in return. Is there anything you have always wanted?" Squirrel told Sun that he always wanted to fly. Sun smiled. "From now on you will fly better than birds but my light will be too bright for you. You will see in the dark and hear everything around you as you fly."

Apakwaanaajiinh Brief Description:

Bats are the only mammal capable of true flight enabled by modification of the forelimb with elongated hand and finger bones acting as structural supports for the wing membrane, providing both lift and forward thrust. Most bats in the US and all bats in Michigan are in the family Vespertilionidae and they share three physiological processes: daily torpor to conserve energy through the day, hibernation to survive the winter, and delayed fertilization to save energy in the spring. Most bats rely on echolocation for identifying prey and finding their way in the dark. All vespertilionids are quite small with tiny eyes but well-formed ears with a fleshy projection (tragus) which aids in echolocation (Kurta 1995). All Michigan bats feed exclusively on insects and other small arthropods consuming tons of insects including harmful agricultural pests. Evening bats can capture prey in mid-air, using their wings to flip the item into their tail membranes and then retrieve it with their mouths. They also pick stationary prey directly from the ground, or off leaves. Bats are often territorial and defend their foraging sites from other bats (Kurta 2010). In the KBIC community survey, a large majority of the respondents believed that bats are important for insect control and many stated they like seeing bats. Over half stated they would like to see KBIC monitor the local bat population.

There are eight species of bats of the Great Lakes Region (Kurta 2010, Winhold 2007) which include:

Big brown bat -- Apakwaanaajiinh (*Eptesicus fuscus*) is most abundant in regions dominated by farmland and least common in heavily forested areas. It is one of the most common building-dwelling bat in Michigan. The big brown bat is a beetle specialist eating hundreds every night including many crop pests. Many spend the winter in nearby mines or caves or in cool attics.

Little brown myotis bat -- Apakwaanaajiinh (*Myotis lucifigus*) is also common in dwellings and farmland areas where they roost behind shutters, under awnings and invade attics and outbuildings. They also inhabit the forested north and utilize tree hollows and rocky crags. They migrate to hibernate in winter in caverns and mines forming loose clusters in large colonial sites. They eat many kinds of insects but specialize in aquatic larval stages foraging over streams and ponds flying just above the surface of the water, eating thousands each night.

Eastern Red bat -- miskwaa apakwaanashiinh (*Lasiurus borealis*) is a handsome larger sized fast-flying bat abundant in rural areas. This bat is migratory arriving in Michigan in April and leaving by October, hibernating in trees to the south for winter. In summer they roost high in trees and prefer moths, beetles, flies, and leafhoppers, foraging along forest-field edges, over streams, and at lights.

Silver-haired bat -- Apakwaanaajiinh (*Lasionycteris noctivagans*) is a migratory species arriving in April and leaving by October and seeks shelter in trees under folds of bark. Its Latin name means "night wandering shaggy bat." It forages over woodland ponds and streams of small forest clearings. It is highly maneuverable and opportunistically feeds on any insect it finds but prefers flies, beetles, and moths. Occasionally they are snagged in midair by fishermen as they cast for trout when the bat mistakes the hook for a flying insect.

Hoary bat -- niibaa-iigonish Apakwaanaajiinh (*Lasiurus cinereus*) is the largest bat in the Great Lakes region with a wing span up to 18 inches. It is a strong flier and only a seasonal resident in Michigan but its winter range is unknown. It is a solitary species that roosts in trees like maple, cherry, and spruce preferring dense shade, and it forages over large canopied streams, along forest edges, and at lights. It prefers large insects including moths and beetles.

Tri-colored bat -- Apakwaanaajiinh (*Pipistrellus subflavus*) is a tiny species of bat that lives in the eastern US but has recently been found in parts of the western Upper Peninsula. Formerly known as the eastern pipistrelle, the new more descriptive common name Tri-colored bat was chosen because of the distinct tri-coloration of each hair, which is black at the base, yellow in the middle and brown at the tips. It hibernates longer than other bats in a cave or mine for 6 to 9 months of the year hanging on the wall singly not in clusters. In the summer it roosts in hollow trees or barns because caves are too cold. It forages over streams and ponds and at forest-field edges efficiently scooping prey out of the air with a wing or tail membrane.

Northern bat (*Myotis septentrionalis*) or Northern long-eared bat On October 2, 2013, the U.S. Fish and Wildlife Service (FWS) proposed the northern long-eared bat (Myotis septentrionalis; NLEB) for listing as endangered under the Endangered Species Act (USFWS 2014).This bat is readily distinguished from other small-bodied bats by its long ears that extend beyond the tip of its nose. It hibernates in caves or mines and migrates to summer range in areas nearby the hibernacula, preferring maples and ash for roosting. They feed most often within forests below the canopy taking moths, beetles, caddis flies, stoneflies and other insects, sometimes "gleaning" insects from the surface of leaves. After leaving their summer roosts, they participate in "swarming" along with other species of bats in groups of hundreds perhaps thousands in late summer.

Indiana bat (*Myotis sodalis*) is a medium sized myotis resembling the little brown bat but with different coloring. Its lack of critical wintering habitat has caused its numbers to decline and the Indiana bat has been declared endangered everywhere. Most Indiana bats migrate into the Great Lakes basin in April and a few of these bats are finding their way north to hibernate. Females form maternal colonies underneath loose bark of dead trees in heavily canopied forests or wetlands with up to 100 bats occupying one tree.

Apakwaanaajiinh Habitat:

Bats inhabit a diversity of environments from forested wetlands to open farmlands. The tree-dwelling bats rely on large standing trees with loose bark and cavities to provide protection from weather and predators and to raise young and rest. Roost trees in low canopy cover allow exposure to sunlight for warmth. Bats also roost in cliff and rock crevices, in tangled thickets, under bridges, and in attics and roofs of barns and other overhangs close to foraging habitat with large insect populations (Winhold 2007, Kunz et al. 2011).

For bats in Michigan, the Upper Peninsula is especially critical habitat because most of the naturally occurring caves in the southern part of the state are too shallow and too cold to protect bats in winter. Most of the hibernating bats head north to abandoned mines in the UP for the winter. Mining exploration created thousands of vertical and horizontal mines and pits in the UP which offer optimum bat roosting sites and hibernacula with constant temperatures, high humidity and low air movement (Van Dam 2012, Winhold 2007).

Apakwaanaajiinh Threats:

- Disease, most notablyWhite Nose Syndrome caused by a cold-loving fungus *Pseudogymnoascus destructans* (formerly known as *Geomyces destructans)* that grows on the skin of bats while they hibernate and can be transmitted to other bats has the potential to undermine the basic survival strategy of more than half the bat species in the U.S.(Cryan 2010) http://www.nwhc.usgs.gov/disease_information/white-nose_syndrome/

- Sealing abandoned mines eliminates hibernation sites that are historical and critical for winter survival
- Reduction and/or fragmentation of forested habitat
- Loss of coarse woody debris, snags, and cavity trees critical for roosting and maternity dens
- Extermination from human dwellings
- Increased use of pesticides and production of environmental pollutants
- Malnutrition -- failure to accumulate enough fat for the long winter
- Collisions with tall buildings, airplanes, wind turbines, and automobiles

Apakwaanaajiinh Stewardship Actions:
Stewardship efforts that focus on creating and maintaining critical habitat for bats for winter hibernation and summer roosting for raising young and foraging will greatly benefit bat abundance by selectively saving roosting trees and snags and diversity in vegetation and insect composition. Gating off abandoned mines with a network of steel bars rather than sealing them allows bats to enter but keeps humans out, providing critical habitat for hundreds of thousands of bats. Educational programs can stress the ecological and economic importance of bats in the environment and the enjoyment of watching bats in our region worthy of conservation efforts. Bats are also important to scientific knowledge providing insight into the biology of mammalian hibernation and sonar mechanisms (Kunz et al. 2011). Most of the bats of Michigan are designated as MDNR species of greatest concern (MDNR SGCN 2006).

Specific Stewardship Actions include:

- Gather information regarding species, numbers, and ecology of bats on and around KBIC lands
- Detect and monitor colonial and forest roosting locations for hibernacula and maternity sites
- Protect hibernacula locally and with partners across the U.P. and throughout the U.S.
- Retain or increase cavity trees, snags, coarse woody debris, and downed logs
- Develop, incorporate, and encourage ways to preserve foraging and roosting habitat for bats through forest maintenance practices and conservation on and near KBIC lands
- Manage wetlands, streams, ponds, and lakes for high water quality to maintain optimal insect populations
- Respond to emerging disease issues for bats including but not limited to monitor roosting areas for diseased and dying bats
- Share information with partner tribes and agencies about local bat status and mortality from annual monitoring results
- Increase public awareness and understanding of the value of bats for healthy ecosystems through educational materials, presentations and on NRD website

3.5 Birds (Binesiwag)

Goal: To promote and protect healthy, diverse populations of migratory and non-migratory birds on and around the KBIC Reservation for seven generations and beyond.

Objective 1: Increase and improve scientific information about bird populations on and near the KBIC Reservation.

Strategies:

- Conduct ongoing monitoring programs
- Conduct research on specific species for recommended stewardship options (i.e. marsh birds, waterfowl, songbirds, etc.)
- Work with partners to align monitoring methodology to better collaborate on population assessments
- Review and revise tribal management plans and harvest quotas based on monitoring results for game birds and waterfowl

Objective 2: Protect, maintain or enhance bird habitat including migratory stopover habitat and colonial roosting areas.

Strategies:

- Evaluate wetland, riparian, and upland habitat health/diversity for birds
- Identify key habitat areas for all life stages including nesting and migratory stop over habitat for specific high priority species
- Work with partners to establish local objectives and projects for further monitoring and conservation efforts that fit with tribal, state and regional initiatives

Objective 3: Monitor and maintain health of bird populations

Strategies:

- Support regional and Federal efforts to identify, study and address traditional and emerging disease problems for birds (i.e. botulism, Newcastle disease, avian cholera, and West Nile Virus)
- Identify and implement actions in response to threats to birds from diseases and invasive species of plants and/or alien wildlife
- Undertake actions to ensure survival of threatened species through conservation, restoration or reintroduction of desired species

3.5.1 Migizi (BALD EAGLE) (Haliaeetus leucocephalus)

Relationship with First Peoples:
The bald eagle is an animal of great cultural significance to the Ojibwe who have long revered it in teachings as a messenger between themselves and the Creator. It was Migizi that flew high into the sky to speak to the Creator and beg him not to destroy the earth because of evil and corruption taking place among the Anishinaabe. Migizi asked him to fly over the earth each day at dawn and look over the people. As long as Migizi can report each day to the Creator that there is still at least one person who sounds the Waterdrum or uses Tobacco and the Pipe in the proper way, the Creator will spare the earth. Therefore, Anishinaabe owe our lives to Migizi (Benton-Banaii 1988). This is why feathers are central to many traditional ceremonies and dances to

honor this special messenger and protector. Migizi is also the chief of the day birds (Harlan Downwind, Personal Communication).

Migizi Brief Description:

The Bald Eagle is a bird of prey indigenous to the Great Lakes Basin and is widely distributed in North America; it is the national bird and national animal of the United States. The Bald Eagle is not really bald but has deep brown plumage with a distinctive white head and wedge-shaped tail that make it unmistakable in its native range. Its beak, feet, and eyes are bright yellow. The plumage of the immature is a mottled brown with white streaks as they gradually acquire the adult plumage near its fourth or fifth year when it reaches sexual maturity. Males and females have the same coloring but females are about 25% larger. Mating pairs engage in spectacular aerial courtship displays, locking talons and descending in a series of somersaults and establish a long-term bond. Nestlings hatch asynchronously and the smallest often dies because of starvation and sibling aggression (Bull and Farrand 1987). Although the Bald Eagle was nearly extirpated in the mid-20th century due to pesticides, loss of habitat, and human-induced mortality, intensive education and conservation efforts allowed it to recover and was removed from the endangered species list in 2007 in the lower 48 states (Dykstra et al. 1998).

Migizi Habitat:

Bald eagles inhabit almost any type of wetland habitat in America including coasts, rivers, and large lakes in open areas with an abundance of fish. They are active in winter and not all eagles migrate. Those that stay through winter congregate around open water. They prefer old growth and mature coniferous and hardwood forests for perching, nesting, and roosting and often select the tallest tree in the stand (Andrew and Mosher 1982). Bald eagles build the largest nest of any North American bird and the largest tree nest of any animal. Their massive nests are made of large sticks and vegetation lined with finer materials and can be up to 10 feet deep and 20 feet across (Wood et al. 1989). Their annual life history is divided into nesting (courtship, nest-building, raising young from January/February to July) and non-nesting periods (August through mid-January); they are particularly sensitive to disturbance in the early phases of nesting leading to failed or abandoned nests (USFWS 2013).

Bald Eagles are opportunistic visual hunters and often locate prey from the air or a perch and swoop down to strike with their talons. They primarily eat fish, small mammals, waterfowl, carrion, and some small vertebrates. They are predators at the top of the food chain and are good indicators of the health of the ecosystem and the effects of persistent toxic substances through biological magnification (Frenzel and Anthony 1989, Kozie and Anderson 1991). Biological magnification is the process in which toxins accumulate in rivers or lakes and are eaten by aquatic organisms such as fish, and then are eaten by large birds, animals, or humans and become concentrated as they move up the food chain (Suedel et al. 1994).

Migizi Threats:

- Habitat loss
- Reproductive impairment from pesticides and heavy metals
- Disturbance by humans
- Egg and nestling mortality due to predation, nest collapse, sibling aggression, starvation, and weather

> High in the sky flew Migizi. To this day we are told there is an eagle that sits on a high place between this world and the next. He tells the Creator of approaching Anishinaabe who have finished their earthly time. Benton-Banai *1988*

Migizi Stewardship Actions:
Bald eagles need suitable habitat near open water with adequate prey and relatively undisturbed by humans for survival. Protecting the water quality and healthy ecosystems of wetlands, rivers, lakes and surrounding older-aged mature forests will benefit bald eagles and their ecological community. Conservation and education programs about protecting bald eagles can include information about enjoying, respecting, and avoiding disturbance at nest sites during the most vulnerable nesting times by keeping safe distance from their nests and roost sites when hiking, camping, boating, and snowmobiling (see USFS 2013).

- Provide education about the sacred relationship of Anishinaabe and bald eagles
- Provide education about minimizing disturbance around nesting eagles
- Promote and enhance free flowing watersheds and open water conditions
- Maintain old growth trees along lakes, streams and ponds
- Restore conifer components that die off along waterways and around lakeshores

3.5.2 Ajijaak (SAND HILL CRANE) (*Grus canadensis*)

Ajijaak Relationship with First Peoples:
Gopioi ajiijaak is an Ojibwe clan of leaders. They are great speakers and their voices and message may be heard far and wide. They speak to others for the community and within the community; they are powerful messengers (Harlan Downwind, Personal Communication). By working together with the Loon Clan, they provided the people with a check and balance among the chieftanship (Benton-Banaii 1988).

Ajijaak Brief Description:
Sandhill cranes are the most abundant crane in the world. The Canadian subspecies, which is found in the Great Lakes region, is widely distributed across the northern US and Canada in breeding season and migrates to wintering grounds in the southern states and Mexico in winter. They are one of our largest birds and one of the oldest in the fossil record in North America. This magnificent tall bird has grey plumage that may appear brown on the back and wings, white cheeks, and an unfeathered red crown. The Sandhill crane can be identified in flight by its straight neck and legs extended behind it, unlike the heron with its crooked neck (Volz 2003). In the early 1900s, cranes were disappearing due to hunting and habitat destruction but have made a gradual recovery over the past century through successful conservation efforts and partnerships (Meine and Archibald 1996). Their elaborate courtship displays at dawn and dusk include loud rattling calls, dances, and threat postures with head- bobbing, bowing, leaping, and running with

wings extended, inspiring dance steps. The crane is an important clan animal and the Anishinaabe have long revered the crane for its stature, plumage, breeding calls and displays, sometimes called “Echo Maker” or “Speaker for the Clans”.

Ajijaak Habitat:
Sandhill cranes are opportunistic omnivores, eating mostly aquatic invertebrates, insects, worms, and small mammals, birds, and eggs, but they also take advantage of plant tubers, seeds, grasses, grain, berries, lichens, and aquatic plants. Flightless chicks feed on emerging insects and other high protein foods for rapid growth. Sandhill cranes prefer shallow wetlands with freshwater margins for breeding (Reinecke and Krapu 1986). Nest sites are mounds built of the dominant vegetation of the area and are concealed bulky large piles of dead sticks, moss, reeds and grass, requiring surrounding water or undisturbed habitat including open freshwater wetlands or open grasslands and sedge meadows adjacent to wetlands and adequate forage (Layne 1983). Their tendency to feed on plant tubers and agricultural seeds sometimes creates conflicts with farmers. Some of their recovery can be attributed to conservation efforts helping to create a more positive relationship between cranes and landowners who provide habitat.

Ajijaak Threats:
- Loss or degradation in staging and wintering riverine and wetland habitats for migrating birds
- Over-hunting in fall staging areas
- Development and persecution in nesting and foraging agricultural lands
- Human induced mortality

Ajijaak Stewardship:
Stewardship efforts focus on conserving and restoring ecosystems and landscapes that sandhill cranes depend upon for foraging, nesting, and overwintering. The International Crane Foundation has ongoing research and conservation projects that have contributed to our understanding and protection of cranes and the landscapes that are critical to them including solutions to crop damage and habitat restoration.
- Continue to monitor spring migration with annual crane counts
- Work with partners to enhance wetland habitat on and around the Reservation for crane reproduction and foraging
- Monitor allowable tribal hunting quotas and include in annual harvest report

3.5.3 Game Birds (Turkey, Woodcock, Grouse Species)

a) Mizise (WILD TURKEY) (Meleagris gallopavo)

Relationship with First Peoples:
Wild turkey is a clean bird in many respects and considers its appearance important. Turkey feathers were used by American Indians to stabilize arrows and adorn ceremonial dress, and the spurs on the legs of wild tom turkeys were used as projectiles on arrowheads. If the spirit of Turkey struts into your life it may be to remind you that hygiene and appearances are important to self-respect and respect for others (Takatoka 2014).

Mizise Brief Description:
The Wild Turkey is native to North America and is the same species as the domestic turkey. They exhibit sexual dimorphism with the male being much larger than the female and having long dark fan-shaped tail and glossy wings. The male's feathers are often more beautifully colored with hues of red, purple, green, and iridescent gold than the duller female. Males typically have "beards", tufts of long coarse modified feathers growing from the center of their breasts, although some females also have shorter and thinner beards (Dickson 1992). They are capable fliers despite their weight and often fly below the canopy to find perches in the forest. Wild turkeys are of great cultural significance to the Ojibwe and have been long revered for their presence, food, and feathers. On the KBIC community survey, respondents indicated they would like to see more turkeys in the KBIC Home Territory and support more active management of wild turkey habitat and hunting to maintain an abundant population. Furthermore, 74% of respondents said they would be willing to limit hunting to only bearded males during spring season to help increase numbers of wild turkeys for the future.

Mizise Habitat:
Turkey abundance was low at the beginning of the 20th century but conservation and restoration efforts have been successful in wild turkey numbers rebounding with reintroductions to much of their range in North America after being nearly extirpated (Hewitt 1967). Turkeys prefer mature deciduous or coniferous forests, with scattered open woodlands and grasses or shrubs for concealing nests and for finding food. They are omnivorous, foraging on the ground or in shrubs and trees and seem to adapt to almost any dense native plant community. Their diet consists mostly of seeds, nuts (especially acorns), leaves, grasses, insects, invertebrates, and small vertebrates. Adults roost in trees and chicks roost under the body, wings, or tail of females until about 4 weeks old. As winter residents, they form winter flocks but prolonged winters and deep snow can be challenging for their overwintering survival (Hull et al. 2013).

Mizise Threats:
- Habitat loss
- Disease spread by domestic poultry
- Predators especially on eggs and nestlings but also adult turkeys by larger predators
- Prolonged winter and deep snow limit early spring feeding

Mizise Stewardship Actions:
Stewardship of beneficial habitat for wild turkeys requires focus on different habitats seasonally and for breeding, nesting, rearing, roosting, and foraging. Turkey abundance is favored by habitat that is an even mix of forested and open/agricultural lands. Monitoring turkey abundance and landscape characteristics integrating biological metrics and social metrics will provide information to develop, evaluate, and adapt harvest regulations including number of permits, sex of turkey, time periods of hunts (see Hull et al. 2013). Specific stewardship and monitoring actions that are warranted include:
- Assist partners with enhancing turkey habitat for all seasons (NWTF, USDA FS)
- Maintain forest openings for breeding displays and insect foraging

- Maintain shrub cover near forest openings for escape cover and nesting
- Plant soft mast trees near openings
- Maintain stands of mesic conifer cover for winter roosting and cover
- Encourage open agricultural lands to leave crop residue for feeding
- Monitor for presence and population estimates of turkey
- Promote hunting season quotas that support the greatest reproductive success for turkeys

b) Badashka'anzhi (AMERICAN WOODCOCK) (Scolopax minor)

Badashka'anzhi Brief Description: Woodcock are migratory game birds that inhabit moist woodlands, swamps, thickets, and young forests near rivers and streams. They eat worms and insects with their long bills in damp soils. Males perform nocturnal aerial breeding displays that include a buzzing sound and a telltale "peent". Woodcock have experienced long-term declines in populations and intensive conservation efforts have focused on improving habitat. Adverse weather conditions in recent years have delayed nesting and brood rearing. Michigan is a key breeding area for woodcock and a leader in woodcock harvest (Vander Wagen 2013).

Badashka'anzhi Habitat:
Woodcock require small scattered openings one to three acres in size for breeding displays. Aspen stands in moist soils provide habitat for feeding, nesting, and brood-rearing. Moist soil provides good substrate for probing for food. Probed holes and footprints of woodcock can often be seen on muddy woodland roads. Riparian corridors are often utilized by woodcock.

Badashka'anzhi Threats:
- Habitat alteration
- Predation
- Over harvest
- Climate change

Badashka'anzhi Stewardship Actions:
- Maintain young aspen stands and small openings
- Work with partner agencies for monitoring populations of woodcock
- Retain coarse woody debris, logs, and brush piles for protective cover

c) Bien or baabaashki (RUFFED GROUSE) (Bonasa umbellus)

Bien Relationship with First Peoples:
Ruffed grouse are known as the "startler" bird. He was even known to startle Nanaboozhoo in a story or two (Harlan Downwind, Personal Communication). Feathers are used for ornamentation and many community members depend on ruffed grouse for fall food. The Potawatomie call the ruffed grouse "the little drummer". The Great Manitou took pity on him when he didn't have a beautiful voice to sing for his mate; so he was taught how to drum.

Bien Brief Description
Ruffed Grouse are fairly common and widely distributed game birds found throughout most of Canada and much of the eastern United States. Ruffed grouse populations exhibit a 10-year

population cycle through the northern portion of the bird's range. Male ruffed grouse perch on stumps and logs and beat their wings, which sounds like a drum (therefore known as drumming), to attract females for mating in spring. It is a common method to count drumming males along roadway survey routes to estimate an index of abundance (Gullion 1966). Aspen forests of the Great Lakes region generally support 4-8 drumming males per 100 acres (Kubisiak 1985). Michigan is among the top states in harvest numbers for ruffed grouse annually (MDNR 2001).

Bien Habitat:
Ruffed grouse thrive in young aspen forests (5-15 years) with brush lands and logs or stumps for potential drumming sites (Dessecker et al. 2006). Aspen stands as well as willow, birch, and hazel in a mixture of young and older forest provide cover and the most important year round food sources with flower buds, green leaves, and catkins. Dense shrub cover with substantial soft mast producing species provide important habitat for developing chicks in the first 4-6 weeks of life (Hollifield and Dimmick 1995). Ruffed grouse are year long residents and prefer conifer stands in winter.

Bien Threats:
- Habitat alteration
- Predation
- Over harvest
- Climate change
- Limited coarse woody debris

Bien Stewardship Actions:
- Retain large stumps, coarse woody debri, and downed logs
- Maintain varied ages of aspen stands to provide for all life stages of the ruffed grouse
- Work with partners to monitor populations
- Increase hard and soft mast species production in suitable areas and near aspen stands

d) Mashkiigobine (SPRUCE GROUSE) (Falcipennis canadensis)

Mashkiigobine Brief Description:
Spruce grouse are rare in Michigan and therefore listed as a protected species. Spruce grouse are often mistaken to be ruffed grouse, although easily differentiated up close, they are similar in size. Spruce Grouse stand about 15 to 17 inches in height. Spruce grouse feed mainly on the needles of spruce and other conifers; this tends to make them less palatable to eat. The female is deep brown in color and has black barred feathers, with facial feathers extending down the beak. Her body lacks the black belly feathers of the male and is tan colored and mottled. The tail is unbarred with a buff colored band. Her flank feathers are blotched with white. Flanks on a male spruce grouse are white spotted. The male also has a *patch of red colored skin above the back of the eye,* and the tail is tipped with a chestnut band. This blending of colors allows the spruce grouse to blend with the colors of needles, leaves and lichens. Spruce grouse walk with jerky heads and a stiff legged gait, as if planting each foot with purpose as they strut among the duff on the forest floor (Pietz and Tester 1982). They leave three pronged footprints as lasting images of their explorations in the soft forest soils. In winter snows, their toes, which are edged with hair

like feathers, create miniature snowshoe imprints. Predation of spruce grouse is by coyotes, red foxes, weasels, hawks and owls. The spruce grouse relies on camouflage and stillness to remain safe therefore, they appear to have a tame personality and often allow people to approach to a close range.

Mashkiigobine Habitat:
Spruce grouse is an inconspicuous resident of northern coniferous forests which lives in Michigan jack pine forests, as well as dense spruce, fir, cedar, and tamarack swamps, in the Lower and Upper peninsulas. Although spruce grouse occupy a variety of forest types across their range, the key feature appears to be structure of adequate density with low cover to protect the birds during their nesting and foraging activities. The nesting hen makes a small depression of about five to six inches in diameter and one to two inches deep among needles and leaf litter underneath young jack pine branches and bent bracken fern stems (Szuba and Bendell 1983).

Mashkiigobine Threats:

- Habitat alteration
- Predation
- Over harvest
- Climate change
- Limited coarse woody debris

Mashkiigobine Stewardship Actions:

- Retain large stumps, coarse woody debris, and downed logs
- Maintain varied ages of conifer stands to provide for all life stages of the spruce grouse
- Work with partners to monitor populations
- Protect or increase mesic conifer

d) Aagask (SHARP-TAILED GROUSE) (Tympanuchus phasianellus)

Aagask Relationship with First Peoples: Aagask have long been valued for their food value and feathers for ornamentation. They are known as "fire grouse" or "fire bird" by Native Americans due to their reliance on brush fires to keep their habitat open.

Aagask Brief Description:
The sharptail is a large grouse (somewhat larger than the ruffed grouse) that lives in open grassy or brushland areas. Generally between 15 and 20 inches, adults have a relatively short tail with the two central (deck) feathers being square-tipped and somewhat longer than their lighter, outer tail feathers, giving the bird its distinctive name. The plumage is mottled dark and light browns and grays against a white background; they are lighter on the underparts with a white belly. During spring, the male's eyebrows are yellow and its air-inflated throat sacks are lavender. In flight, they have a short, pointed tail, white at base and wings are rather long and rounded. Flocks of these open-land grouse were once so large that pioneers said they sometimes blocked the sun. But as grasslands and brushlands have

disappeared, so have sharp-tailed grouse. Michigan Breeding Bird Atlas data indicated that sharp-tailed grouse was present in low numbers from Isle Royale to Drummond Island in the Upper Peninsula (Reilly 1991). Most U.P. counties east of Marquette (but not Baraga, Houghton, or Keweenaw) had confirmed sharp-tailed grouse breeding during the first Michigan Breeding Bird Atlas or known breeding occurrences from the Michigan Natural Features Inventory database (MNFI 2007). Although sharp-tailed grouse is classified as a game bird and was previously hunted in Michigan, hunting is currently limited due to the small population size.

Aagask Habitat:
Michigan is on the eastern edge of the occupied sharp-tailed grouse range in the United States. The primary sharp-tailed grouse range in Michigan during the 1990s was the eastern Upper Peninsula where distribution and abundance was associated with availability of relatively large grassland and grassland-shrub complexes. Sharp-tailed grouse use a wider variety of habitats than their close relatives prairie-chickens. Habitat selection and usage vary by season with lekking, nesting, brood rearing, and winter habitat selected and utilized differently. If trees begin growing up in open areas, the sharptails abandon the habitat. During the summer and fall, sharptails eat a variety of weed seeds and small grains. During the winter, buds and twig ends of yellow birch, paper birch, and aspen are favored. Chicks eat mainly insects during the summer.

Aagask Threats:

- Predators - great horned owls, goshawks, foxes, skunks, and raccoons
- Loss of contiguous non-forested habitats
- Habitat fragmentation has been one of factors driving the decline

Aagask Stewardship Actions:
- Work with GLIFWC and other partners to explore habitat suitability for sharptails
- Controlled burning and tree clearing prevents some open brushlands and grasslands from turning into woodlands and benefits sharptails
- Lekking habitat can be managed by burning, mowing, clear cutting, and grazing
- There is some evidence that sharp-tailed grouse populations are cyclic over about ten-year intervals, so decades of monitoring may be required to resolve changes in abundance

3.5.4 Ondendeshiinyag – (MIGRATORY BIRDS)

Ondendeshiinyag Relationship with First Peoples:
Birds play many roles for the Anishinaabe. Crows and Ravens are scouts, they tell you something is happening or there is something ahead. Ruffed Grouse are put here to be the startlers, they scare you when you walk through the woods to keep you vigilant. Owls and woodpeckers are messengers, usually of sickness or strife but they do not cause it. Songbirds speak to the Creator every morning and tell him what you did yesterday; whether you were good or bad. Owl is the chief of night birds and accompanies the 3rd level Midewin into the Lodge. Eagle is the chief of day birds. Loon is

> "In their positive personal relationships with humans, owls provide aid in distressing times and tell the future. An owl's sonorous hoot and its concerned expression reassure the Ojibwe that they will live long lives." Michael Pomedli

the chief of water birds and a subclan of the crane. (Harlan Downwind, Personal Communication) According to the 2013 community survey, 86% of respondents enjoy observing wide varieties of birds and 63% feed wild birds on their property.

Brief Descriptions by Group

Waterfowl (*Anseriformes* spp.) are aquatic birds including swans (waabizii), geese (nika), and ducks (many species of ducks and mergansers), that have long necks, narrow pointed wings, and webs between three front toes; most have short legs and flattened bodies. Their flat bills with toothy edges act like strainers when foraging. They are well insulated with downy feathers and their young can walk and swim within a few hours of hatching. **Loons** (*Gaviiformes*) are in a separate order of birds and specialize in swimming and diving, coming ashore only to breed. The Common Loon maang (*Gavia immer*) is the most abundant loon in the East, breeding along lakes and rivers and is a culturally significant bird and clan animal for the Ojibwe. See annual KBIC waterfowl index reports.

Marsh Birds, (*Gruiformes* spp.) including herons, bitterns, cranes, coots, rails, and soras, are a diverse group of wading birds with long legs that move around in tall grasses and cattails usually without being noticed and they use their environment to the fullest. Many have long toes enabling them to run on grassy vegetation on the surface of the water while others prefer deeper water in which they can forage.

Shorebirds (*Charadriiformes* spp.) including plovers, sandpipers, and gulls, form a large group of highly migratory wading or swimming birds, most white and gray or brown with long pointed wings, long legs, and webbed feet. They can be found throughout North America along our water's edges across the land. Some prefer saltwater but others can be found in salt and fresh water sites depending on the season.

Songbirds or Perching Birds (*Passeriformes* spp.) are a diverse group of small to medium sized birds with feet well adapted for perching, having three toes in front and one long toe behind. With a vast variety of bill shapes, feather colors, and habits, most are beautiful singers and are highly migratory, especially the insect, fruit, and seed eaters who must travel seasonally for food (such as warblers, wrens, flycatchers, and thrushes). Others, like chickadees, are adapted to stay and endure the winter.

> It is the hammering sound of the Papasay (woodpecker) that announces the approach of a visitor. "Someone is coming, expect someone, expect something, someone is coming!" Benton-Banaii 1988

Corvids (Jays, Crows, Ravens) are large, noisy, gregarious, omnivorous birds that are mostly blue, gray, or all black. Blue Jays and Gray Jays are present in our area and are medium sized birds with heavy bills, short rounded wings, and long rounded tails. Common Ravens and American Crows are large flocking birds with solid black plumage and cawing or croaking calls and are present year round in the north. Crows are smaller and have a shorter flat tail tip whereas ravens have a distinctive pointed wedge-shaped tail. Corvids are often scolded and chased by smaller birds especially in nesting season.

Hummingbirds, Kingfishers, and Woodpeckers are in separate orders of birds and are important members of the northern ecological communities with their unique qualities as pollinators, fishers, and cavity makers.

Birds of Prey (Raptors) are large carnivorous birds with keen vision, strong talons, and sharp beaks including the vultures, hawks, eagles, osprey, falcons, and owls. They are capable of taking live prey and also benefit from carrion. As top predators in food webs they face complex threats and conservation challenges. They are important components of natural communities and healthy ecosystem functioning and by protecting them and their habitat many other species will benefit.

Ondendeshiinyag Threats:

- Loss of critical breeding and migratory stopover habitat to human development and habitat alteration
- Toxins including pesticides, herbicides, oil spills, lead, pollution
- Collisions with towers, automobiles, plate glass windows, wind turbines
- Predation by wild and domestic animals
- Introduced exotic species including disease, plants, invertebrates

Ondendeshiinyag Stewardship and Monitoring Actions:
Landscape level habitat stewardship with focus on preserving the breeding, nesting, and feeding habitat for our native birds will also benefit the whole community of species who thrive here. Habitat for game birds can be managed by maintaining aspen forests for a variety of age class distribution and associated early successional forest composition which benefits many other species including moose, deer, bear, and snowshoe hares. Regenerating or young upland dominated deciduous forests with small openings and suppression of non-native invasive shrubs in favor of native shrubs provides critical habitat. Marsh bird monitoring will include species detection and habitat evaluation, we will provide stewardship recommendations to enhance or protect prime habitat and seek funding for implementing projects.
Specific stewardship and monitoring actions that are warranted include:

- Monitor diverse species of song birds and marsh birds for evaluating health of ecosystems and for early detection of habitat changes/degradation
- Ensure that alternative energy initiatives (large scale wind turbines and/or solar fields) on and near the Reservation are not located in flyways or otherwise dangerous to bird populations
- Protect or enhance contiguous habitat that will support a healthy and diverse population of birds
- Retain cavity trees, coarse woody debris, snags, stumps, and downed logs for microhabitat used for nesting, escape cover, and insect larvae needed for food
- Map and monitor colonial roosting areas (i.e. great blue heron rookeries) and breeding locations of rare/sensitive species (i.e. trumpeter swan)

3.6 Amphibians and Reptiles

Goal: Protect and conserve amphibians and reptiles and their habitats on KBIC lands.

Objective 1: Monitor population trends to determine status of populations through time.

Strategies:

- Continue to monitor frog and toad populations at established index stations
- Increase effort to monitor turtles, snakes and salamanders
- Utilize citizen scientists such as summer youth and other groups to assist with monitoring efforts
- Produce a species list and distribution of herps in various habitats
- Verify presence/absence of threatened, endangered or sensitive species
- Utilize methods consistent with regional monitoring efforts
- Share information from index stations and other surveys with regional monitoring programs

Objective 2: Protect or enhance habitat for amphibians and reptiles
Strategies:

- Identify locations and establish buffers around vernal pools (seasonal standing water)
- Provide rock piles in suitable habitat for reptiles
- Use best management practices to avoid logging in wet areas until winter
- Maintain or increase coarse woody debris, snags, cavity trees, and downed logs

3.6.1 Amphibians of Upper Michigan (Frogs, Toads, Salamanders, Newts)

Omakakii (FROGS)

•Northern Spring Peeper (*Pseudacris crucifer*)
•Gray Treefrog (*Hyla versicolor and H. chrysoscelis*)
•Green Frog (*Rana clamitans*)
•Mink Frog (*Rana septentrionalis*)
•Bullfrog (*Rana catesbeiana*)
•Wood Frog (*Rana sylvatica*)
•Northern Leopard Frog (*Rana pipiens*)
•Pickerel Frog (*Rana palustris*)

Babiigomakakii (TOADS)

•Eastern American Toad (*Bufo americanus*)

Okaadiginebig (SALAMANDERS)

•Mudpuppy (*Necturus maculosus*)
•Blue-spotted Salamander (*Ambystoma laterale*)
•Spotted Salamander (*Ambystoma maculatum*)
•Eastern Newt – red spotted newt (*Notophthalmus viridescens viridescens*)
•Red-backed Salamander (*Plethodon cinereus*)
•Four-toed Salamander (*Hemidactylium scutatum*)

Amphibian Relationship with First Peoples:
As told by Harlan Downwind, frogs and toads provide some of the strongest medicine. They are known as healers for those seeking deeper spirituality. They once took up residence in a dormant sweat lodge on Sugar Island. This was very good medicine. After temporarily spooking the

frogs away, the lodge was placed back the way it was for the frogs to return.

Amphibian Brief Description:
Amphibians are important members of the ecological communities they live in. They were the first animals with backbones to adapt to living on the land, but water is also essential to their existence. Most amphibians begin life as aquatic larvae with gills and then transform into being able to live on the land. The amphibians that inhabit the Upper Peninsula of Michigan are hardy ectotherms (cold-blooded animals) that get their warmth from their surroundings, so they must be adapted to cold and freezing temperatures to survive in upper Michigan (Harding and Holman 1999). Most frogs and toads become dormant in winter and some, like the wood frog, can survive extracellular freezing while overwintering with biochemicals that act like antifreeze (Costanzo and Lee 1993). Some species of salamanders hibernate in winter but others that are fully aquatic remain active in the winter. In recent decades, there has been a dramatic decline in amphibians worldwide. Amphibians' skin acts as a secondary respiratory surface; this permeable skin and their complex reproductive processes often make amphibians good candidates as ecosystem health indicators.

Amphibian Habitat:
Frogs and toads inhabit wetlands and woods in mixed conifer/hardwood forests (Werner et al. 2007). Salamanders spend most of their lives beneath woodland soils and debris or in the waters of ponds and lakes nearby. They rely on wetlands in forested areas while uplands provide mixed hardwood soils and coarse woody debris (Holman 2004). Amphibians are particularly vulnerable to human encroachment, degradation of habitat that includes loss of wetland, vernal pools and coarse woody debris.

Amphibian Threats:
- Water pollution and chemical pesticides
- Destruction and degradation of wetlands
- Off-road vehicles and automobiles especially during migrations
- Destruction of vernal pools from development and/or logging practices
- Climate change
- Lack of coarse woody debris

Amphibian Stewardship Actions:
Habitat stewardship for amphibians focuses on protection, restoration, and reclamation of forested wetlands which also benefits the entire ecological community they are part of. Monitoring presence and abundance of amphibians through surveys gives insight into their survival and the health of the ecosystem. Surveys are most effectively conducted in the spring and early summer months.

- Monitor populations using various methods
- Maintain high water quality in lakes, ponds, rivers and streams
- Control sedimentation and improve bank stabilization around wetlands and riparian areas
- Restore and/or maintain free-flowing watersheds
- Protect vernal pools with sizable buffer zones
- Retain or increase coarse woody debris, snags, stumps, cavity trees, and downed logs

3.6.2 Reptiles of Upper Michigan (Turtles, Snakes, Lizards)

Relationship with First Peoples:
Ojibwe sing special songs and dance in a circle in memory of the great flood event and re-creation of the earth. We also give special honor to our brother, the turtle. He bore the weight of the new Earth on his back and made life possible for the Anishinaabe. If you need to learn patience, you are to watch the turtle (Harlan Downwind, Personal Communication). Some Ojibwe display a snake often made of birch bark on the door of the house after a family member dies. This tells the departed spirit that they must journey alone.

> Snakes accompany the 8th degree Midewin into the Lodge. They are often messengers of sickness and bad times, but they do not cause it. They are actually some of the strongest healers. Harlan Downwind

Turtles- Mishiike

- •Common Snapping Turtle (*Chelydra serpentina*)
- •Blanding's Turtle (*Emys blandingii*) (rare in UP)
- •Painted Turtle (*Chrysemys picta*)
- •Wood Turtle (*Glyptemys insculpta*)

Snakes- Ginebig

Note: The Eastern Massasauga Rattlesnake (*Sistrurus catenatus catenatus*) is Michigan's only venomous snake and it is not found in the Upper Peninsula. All other species are non-venomous and harmless to humans.

- •Northern Red-bellied Snake (*Storeria occipitomaculata occipitomaculata*)
- •Eastern Garter Snake (*Thamnophis sirtalis*)
- •Northern Ring-necked Snake (*Diadophis punctatus edwardii*)
- •Western Fox Snake (*Elaphe vulpina*)
- •Smooth Green Snake (*Liochlorophis vernalis*)
- •Eastern Milk Snake (*Lampropeltis triangulum triangulum*) (isolated records in Marquette County)

Lizard - Beshaa okaadiginebig

Five-lined Skink (*Eumeces faciatus*) (mid-section of the Upper Peninsula)

Reptile Brief Description:
Reptiles are an animal group of vertebrates that includes turtles, snakes, and lizards. They breathe air and are cold-blooded animals that get their body warmth from their surroundings. Turtles have part of their skeleton on the outside of its body in the upper shell (carapace) attached to the back bones and ribs while the lower shell (plastron) is formed from the abdominal ribs and part of the shoulder. The shell is strengthened by an outer layer of overlapping scales (scutes) which connect the bones (Harding and Holman 1990). The greatest threat to turtles is illegal over collecting of their beautiful shells because they

> "Waynaboozhoo put the piece of Earth on the turtle's back. All of a sudden the noon-di-noon (winds) began to blow. The wind blew from each of the Directions. The tiny piece of Earth on the turtle's back began to grow. Larger and larger it became, until it formed a mi-ni-si' (island) in the water. Still the Earth grew but still the turtle bore its weight on his back." Benton-Benai

cannot live without them (Ewart et al. 1998). Snakes differ from other reptiles because they are legless and lack eyelids and external ears. They have a protective transparent scale over their eyes, they "hear" through vibrations in their skull and jawbones, and they smell odors through flicking their tongue, which is never used as a stinger (Harding and Holman 2006). Most people are not aware that we have lizards in Michigan but the Five-lined Skink has been located in the lower peninsula, in the mid-section of the UP and in Baraga County in 1996 (Pamela Nankervis, Personal Observation).

Reptile Habitat:
Turtles inhabit ponds, marshes, lakes, streams, slow rivers, and shallow weedy waters with muddy bottoms, although wood turtles often forage in woods, swamps, and meadows in summer and require wet herbaceous areas and associated riparian areas for foraging. Turtles eat both plants and animals including insects, small animals, carrion, plants, and fruits. They do not consume large numbers of fish and have little impact on the fishery. Snakes inhabit a variety of habitats including fields and woodlands hiding under logs and rocks, marshes, farmlands, and backyards, although the delicate little green snake prefers grassy places that make it difficult to be seen. Snakes eat earthworms, insects, amphibians, small animals, slugs, and snails. Skinks prefer moist wooded areas with significant cover and open basking sites including wood or brush piles, stumps, logs, rocky outcrops, and forest edges (Karns 1986).

Reptile Threats:
- Predation
- Illegal collection for pet trade
- Persecution by humans
- Habitat degradation and loss
- Toxins, parasites, and pathogens
- Lack of coarse woody debris

Reptile Stewardship Actions:
Michigan has recently enacted legislation to protect all native amphibians and reptiles. Rare and declining species are protected from harm and exploitation and all species are protected by limits on numbers being removed from the wild. Maintaining good water quality, controlling sedimentation, good forest management along riparian zones, and restricting pesticide use near waterways will provide good foraging, nesting, and basking habitat.
- Monitor populations
- Retain or increase coarse woody debris, snags, cavity trees, stumps, and downed logs
- Maintain high water quality in lakes, ponds, rivers and streams
- Control sedimentation and improve bank stabilization around wetlands and riparian areas
- Restore and/or maintain free flowing watersheds
- Educate the public about common misconceptions and importance of reptiles

3.7 Anooj Dinowag Giigoonyag (FISH)

Anooj Dinowag Giigoonyag Relationship with First Peoples:
Fishing in Keweenaw Bay has a lineage centuries long. Although humans have lived in the Great Lakes region for thousands of years, recorded Great Lakes legacy extends back to the

sixteenth and seventeenth centuries when European explorers, tradesmen, and missionaries came to the region (Doherty 1990). From their descriptive writings shaped the glory of the Lakes as well as the image of the Indian living in the Great Lakes region: he was a fisherman (Bogue 2000). Archaeological studies support this finding and indicate that sometime between 3000 and 2000 B.C., a considerable collection of fishing technology had been developed (spears, gaffs, hooks and lines, and weirs) and fishing nets were developed sometime between 300 and 200 B.C. (Bogue 2000). Anthropologist Charles E. Cleland described the significance of the fishermen as he concluded that the fishery "provides the most important single organizing concept for understanding the cultural development of this region" and that the seasonal spawning cycles "is the key to understanding the evolution of subsistence and settlement systems of the upper Great Lakes Indians" (Cleland 1982).

There is a social order for Fish Clans—sturgeon, bullhead, musky, northern pike, walleye and then sucker. They all maintain the health of the water for water spirits and each has specific roles to play in that protection (Harlan Downwind, Personal Communication). Presently, each and every family is woven to fishing in some way. As their ancestors did before them, subsistence fishermen continue harvesting for their families and community members as well as provide for both ceremonial and communal feasts (Gagnon 2014). Fishing is the strand of the cultural core that ties history to present day to future; it is a vital foundation for cultural beliefs and values, traditional lifeways, and even individual identity (Gagnon 2011).

Anooj Dinowag Giigoonyag Brief Description:

> "We turn our thoughts to the Fish life in the water. They were instructed to cleanse and purify the water. They also give themselves to us as food." R. Wall Kimmerer 2013

Fish play an important role in the entire ecosystem food webs including essential consumption for humans and other species, ecological community dynamics, socio-economic impacts, and health. Lake Superior and the nearby land have provided bountiful sources of food for the Anishinaabe over time and settlement on its shores has allowed tribal fishermen to harvest fish including lake trout, whitefish, and sturgeon. In the 1900s, increased fishing pressure and the introduction of exotic fish led to a drastic decline in native fish populations (Bronte et al. 2003). In recent years, and through decades of great effort (Doherty 2007; Wilkinson 2005), the treaty rights of the tribes have been upheld for both commercial and subsistence purposes in the landmark Michigan Supreme Court decision the *People vs. Jondreau* (1971). Ojibwe tribes have demonstrated commitment to protecting and preserving the Lake Superior fishery (Bienkowski 2013). Tribal biologists participate in monitoring, assessment, and on-reservation hatchery programs for preservation of this shared resource for generations to come.

Discovered late in the 1960s, additional hazards threaten fish populations and human health: toxic contaminants. On human health and toxic contaminants, the U.S. Environmental Protection Agency (USEPA) (2012a, 2012b) reports the following:

1) fish consumption is the primary route of human exposure to toxics
2) exposure causes immune deficiencies, reproductive diseases, neurological disorders, and cancers

3) the most vulnerable populations to toxic harm are developing children and those who depend heavily on marine diets

Decades of scientific evidence document multiple physical health concerns and impacts due to exposure to DDT, DDD, DDE, dioxin-like chemicals, methyl-mercury, PCBs, selenium, chlordane, and toxaphene. For a comprehensive review of the scientific studies concerning human health and toxic contaminants, see the Michigan Department of Community Health website, "Eat Safe Fish - Reports and Science.

Because fish consumption is the primary route of human toxic exposure, all fifty states, the District of Columbia, and many Native American tribes issue fish consumption advisories to mitigate exposure. In the early 1970s, advisories were intended to be a temporary policy measure (O'Neill 2004). At the time of this writing, fish consumption advisories cover almost half of the nation's lake acreage, river miles, and coastlines (USEPA 2012b). Jointly, the EPA and the Food and Drug Administration (FDA) have issued a nationwide mercury advisory for store-bought and restaurant fish; and thirty-eight states, including all of the Great Lakes states, have issued statewide mercury advisories for fresh-caught fish (MDCH 2013; OEPA 2014; USEPA 2011). Within the KBIC, more than seventy-five-percent of tribal members report fish as a primary source of subsistence (Gagnon, Nankervis, and Johnston 2013). GLIFWC has a long-standing mercury-monitoring program to ensure tribal members can safely exercise their off-reservation fishing treaty rights with guidance on *ogaa* (Walleye). View GLIFWC series of Mercury Maps for listing of mercury analyses from inland lakes within the 1842 ceded territory. Because exposure to risk accumulates unequally in marginalized populations (National Environmental Justice Advisory Council 2002), several KBIC departments and staff continue to collaborate with federal, intertribal, and state agencies as well as participate in multi-disciplinary scientific research in order to affect the policy and decision-making concerning contaminants and health. In addition to others, the KBIC asserts that advisories are not and should not be viewed as a permanent policy to address the problems associated with widespread fish contamination (National Environmental Justice Advisory Council 2002; O'Neill 2004, 2007; Wood 2007). To learn more about one of the current projects in which KBIC is a supporting partner, see: http://asep.mtu.edu/.

Selected Native Fish of Lake Superior
Adikaameg, Lake Whitefish – (*Coregonus clupeaformis*)
Chinamekos, Lake Trout (and Siscowet) – (*Salvelinus namaycush*)
Adikamig Lake Herring (Cisco) – (*Coregonus artedii*)
Ogaa, Walleye - (*Stizastedion vitreum*)
Name, Lake Sturgeon – (*Acipenser fulvescens*)
Namekos, Brook trout –(*Salvelinus fontinalis*)

Anooj Dinowag Giigoonyag Habitat:
Quality fish habitat requires healthy waters where fish can feed, spawn, breed, and grow to maturity (Magnuson 2010). Although Lake Superior supports fewer fish per surface area than the other Great Lakes, the improved health of the fishery in the past 40 years has enabled a large

suite of native fish species to thrive. Lake Superior waters and the whole ecosystem can be affected by threats from many sources and requires vigilant monitoring and environmental protection of the Lake Superior basin (Kitchell et al. 2000). GLIFWC and its member bands work with the Lake Superior Binational Program and the International Joint Commission to protect and preserve Lake Superior as an Outstanding Resource Water (ORW), and keep a watchful eye on any threat that could adversely impact the lake's water quality and surrounding land to preserve this precious resource habitat for the future.

Anooj Dinowag Giigoonyag Threats:

- Discharge of pollutants from industrial sources including mining and paper mills
- Legacy, ongoing, and emerging contamination by PCBs, mercury, pharmaceuticals, and other toxic pollutants
- Exotic aquatic invasive animals and plants
- Pathogens and parasites
- Siltation and other degradation of water quality
- Overharvesting
- Impeded stream connectivity throughout the watersheds
- Loss of shade trees to cold water streams
- Climate change

Anooj Dinowag Giigoonyag Stewardship Actions: Please refer to the KBIC Fisheries Management Plan for more specific strategies. Stewardship and monitoring actions focus on protecting, restoring, and maintaining healthy and productive habitat for fish including protection of coastal areas from pollutants and storm damage, identifying and preserving essential habitat for key species, controlling invasive species and parasites, and conservation of the fishery through monitoring quotas, seasons, and locations. Wildlife habitat, watershed, and riparian projects will consider healthy fish habitat and water quality when implemented. Population information from spring and fall assessments is essential in determining the health of an aquatic ecosystem and KBIC assessment results and fisheries objectives will be considered when planning wetland, lake, and riparian projects.
The Wildlife division of KBNRD will work to incorporate helpful strategies that benefit fish species when designing wetland/aquatic inventories and habitat restoration projects. The following goal and associated objectives and strategies (1-4) are from an updated *draft* of the IRMP 2013-2023 *in progress.*

Goal: To maintain and perpetuate comprehensive, pro-active and, when warranted, responsive fisheries stocking, research, conservation and management activities for local and regional fisheries.

Objective 1: Continue long-term monitoring of fisheries
Strategies:

- Conduct standardized spring, summer and fall lake trout surveys
- Conduct river and stream surveys to evaluate habitat, macroinvertebrate, and fish communities
- Continue to evaluate hatchery fish survival
- Work with partners to align monitoring methodology to standardized multi-agency lake sturgeon surveys in western Lake Superior

Objective 2: Continue walleye population monitoring and propagation

Strategies:

- Conduct long-term adult walleye population monitoring in Huron Bay and Portage Lake
- Establish inland lakes walleye survey schedules
- Acquire walleye survey capacity and capability (assessment nets, boat, etc.)
- Develop walleye egg collection and incubation plan for walleye production

Objective 3: Continue habitat monitoring, restoration, rehabilitation, and education efforts

Strategies:

- Continue to improve stream road-crossing connectivity
- Improve baseline and continued fishery data collections
- Acquire strategic wetland and riparian areas vital to lake and stream health
- Continue stream and lake habitat monitoring and improvement efforts
- Maintain riparian health including overall watershed connectivity, bank stabilization, shade tree coverage and coarse woody debris
- Improve public access and use of Sand Point Kids Derby Pond and other areas
- Educate and share fish contaminant information

Objective 4: Continue exotic/ invasive species monitoring

Strategies:

- Survey adult sea lamprey in the Silver River and possibly other systems
- Conduct non-native and exotic fish species data collections as per standardized fish surveys
- Educate and share invasive species information

Objective 5: Education and outreach within the community

Strategies:

- Continue collaboration with partner federal, intertribal, and state agencies
- Continue outreach of the cultural significance of the tribal fish harvest in collaboration with others
- Continue to participate and support multi-disciplinary scientific research with area Universities
- Continue surveying and incorporating KBIC fishing activities, practices, and values for stewardship plans
- Improve fish contamination outreach and health protection with the community

3.8 Rare, Threatened, or Endangered Species (Tribal, State, or Federally recognized)

Goal: To preserve, protect, and enhance rare, threatened, or endangered fish and wildlife populations and their habitats and ensure their continued existence for seven generations and beyond.

Objective 1: To identify and assess rare, threatened, or endangered species that may need protection and take steps to preserve or recover those species

Strategies:

- Verify presence/absence of threatened, endangered, or sensitive species on and around the KBIC reservations
- Work with tribal, federal, state agencies, and private groups and landowners to help prevent animals and plants within our region from becoming extinct or assist in recovery; including but not limited to conducting reintroductions and monitoring
- Monitor populations of identified rare, threatened, or endangered species to determine status of populations through time
- Utilize citizen scientists such as summer youth and other groups to assist with monitoring efforts
- Produce and distribute a list of rare species in various habitats
- Update tribal hunting code to protect albino animals from hunting or trapping
- Update tribal hunting code to protect at risk species from over-harvest
- Utilize methods consistent with regional monitoring efforts
- Share information and other surveys with regional monitoring programs

All white (albino) animals are sent as a messenger from the Creator. Each message is different depending on the times and species, but all are sacred.

Objective 2: Protect or enhance critical habitat for rare, threatened, and endangered species on and near tribal lands

Strategies:

- Work with tribal, federal, and state agencies, and private groups and landowners to help protect and enhance critical habitat
- Identify locations and critical habitat for rare, threatened, and endangered species
- Use best management practices to protect critical habitat
- Educate the community and private land owners about sensitive species and maintaining their habitats

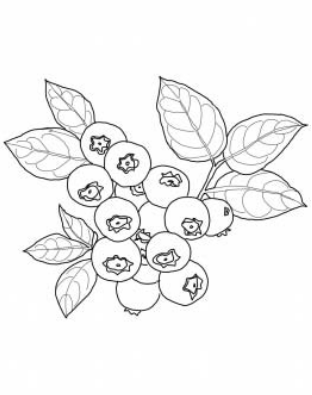
Please refer to the following resources for a full list of species:

- U.S. Fish and Wildlife Service Michigan Federally-listed Threatened, Endangered, Proposed, and Candidate Species
  http://www.fws.gov/midwest/endangered/lists/michigan-spp.html
  http://www.fws.gov/midwest/endangered/lists/pdf/MichiganSppListDec2013.pdf

- Michigan Natural Features Inventory http://mnfi.anr.msu.edu/data/specialanimals.cfm
  http://mnfi.anr.msu.edu/data/special_animals_list_categorized.pdf

3.9 Promoting Native Species

Non-native species of plants and animals can and often do out compete native species. Therefore, we will monitor and reduce negative impacts that local non-native species impose on our natural environment. KBIC NRD has invasive species control protocols and continuously monitors and maintains various locations throughout the reservation to ensure native plants persist and preferably thrive to protect the highest quality of habitat possible for local wildlife. Current examples of habitat quality management activities include but are not limited to monitoring and/or control of: purple loosestrife, swamp thistle, garlic mustard, spotted knapweed, Japanese barberry, reed canary grass, Eurasian phragmites, Eurasian water milfoil, various buckthorn, honeysuckle and knotweed. A program to implement an aquatic invasive species management plan has also been initiated to address the monitoring, control and spread of a wide variety of aquatic species.



We are fortunate to live in an area where non-native wildlife is currently a smaller, yet equally important concern. Most of our non-native animal species that are known to be problematic are aquatic and include sea lamprey, round goby, Eurasian ruffe, alewife, rainbow smelt, three spine stickleback, rusty crayfish, zebra mussel, quagga mussel, Asian clam, New Zealand mudsnail, and various other species of snails and water fleas.

Some terrestrial wildlife such as cormorants, mute swan, and brown headed cowbirds cause site specific concerns that may require human intervention to help enhance conditions for native wildlife. For example, mute swans are very aggressive when breeding and will displace geese, trumpeter swans, or loons from prime breeding habitat. Cowbirds can have devastating effects on threatened species that struggle to recuperate such as the Kirtland Warbler. Even certain species of earthworms can be detrimental to forest communities because soils become more clay-like due to worm castings and cause barren patches of limited vegetative growth in otherwise healthy forests.

Promoting Native Species GOAL:
To preserve, restore or enhance populations of native plants and wildlife.

Promoting Native Species Objective 1: Establish or expand our KBIC invasive species program

Promoting Native Species Actions:

- Work to provide a leadership role in regional based initiatives such as weed management cooperatives and other cooperative initiatives (i.e. Partnering for Watershed Restoration)

- Develop a Non-native Management Plan to establish clear goals and actions that will control the encroachment of non-native species

- Inventory streams, ponds, lakes for baseline data on aquatic plants to identify potential invasive issues and unrealized cultural resources as well as map locations of terrestrial invasive species

- Create a Non-native Species Coordinator position to better integrate field work with partner agencies, improve public education, recruit volunteers, increase monitoring efforts, and conduct control efforts that will reduce non-native species on and around the reservation for both aquatic and terrestrial resources

- Coordinate with partners and incorporate protocols for plant or animal population control methods when they help to achieve specific ecological outcomes such as improving watershed connectivity, enhancing wild rice productivity, etc. and such actions do not threaten the overall population stability of any native species

Promoting Native Species Objective 2: Expand our KBIC native plant species propagation and planting program

Promoting Native Species Actions:

- Expand our native propagation to include cultivated seed orchards for cultural, medicinal, and important wildlife food plants

- Locate more project areas to replace non-native species with propagated native species

- Seek to grow enough native seed and/or plants to provide to other KBIC Departments and partner agencies

- Seek to work more closely with the KBIC Traditional Clinic and Forestry Department to identify propagation needs

Promoting Native Species Objective Three: Work with other KBIC Departments and partners in State, Federal and Private organizations to enhance our ability to contribute to state and regional initiatives for controlling invasive species and promote native species.

Promoting Native Species Actions:

- Expand our aquatic invasive species program to include monitoring and controlling all possible threats including plant and animal

- Continue to work with partner agencies to monitor and/or control sea lamprey, and expanding populations of non-native mute swans, cormorants, and other species on State and Federal watch lists

- Continue to work with partner agencies to monitor and control aquatic and terrestrial invasive plant species

- Work to bolster or re-introduce populations of native species of wildlife and plants

3.10 Interspecies Co-existence

Concerns that people often have with living in areas surrounded by wilderness is the occasion for conflicts between people and wildlife. Conflicts often include nuisance wildlife complaints (i.e. crop damage, garbage and bird feeder raids), depredation (i.e. loss of life to pets or livestock), displacement (i.e. animals such as raccoons or skunks in buildings, injured wildlife) and perceived human-safety violations where people are uncomfortable with close encounters with wildlife on their personal property. It is extremely rare for any actual physical altercation or harm to be initiated by wildlife toward humans.

Interspecies Coexistence GOAL:
To promote peaceful coexistence between people and wildlife.

Interspecies Coexistence Objective 1: Respond to conflict complaints in a timely manner.

Actions:
- Work with KBIC Conservation, State and Federal partners to coordinate the most timely response action on a case by case basis
- Train with partner agencies to maintain up to date and consistent protocols for response
- Purchase and maintain necessary equipment for capture and handling of displaced or injured wildlife
- Take an active role in assisting State and Federal partners to develop thoughtful, humane and ecologically sound control measures (i.e. planning for mammal damage management in Michigan for USDA APHIS Wildlife Services)
- Utilize non-lethal methods whenever possible; minimize lethal control to be determined on a case by case basis

Objective 2: Provide public education on how to avoid conflict with wildlife.

Interspecies Coexistence Actions:
- Work with partners to develop and distribute educational materials and provide presentations for avoiding conflicts with wildlife
- Increase distribution of educational materials about wildlife to increase general knowledge and dispel common misconceptions

4. Wildlife Health

Goal: To maintain healthy thriving wildlife populations on and around tribal lands by safeguarding wildlife health and implementing disease prevention to the fullest extent possible, recognizing that the health of wildlife is vital to the sustainability of the Earth's ecosystems

Wildlife Health Objective 1: Develop and maintain prevention efforts regarding threats to wildlife health on and around tribal lands

Strategies:

- Conduct habitat management activities in a way that preserves diversity of plant and animal species and wide distribution across the landscape
- Educate landowners about importance of habitat diversity for disease prevention
- Avoid practices that concentrate populations of animals in small areas
- Educate landowners and the general public about wildlife disease and the need to discourage high density concentrations of animals (i.e. recreational feeding)
- Educate the general public about importance of domestic animal vaccination and tracking of livestock (i.e. ear tags)
- Address threats posed by toxins, infectious diseases, and non-infectious diseases of wildlife before they become epidemic

Wildlife Health Objective 2: Partner with local, state, and federal agencies in the investigation, research, surveillance, response, and reporting of endemic and emerging wildlife diseases

Strategies:

- Work with partners to align monitoring methodology to better collaborate on population assessments
- Conduct proactive targeted surveillance for early detection of wildlife diseases
- Train KBNRD wildlife personnel in wildlife disease investigation and reporting techniques
- Educate community on recognizing signs and symptoms of disease in wildlife
- Provide an avenue to report potentially diseased animals
- Investigate reports of diseased or dying animals
- Identify pathogens and causes of morbidity/mortality of wildlife utilizing a network of specialized partners
- Promote reporting and sharing of information between agencies
- Monitor wildlife disease presence through hunter surveys and community reporting
- Maintain vigilant contaminant monitoring programs in aquatic and terrestrial habitats as well as in vulnerable species for bioaccumulation such as fish

Note: See specific surveillance, monitoring, and prevention actions under each wildlife disease

Wildlife Diseases – Descriptions, Prevention, Surveillance, and Response
An ever increasing number and escalating incidence of wildlife diseases have been noted in recent years affecting a wide range of wildlife including birds, fish, amphibians, bats, furbearers, and large mammals. Humans contribute to introductions of disease through degradation of habitat (including environmental contaminants), transportation of invasive species (intentionally and unintentionally), and exposing wildlife to sources of infections, toxins, and disease (including from domesticated animals). Many emerging infectious diseases can be traced to translocation of animals and plants, invasive species, wildlife feeding, and high density populations where disease is easily spread. Prevention and reduction of wildlife diseases are dependent upon proactive education, surveillance, monitoring, reporting, and sharing of information by community members. Wildlife diseases of concern include but are not limited to the following:

4.1 Chronic Wasting Disease (CWD)

CWD is a contagious neurological disease affecting deer, elk, and moose but is not known to infect livestock or humans. No treatment is known and it is typically fatal. It causes a characteristic spongy degeneration of the brains of infected animals resulting in emaciation, abnormal behavior, loss of bodily functions, and death. The infectious agents are considered to be prions and the disease may be spread both directly (animal to animal contact) and indirectly (soil or other surface to animal), most likely through the saliva and feces of infected animals, or decomposing carcasses. In Michigan in 2008, CWD was confirmed in a captive white-tailed doe from a privately owned facility in Kent County in the lower peninsula. Hunters and others should avoid eating meat from deer and elk that look sick or may have CWD. Hunters importing harvested free-ranging deer, elk or moose from Colorado, Illinois, Kansas, Maryland, Minnesota, Missouri, Nebraska, New Mexico, New York, North Dakota, South Dakota, Texas, Utah, Virginia, West Virginia, Wisconsin, Wyoming, Alberta or Saskatchewan are restricted to bringing into Michigan only deboned meat, antlers, antlers attached to a skull cap cleaned of all brain and muscle tissue, hides cleaned of excess tissue or blood, upper canine teeth or a finished taxidermic mount (MDNR 2014 CWD).

CWD Prevention and Surveillance Actions:

- Avoid over-crowding of deer in artificial feeding areas; limit feed amount and distribute widely
- Work with partners and the public to collect samples from deer that appear sick, road-killed deer, and hunter-harvested deer
- Hunters should shoot only healthy-appearing animals, and take usual precautions like wearing rubber gloves for field-dressing and washing thoroughly when finished
- Educate the community on CWD information, prevention, where to report animals exhibiting symptoms, and proper handling of carcasses
- Address potential routes of transmission if CWD is detected; regulate artificial feeding, modify hunter harvest rates accordingly, evaluate and modify land management to avoid dense concentration of deer in small areas

4.2 Epizootic hemorrhagic disease (EHD)

EHD is an acute, infectious, often fatal viral disease of wild ruminants, characterized by extensive hemorrhages in deer. The disease is not transmitted directly from one deer to another but must go through the insect vector, most commonly a tiny biting midge, *Culicoides variipennis*. EHS may be suspected in instances of unexplained deer mortality during late summer or early fall, especially if characteristic signs are present. Infected deer initially lose their appetite and fear of humans, grow progressively weaker, often salivate excessively, develop a rapid pulse and respiration rate, fever, and finally become unconscious. Affected animals frequent bodies of water to lie in to reduce their body temperature. Hemorrhage and lack of oxygen in the blood results in a blue appearance of the oral mucosa (roof of the mouth and tongue), hence the name 'bluetongue'. As of 2013 in Michigan, EHD was diagnosed in 7 deer from 6 counties in the lower peninsula (MI DNR 2014). The edibility of the venison is not impacted by the disease. There is no evidence that humans can contract the EHD virus either from the midge or from handling and eating venison. Pets and other wildlife cannot be infected by either midges or from EHD infected deer carcasses. There are presently no known strategies available to prevent or control EHD but typically it does not decimate local deer populations and is curtailed by the onset of cold weather. Simultaneous infections can occur in domestic cattle and sheep, most cases however, are subclinical.

EHD Prevention and Surveillance Actions:

There are presently no known strategies available to prevent or control EHD but typically it does not decimate local deer populations and is curtailed by the onset of cold weather.

- Educate hunters on what to look for in their deer including hoof abnormalities and EHD lesions
  http://www.michigan.gov/documents/emergingdiseases/EHD_chkst_guide2_402277_7.pdf
  http://www.michigan.gov/documents/emergingdiseases/EHD_chkst_guide1_402276_7.pdf
- Monitor local deer populations and hunter harvested deer for signs of EHD
- Educate the community on EHD
- Work with partner agencies on reporting outbreaks and sharing information

4.3 Bovine Tuberculosis (BTB)

BTB is an infectious disease caused by the bacterium *Mycobacterium bovis*. Bovine TB is spread through the air when an infected animal is in close contact with other animals. Bacteria released into the air through coughing and sneezing can spread the disease. Current research suggests that BTB can also be contracted from contaminated feed. Close contact between deer and other animals at feeding locations is the likely point of transmission. Bovine TB is a chronic disease in deer and it can take years for lesions to develop in the lungs. Infected deer have tan or yellow lumps on the inside surface of the rib cage and in the lung tissue. Surveillance of hunter-harvested deer in Michigan has found BTB is rare and is only found in the lower peninsula. BTB-positive deer in surveillance surveys have lesions in the chest cavity or lungs that would be recognized as unusual by most deer hunters. If lesions are found, the meat should not be eaten. No moose in Michigan have been found to have BTB. Humans can contract *M. bovis* by eating or drinking contaminated, unpasteurized dairy products. The pasteurization process, which destroys disease-causing organisms in milk by rapidly heating and then cooling the milk, eliminates *M. bovis* from milk products. Infection can also occur from direct contact with a

wound, such as what might occur during slaughter or hunting, or by inhaling the bacteria in air exhaled by animals infected with *M. bovis*. Direct transmission from animals to humans through the air is thought to be rare, but *M. bovis* can be spread directly from person to person when people with the disease in their lungs cough or sneeze.

BTB Prevention and Surveillance Actions:

- Encourage vigilant livestock testing for TB
- Avoid providing domestic livestock feeding areas that allow access for deer or other wildlife
- Store domestic feed in areas where wildlife cannot access it
- Monitor local deer populations and hunter harvested deer for signs of BTB
- Educate community on recognizing lesions in chest cavity or lungs of deer
- Work with partner agencies on reporting outbreaks and sharing of information

4.4 Canine parvovirus

Canine parvovirus is a contagious and serious disease that is caused by a virus mainly affecting domestic dogs and wild canids but not humans. Canine parvovirus emerged as a global pandemic around 1978 with what was considered small spill-overs into wild animal populations. The disease is highly contagious and is spread from dog to dog by direct or indirect contact with their feces and can be transmitted by any person, animal, or object that comes in contact with infected dog feces. It can be especially severe in puppies that are not protected by maternal antibodies or vaccination. Highly resistant, the virus can live in the environment for months. The general symptoms of parvovirus are lethargy, severe vomiting, loss of appetite, and bloody, foul-smelling diarrhea that can lead to life-threatening dehydration. Vaccines can prevent this infection in domestic animals, so it is of great importance for dog owners to vaccinate their dogs to prevent the potential spread of infection between wildlife and domestic animals. The extent to which canine parvovirus affects wild populations of canines is not well documented, but wolves have been shown to die from parvovirus and the virus may limit growth of populations (Mech et al. 2008). A recent study done at the Baker Institute for Animal Health has found many wild carnivores carry the virus and that it is relatively easy to transmit between wild carnivores and domestic animals (Allison et al. 2014).

Canine Parvovirus Prevention and Surveillance Actions:

- Encourage vaccination of domestic dogs and cats
- Avoid interactions between wild animals and domestic animals (or their feces)
- Do not attract carnivores by leaving pet food outdoors
- Report and track observations of sick wild carnivores

4.5 White-Nose Syndrome in Bats (WNS)

WNS is an emergent disease of hibernating bats that has spread from the northeastern to the central United States at an alarming rate. Since the winter of 2007-2008, millions of insect-eating bats in 22 states have died from this devastating disease. The disease is named for the cold loving white fungus, *Pseudogymnoascus destructans* (formerly known as *Geomyces destructans*) which infects skin of the muzzle, ears, and wings of hibernating bats, and arouses them frequently causing a severe depletion of

fat reserves. Bats weakened by the loss of fat reserves are unable to replenish them due to lack of food (insects) in winter and die before spring. It is not harmful to humans, and does not grow on bats during the summer months or when bats are at typical active temperatures. This fungus has been confirmed to be the causative agent of the disease and can be spread by bat to bat contact or by humans carrying the virus on their shoes or clothing into caves that are used as bat hibernacula. WNS has been recently confirmed in the upper peninsula of Michigan in Little brown myotis bats in Dickinson County. It is a threat to other species of bats here considering the migratory nature of bats and the abundant caves in the UP that bats use as winter hibernacula. The emergence and spread of a pathogenic fungus that infects hibernating bats has the potential to undermine the basic survival strategy of more than half the bat species in the U.S. and all species of bats that occur in the higher latitudes of North America. Although the true potential for this fungus to spread is unknown, the possibility of it undermining the ubiquitous survival strategy of bats at higher latitudes has enormous implications. We are just beginning to appreciate the roles that bats play in North American ecosystems, and it is clear that threats like white-nose syndrome have the potential to influence ecosystem function in ways that we currently do not understand (Cryan 2010).

WNS Prevention and Surveillance Actions:

- Protect bat hibernacula from human disturbance
- Avoid lethal means of removing bats from human dwellings
- Monitor bat populations to detect changes in numbers and species occurrence
- Work with partners to educate the community on prevention and reporting of WNS
- Ask community members to report observations of bats with unusual behavior like flying in the daytime or winter or difficulty flying, dying or dead bats at the entrance to caves
- Work with partners to monitor the occurrence and spread of WNS or other disease and mortality

4.6 Rabies

Rabies is a viral disease that is spread when an animal or human is bitten or scratched by an affected animal. It generally persists in nature as a salivary gland infection of carnivorous animals. Rabies attacks the nervous system and is virtually always fatal, however, proper post-exposure treatment is nearly 100% effective. It is most commonly found in bats, raccoons, skunks, red fox. In Michigan, it is mostly bats and skunks that harbor the virus and mostly concentrated in the northeast area of lower Michigan (State of Michigan 2014). Unvaccinated pets or livestock can also be infected. Rabies in domestic animals can be controlled by vaccination. Because the majority of rabies cases in people in the United States are contracted from wild animals, people should avoid contact with them. Signs in an animal which should lead you to suspect that it may be rabid are: nervousness, aggressiveness, excessive drooling and foaming at the mouth, losing their fear of human beings, animals normally active at night being seen during the day.

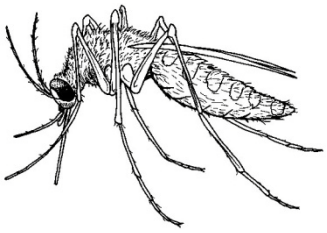
Rabies Prevention and Surveillance Actions:

- Educate the public on the importance of rabies vaccinations in domestic pets to prevent transmission
- Educate the public on avoiding contact with wildlife or stray animals
- Report all cases of suspicious behavior in animals to partner agencies and proper authorities

- Report all animal bites to health authorities
- Submit suspect animal carcasses to proper authorities as warranted

4.7 West Nile virus (WNV)

WNV is a mosquito-borne virus that can cause encephalitis (inflammation of the brain) and/or meningitis (inflammation of the lining of the brain and spinal cord). Outbreaks of the disease have occurred worldwide, first seen in the US in the fall of 1999. WNV was first detected in Michigan in 2001 and has been found in Michigan each year since 2001. WNV primarily infects and multiplies in birds, which serve as reservoirs for the virus. The virus is spread between birds mostly through the bite of an infected mosquito. The virus has been detected in a total of 48 species of mosquitoes, over 250 species of birds, and at least 18 mammal species including humans (National Wildlife Health Center 2014). When the level of virus circulating amongst birds and mosquitoes becomes high, horses and humans can be accidentally infected. The virus also has been shown to infect several other types of mammals (including bats, cats, chipmunks, squirrels, skunks, and domestic rabbits) usually without causing clinical signs. Currently vaccines are available for preventing WNV in horses, which are highly susceptible to WNV, but there are no vaccines for humans, pets, or birds.



It is unclear what the long term affects will be of this virus on North American bird populations. Most corvids (especially crows and blue jays) infected with WNV die within 3 weeks of infection. Clinical signs prior to death may include uncoordinated flying or walking, weakness, lethargy, tremors, and abnormal head posture. Humans can be infected with WNV from mosquitoes and develop flu like symptoms but many people will have no symptoms.

WNV Prevention and Surveillance Actions:

- Vaccinate horses again WNV
- Report and share information about outbreaks in avian species (frequent sightings of sick or dead birds)
- Use preventive measures for controlling human and pet exposure to mosquitoes
- Educate the public on how to reduce the proliferation of mosquitoes (dispose of standing water around yards and buildings)
- Work with partners to study WNV and the potential effects on bird populations
- Monitor birds using census techniques and share information with regional bird inventories

4.8 Deer Fibromas

Deer fibromas (papillomas, fibromas, or papillofibromas) are usually benign viral wart-like growths fastened to the skin of white-tailed deer and other members of the deer family. They are popularly referred to as skin tumors or simply warts. They are firm, hairless, gray or black in color, can be smooth or rough in texture, as small as peas or as large as footballs, and may grow in clusters. Sometimes they can become so heavy that they hang like a pendulum from the deer. They may be found anywhere on the animal's body but occur most frequently about the eyes, neck, face, and forelegs. These growths are caused by viruses that are contagious only within the same species. Typically they will eventually outgrow their blood supply, dry up and disappear. Fawns exposed to the papilloma virus can develop immunity early in their life. Transmission is

through contact of broken skin with infectious material, either from an infected deer or vegetation which has been rubbed or brushed by an infected deer. The fact that the incidence is highest among young bucks suggests that fighting is a means for the spread of the disease. Biting insects may possibly be responsible since many viruses are transmitted by insect vectors. Infected deer behave normally unless the location of the fibromas blocks vision or results in other physical impediment to normal activities. Fibromas involve only the skin and have no direct effect on the general health of deer and are not an important cause of deer mortality. Although fibromatosis does not affect the meat, the ugly-looking lumps are repulsive to most persons. Deer hunters who harvest an animal with fibromas can simply trim them away while butchering for meat, leaving the venison unaffected and suitable for consumption.

Deer Fibromas Prevention and Surveillance Actions:

- Educate the community on the appearance, cause, and distribution of fibromas in deer
- Inform hunters about trimming away fibromas when butchering deer leaving the venison suitable for consumption

4.9 Mange

Mange (Sarcoptic and Notoedric) is a serious skin disease of mammals caused by a tissue-burrowing mange mite. Many varieties of mange mites exist but the ones most often identified as the cause of mange in Michigan wildlife are *Sarcoptes scabiei* and *Notoedres centrifera*. The mites are too small to be seen with the naked eye, but skin changes brought on by infestation can be dramatic. In Michigan, sarcoptic mange has been reported in red fox, coyote, gray wolf, porcupine, black bear, cottontail rabbit, and raccoon. Red foxes are particularly vulnerable to mange and marked decline of foxes in several states has been attributed to mange. Notoedric mange has been found in the eastern fox squirrel and the gray (black) squirrel. Sarcoptic and notoedric mange mites spread to new hosts through direct body contact or by transfer from common nests and burrows. Notoedric mange mites are host specific for squirrels and are not transmissible to either canid or felid pets but sarcoptic mange mites are less host-specific than originally believed potentially allowing transfer between dogs and wild canids. Sarcoptic mange is characterized by thinning and loss of hair, thickening and wrinkling of the skin, and scab and crust formation, in severe cases leaving the animal emaciated and weak. Notoedric mange results in hair loss, first over the chest and shoulders, but progressing over the entire body. In extreme cases nearly the entire body is bare and the exposed skin becomes thickened and dark. Sarcoptic mange mites are known to transfer from animal hosts to people, so persons handling mangy animals should take reasonable precautions. Notoedric mites are not transmissible to humans. Since transmission is typically through direct contact, outbreaks tend to occur during times of high population densities of affected animals and can be cyclic (Pence and Uekermann 2002).

Mange Prevention and Surveillance Actions:

- Educate the community about the signs of mange in wild animals and potential transfer of sarcoptic mange between pets and wild animals if direct contact occurs with live, dying or freshly dead carcasses of infected wildlife

- Maintain diverse and connected travel corridors to avoid concentrations of wildlife in smaller areas
- Inform hunters and trappers about taking precautions when handling animals with hair loss: wear rubber gloves if possible, and always wash promptly after handling a diseased animal. Freezing kills the mites.

4.10 Avian Botulism

Avian botulism is a paralytic disease caused by ingestion of a toxin produced by the bacteria, *Clostridium botulinum*. This bacteria is widespread in soil and requires warm temperatures, a protein source and an anaerobic (no oxygen) environment in order to become active and produce toxin. Decomposing vegetation and invertebrates combined with warm temperatures can provide ideal conditions for the botulism bacteria to activate and produce toxin. Birds either ingest the toxin directly or may eat invertebrates containing the toxin. Invertebrates are not affected by the toxin and store it in their body. A cycle develops in a botulism outbreak when fly larvae (maggots), feed on animal carcasses and ingest toxin. All bird species are susceptible to botulism. In wild birds however, water birds are typically the most often affected. Ducks that consume toxin-laden maggots can develop botulism after eating as few as 3 or 4 maggots (USGS National Wildlife Health Center 2013). Healthy birds, affected birds, and dead birds in various stages of decay are commonly found in the same area. The toxin affects the nervous system by preventing impulse transmission to muscles. Birds are unable to use their wings and legs normally or control the third eyelid, neck muscles, and other muscles. Birds with paralyzed neck muscles cannot hold their heads up and often drown. Death can also result from water deprivation, electrolyte imbalance, respiratory failure, or predation. Outbreaks occur from coast to coast in the United States and Canada, generally from July through September. Thousands of birds may die during a single outbreak.

Avian Botulism Prevention and Surveillance Actions:

- Avoid altering water depth by flooding or drawing down water levels during hot weather. This may increase invertebrate and fish die-offs, a protein source for the bacteria.
- Avoid chemical outputs from farms or other sources from entering wetlands
- Reduce organic inputs into wetlands or eliminate factors that introduce large amounts of decaying matter
- Prompt removal and proper disposal of carcasses by burial or burning (in accordance with applicable ordinances) is highly effective in removing toxin and maggot sources from the environment.
- Citizens should contact one of the individuals on the Northern Lake Michigan Botulism contact list or MDNR Wildlife Office. It may be possible for DNR personnel to pick up specimens, but it may be necessary to deliver them. DNR field personnel will forward the specimens to the DNR wildlife Disease Lab in Lansing for necropsy and botulism testing. (MDNR. 2014. Emerging Disease Issues)

4.11 Toxic Contaminants

Many kinds of potentially harmful chemicals are found in environments used by wildlife. Persistent organic pollutants (POPs) are toxic chemicals that adversely affect human and wildlife health and the environment around the world. Because they can be transported by wind and water, most POPs generated in one country can and do affect people and wildlife far from where they are used and released. Organophosphate compounds include some of the most toxic chemicals used in agriculture. They persist for long periods of time in the environment and can accumulate and pass from one species to the next through the food chain. A major route of exposure in humans and wildlife is through contaminated food, particularly fish. Natural and synthetic materials may cause direct poisoning and death, but they also may have adverse effects on wildlife that impair certain biological systems, such as the reproductive and immune systems. New studies have shown that lead poisoning impairs learning and memory in animals. The most significant hazard to wildlife is through direct ingestion of spent lead shot and bullets, lost fishing sinkers, tackle and related fragments, or through consumption of wounded or dead prey containing lead shot, bullets or fragments.

Toxic Contaminants Prevention and Surveillance Actions:

- Educate the community on the importance to reduce and/or eliminate toxic substances (such as POPs) and their releases on a regional and global basis
- Educate hunters that although lead shot was banned for waterfowl hunting, its use in ammunition for upland hunting, shooting sports, and fishing tackle remains widespread and is a threat to wildlife health
- Continue to expand vigilant contaminant monitoring programs in fish and wetlands
- Continue to educate the community on the importance and where to find regularly released fish consumption advisories to help them determine which fish are safe to eat and how much is safe to eat

5. Wildlife HABITAT Goals, Objectives and Strategies

Habitat Communities by Ecological Groups
See KBIC L'Anse Reservation Habitat Maps (3 sections) Appendix 2a,b, and c

Land Classification	**Acres**	**% of Reservation**
Developed	710	1
Deciduous Forest	36,417	62
Mixed Forest	8,695	15
Evergreen Forest	6,444	11
Forested Wetland	3,067	5
Emergent Wetland	484	1
Grassland	332	1
Open Water	311	1
Farm/Agriculture	2,567	4
TOTAL	**59027**	100

A) Overall Wildlife and Habitat *Goals:*

1) To approach the implementation of this stewardship plan as caretaker and nurturer (steward) of a mutually beneficial relationship between our wildlife, natural communities and our people, incorporating centuries of Anishinaabe knowledge, beliefs, and values.

2) To care for wildlife and habitat in an ecologically sound manner that allows for sustainable use of hunting, fishing, and gathering.

3) To restore degraded habitat and any declining or at-risk populations of wildlife, fish, or plants.

4) To enhance habitat conditions for expanding wildlife, fish, and plant populations.

5) To protect ecologically diverse, rare, and culturally important wildlife species and habitat against loss or degradation.

6) To preserve healthy, diverse conditions of streams, lakes, wetlands, fields, and forests for maximum sustainability of wildlife, fish, and plant populations for generations to come.

B) Overall HABITAT Objectives and Strategies:

HABITAT Objective 1: Increase knowledge of natural habitat community types, habitat use, and ecological importance of diversity in and around KBIC lands

Strategies to Increase Knowledge:

> "We are all thankful for the powers we know as the Four Winds. We hear their voices in the moving air as they refresh us and purify the air we breathe." R. Wall Kimmerer 2013

- Ask KBIC members to share their wisdom about their habitat knowledge and cultural memories and continue to add this traditional ecological knowledge to the plan over time, including: what is Anishinaabemowin for deciduous forest or other forest types; what activities take place there, what is gathered there, when, by whom, in what way, for what purpose; what is our part/role in this nurturing this mutually beneficial relationship. If plants/trees are not harvested, why not.
- Conduct ongoing monitoring and assessment of habitat and all natural communities
- Review current research on tree species and habitat types for up to date recommendations of stewardship options
- Develop a KBIC wetland program to monitor long term for changes in conditions of habitat quality and associated wildlife species assemblages in response to climate change, land use and environmental degradation
- Work with partners to align monitoring methodology and forest practices to better collaborate on habitat strategies

- Review and revise tribal plans based on monitoring results
- Provide public access to existing information about local habitat through presentations, publications, and the NRD website.

HABITAT Objective 2: Increase community awareness of the cultural and ecological significance of forest components and natural resources on the land

Strategies to Increase Awareness:

- Incorporate traditional stories and ways into public media and presentations
- Develop species specific education and outreach materials
- Work with partner tribes and agencies to develop and distribute educational materials
- Provide information at public events and on the KBIC NRD website
- Educate partner agencies about relevant cultural respect for resources to increase understanding and mutual cooperation

HABITAT Objective 3: Maintain or increase wildlife travel corridors and habitat connectivity to ensure safety and dispersal routes that are relatively free from human development

Strategies for Habitat Connectivity:

- Evaluate conditions of wildlife travel corridors and contiguous forest habitat types (i.e. riparian zones and buffers along streams) to ensure Best Management Practices are followed
- Collaborate with partner agencies on habitat improvement projects and connectivity to minimize habitat fragmentation
- Enhance or restore habitat through management of invasive species and restoration of declining native species

HABITAT Objective 4: Ensure diverse habitat of streams, lakes, wetlands, fields, and forests for maximum sustainability of wildlife, fish, and plant populations.

Strategies to Ensure Diversity of Habitat:

- Monitor and evaluate habitat conditions (including erosion/sedimentation issues) and ensure Best Management Practices are followed
- Collaborate with partner agencies on landscape level habitat improvement
- Enhance or restore select natural communities through vigilant monitoring and use of best stewardship options (i.e. mesic conifer deer wintering complexes such as upland conifer—hemlock and spruce/fir and lowland conifer swamps (cedar and black spruce)
- Prevent habitat loss and habitat degradation through cooperative monitoring and management of forests, wetlands, and uplands
- Protect ecologically diverse, rare, and culturally important habitat against loss or degradation through preservation and hands-off protection

- Enhance ecologically diverse, rare, and culturally important habitat through proactive plantings, harvest, prescribed fire, etc.
- Avoid clear cuts for purely short-term economic benefit; evaluate the surrounding landscape (distance to nearest clear cut and what age class etc.) to ensure it is the best option for improving wildlife habitat and the future of the stand (Silviculture and Forest Aesthetics Handbook 2010)
- Establish a regeneration plan/goal for every forest treatment (what do you want the future of this stand to look like and its uses?)
- Avoid high grade only or diameter limited selective cuts unless conducted to improve growth and quality of surrounding trees; harvesting out only the largest and best trees leaves behind lower quality trees and actually reduces the value of the land economically and ecologically (Silviculture and Forest Aesthetics Handbook 2010).
- Identify specific trees in proposed harvest areas that have high value for wildlife and retain sufficient numbers and sizes (standing dead trees (snags), soft mast like black cherry and sugar plum, hard mast like red oak and hazelnut, logs, and other coarse woody debris) (Silviculture and Forest Aesthetics Handbook 2010).
- Retain "wolf trees". A wolf tree is a generally a dominant tree with a broad, spreading crown that occupies more growing space than its more desirable neighbor species. Though reserving these wolf trees may sacrifice some timber production, they are among the best mast and cavity producers (Silviculture and Forest Aesthetics Handbook 2010).
- Retain large older aged white pine or hemlock groves for winter cover and wildlife use.
- Maintain a distribution of all successional stages (MI Wildlife Action Plan 2006)

Note: See specific stewardship and monitoring actions under each habitat type

5.1 Deciduous Forest (36,417 total acres)

Deciduous Forest Description: The principal feature of the deciduous forest is the seasonal growth and loss of leaves and the resulting shade and open canopy in which many species synchronize their growth and use of the forest (early spring ephemerals to late autumn mast crops). Maintaining a variety of age classes of deciduous forest ranging from young stands thick with aspen to more open older aged stands of large diameter maple, aspen, birch, ironwood, green ash and basswood are important for maintaining adequate habitat for a diverse wildlife community. Deciduous species will vary depending on the soil, location, harvest protocol and age of the stand but may include: sugar maple, red maple, quaking aspen, bigtooth aspen, balsam poplar, northern red oak, northern pin oak, basswood, black cherry, American elm, white birch, yellow birch, ironwood, black ash, and green ash. Sub-canopy layers of spruce/fir, beaked hazel, and other shrub species are a significant component of deciduous forest. Most of the ironwood also occurs in the sub-canopy. Other components include groves of hemlock (usually associated with higher moisture gradients), scattered white pine, and on some sites, even upland cedar.

Deciduous forests can be classified according to soil moisture that supports certain species combinations. Lowland hardwoods are considered rare or uncommon in the state of Michigan.

These lowland areas have seasonal or permanently saturated soil and dominated by moisture-tolerant species such as silver maple, black ash, American elm, yellow birch, swamp white oak, red maple, green ash and cottonwood (MI Wildlife Action Plan 2006). Mesic hardwoods, also considered uncommon, have moist soil and are often dominated by American beech, sugar maple, red maple, and basswood. Mesic areas often occur as transitional between wet lowland sites and dry upland. These areas typically are rich in wildflower diversity and berry producing herbs and shrubs (MI Wildlife Action Plan 2006). Dry hardwoods have dry soils and fairly open canopy that can allow shade-intolerant species to dominate such as red oak, black cherry, pin oak, quaking aspen, and bigtooth aspen (MI Wildlife Action Plan 2006). Red maple and sugar maple often grow over these areas due to fire suppression.

Deciduous Forest Associated Natural Communities: Aspen stands, northern hardwood maple dominated stands, lowland hardwoods, mesic hardwoods, birch stands, mixed upland deciduous stands

Deciduous Forest Associated wildlife species: Species of Greatest Conservation Need (SGCN) include blue spotted salamander, four-toed salamander, chorus frog, wood turtle, gray wolf, long eared bat, pipistrelle bat, moose, northern flying squirrel, least chipmunk, snow shoe hare, bog lemming, bald eagle, northern goshawk, Cooper's hawk, green heron, merlin, and American woodcock to name a few (MI Wildlife Action Plan 2006). Other important species include insect pollinators, honey bee colonies, a wide variety of migratory birds, woodpeckers, turkey, ruffed grouse, black bear, owls, white-tailed deer, raccoon, woodchuck and various species of small rodents.

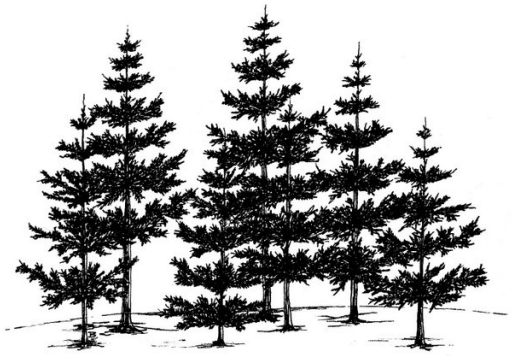
Deciduous Forest High Priority Considerations: Sugarbush, gathering of berries and medicines, poles for lodges, firewood, breeding bird habitat, hawk and owl habitat, diversified age classes of trees, consideration for forest health issues and biodiversity, enhancement of native species, inventory and control invasive species, retaining older age forest communities, coarse woody debris and snags for cavity nesters and bats.

Deciduous Forest Stewardship Actions:

- Maintain large tracts of unfragmented northern hardwood forest for habitat connectivity and components of mature forest (large living cavity trees and canopy cover)
- As the white, green, and black ash resource in the UP is threatened by the Emerald Ash Borer, management of stands of ash may be necessary as they decline
- Retain coarse woody debris from incidental breakage and cutting with tops and limbs of dead and downed trees
- Create or maintain some gaps big enough to allow light to reach the forest floor for seedlings to become established especially oak and other mast trees
- Develop, maintain, or restore forested corridors that connect larger forested tracts, with particular attention to riparian corridors
- Discourage land transactions and management activities that cause further fragmentation
- Increase or maintain hard and soft mast trees by providing forest treatments and retention that promote acorns and other nuts, catkins, buds, and berries

- Maintain aspen stands with 10-15% uncut aspens and scattered conifers with a rotation age of 50-60 years for aspen
- Use single tree selection or group selection cutting to enhance tree species diversity in hardwood stands
- Leave scattered groves of conifer species
- Retain older aged living and dead trees on an acre by acre basis (3-5 per acre) including clear cut areas for cavity trees and snags (Silviculture and Forest Aesthetics Handbook 2010)
- Where large diameter tree snags and coarse woody debris are occasional or rare, seek to increase their volume (MI Wildlife Action Plan 2006)
- In birch dominated areas, do summer cutting to scarify the site, leaving seed trees, and consider slash reduction burns post-harvest to promote early successional species like birch
- Maintain a distribution of all stages of succession (MI Wildlife Action Plan 2006)
- Control invasive species and disease to protect and enhance conditions for native species

5.2 Upland Conifer Forest (6,444 total acres)



Description: The northern coniferous forest and the undergrowth beneath provide habitat for species that benefit from the thermal and protective cover, rich soils, and decomposition that recycles nutrients in fallen trees and needles. Decomposition is slow because of the cold winters of the north allowing vegetation produced in the short growing season to provide needles, twigs, dried grass, and berries as food. The snow and rain that runs off of the coniferous forest provide habitat in streams and small marshy areas for a variety of species. Maintaining a variety of age classes and interspersed stands of evergreen forests ranging from young pine plantations to older aged winter deer habitat of eastern hemlock or cedar are important for maintaining adequate habitat for a diverse wildlife community. Species of evergreen will vary depending on the soil, location, harvest protocols and age of the stand but may include on the reservation: white pine, red pine, jack pine, black spruce, white spruce, blue spruce, tamarack, northern white cedar, balsam fir, eastern hemlock, and Canada yew. In the Upper Peninsula, eastern hemlock benefits 37 species of mammals, 20 species of reptiles and amphibians, and 31 species of birds as an important source of thermal cover, food, nesting cavities and cover.

> "The Earth has many families of Trees who each have their own instructions and uses. Some provide shelter and shade, others fruit, beauty and many useful gifts." R. Wall Kimmerer 2013

Boreal forest is found on moist to dry sites with high levels of wind throw, fire and insect epidemics are natural disturbance regimes. Wind throw creates openings and tip-up mounds of bare soil which provide seedbeds for white spruce, northern white cedar, balsam fir and white birch, it also provides nurse logs on which young trees germinate (Cohen 2007).

Mesic conifer is upland forest that grows in moderately moist soil. Depending on site conditions, two groups of species that often grow include 1) eastern hemlock, yellow birch, red maple and white pine or 2) white spruce, balsam fir, and northern white cedar (Sargent and Carter 1999). Mesic conifer is crucial winter habitat that offers thermal cover for wildlife such as white-tailed deer, ravens, and sharp-shinned hawks.

Dry upland conifers of jack pine and red pine are often growing as plantations or pine barrens in typically flat and sandy areas. This is critical breeding habitat for the Kirtland Warbler.

Upland Conifer Forest Associated Communities: Red pine, Eastern hemlock, balsam fir/white spruce, white pine, jack pine, mixed conifer forest, boreal forest, mesic conifer

Upland Conifer Forest Associated Wildlife Species: White-tailed deer, moose, snow shoe hare, bobcat, black bear, spruce grouse, silver haired bat, northern flying squirrel, pine marten, fisher, red crossbill, bluebird, woodpecker, wild turkey, bald eagle, reptiles, amphibians, rodents, squirrel, owl, fox, wolves, and lynx.

Upland Conifer Forest High Priority Considerations: Critical winter habitat for wildlife, gathering of cedar and balsam, firewood, gathering of medicinal plants and food, older age forest communities, coarse woody debris and snags for cavity nesters and bats, control of invasive species

Upland Conifer Forest Stewardship Actions:

- Increase mesic conifer component (hemlock, cedar, spruce/fir, white pine, red pine) by retaining conifers during harvests and encourage regeneration
- Manage for late succession conifer-dominated species, especially hemlock
- Increase uneven aged hemlock and conifer inclusions within hardwood complexes through selection
- Under-plant conifers on suitable sites without a seed source
- Retain patches of mixed swamp conifers and upland spruce/ fir stands beneficial to both edge and interior species
- Retain white pine seed trees whenever possible
- Retain patches of jack pine and ensure regeneration with prescribed burn as warranted
- Plant cedar where appropriate
- Retain or increase coarse woody debris, snags, and cavity trees particularly of larger size (≥18" dbh)
- Maintain a distribution of all successional stages (MI Wildlife Action Plan 2006)
- Control invasive species and disease
- Consider prescribed burns to mimic natural fire and restore/enhance native species regeneration

5.3 Upland Mixed Forest Emphasis (8,695 total acres)

Upland Mixed Forest Description: As a transitional area between the boreal forest to the north and the temperate deciduous forest and prairie to the south and west, the Mixed Forest

(Temperate Broadleaf Forest) encompasses a diversity of habitats that benefit a wide variety of wildlife species. The mixed forest has two or more predominant kinds of conifer and deciduous trees consisting of at least 20 percent other than the most common tree species. It is a humid and temperate ecoregion that usually has four layers in the forest: canopy, shade-tolerant understory, shrub layer, and herbaceous layer. The western Great Lakes mixed forest habitats include components of coniferous forest, hardwood forest, boreal forest, swamp forest, peatlands, marshes, bogs, fens, and hardwood river basins and is very rich in wildlife.

Upland Mixed Forest Associated Communities: Conifer dominated including mixed pine (white, red, jack), hardwood dominated with mixed hardwood and conifer, Mixed balsam fir – white spruce, Hardwood Emphasis – long-term goal >50% hardwoods, Mixed hardwood (aspen, oak, northern hardwood)

Upland Mixed Forest Associated wildlife species: Species associated with mixed habitat are dependent upon the tree species composition and understory, but species that are known to prefer conifer dominated mixed habitat include American marten, fisher, black bear, moose, red fox, gray fox, gray wolf, coyote, eastern red bat, hoary bat, lynx, bobcat, snowshoe hare, white-tailed deer, beaver, squirrels, song birds, blackburnian warbler, gray jay, ruffed grouse, hooded merganser, pileated woodpecker, bald eagle, turkey vulture, wood duck, and ravens.

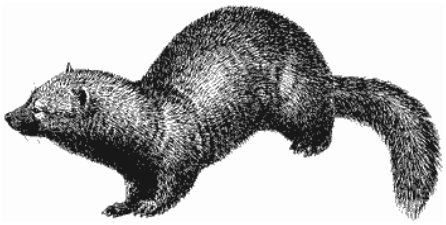
Upland Mixed Forest High Priority Considerations: Gathering potential for medicinal and edible plants, maintaining or increasing coarse woody debris and snags for soil quality and wildlife benefits, conifer components for wildlife, invasive species control, disease control for susceptible tree species

Upland Mixed Forest Stewardship Actions:

- Utilize silviculture treatments to maintain within stand diversity of mature forests, mesic conifers, and upland spruce/fir beneficial to both edge and interior wildlife species
- Protect contiguous stands for thermal and protective cover and travel corridors
- Enhance and expand balsam fir stands or eastern hemlock near wetlands for feeding, shade, rest, and thermal cover
- Restore conifer forests where logging practices have resulted in conversion from conifer-mixed hardwoods to aspen by re-establishing a fire regime
- Prevent habitat loss and habitat degradation through monitoring and preservation of contiguous forests
- Retain patches of mature trees within timber harvest boundaries
- Retain coarse woody debris, snags, and cavity trees particularly of larger size (≥18” dbh)
- Where large diameter tree snags and coarse woody debris are occasional or rare, seek to increase their volume (MI Wildlife Action Plan 2006)
- Control invasive species and disease

5.4 Forested Wetland (Lowland) (3,067 total acres)

Forested Wetland Description: Forested wetlands play an important role in the health of watersheds in that they reduce flood peaks, serve as natural filters, control erosion, and recharge and discharge groundwater. Forested wetlands may not always be recognized as wetland during drier seasons. Wetlands are identified based upon three criteria: the presence of plants adapted to survive in wet soil conditions, the presence of water at or near the surface for more than two weeks during the growing season (May-September), and the presence of soil that shows signs of extended saturation (hydric soil). Forested wetlands are diverse in plant species and wildlife. Some lowland conifer natural communities are classified as rare or uncommon in Michigan.



Lowland hardwood is considered rare or uncommon in the state of Michigan. These lowland areas are dominated by moisture-tolerant deciduous species such as silver maple, black ash, American elm, yellow birch, swamp white oak, red maple, green ash and cottonwood (MI Wildlife Action Plan 2005). Poor conifer swamp is nutrient poor forested peatland dominated by black spruce, tamarack and sphagnum moss. These swamps typically occur in depressions in sandy glacial outwash, glacial lakeplain, and moraines (Cohen 2006). Rich conifer swamp is influenced by groundwater and dominated by northern white cedar and occurs on rich peat or muck soil and often referred to as a cedar swamp (Burger and Kotar 2003).

Forested Wetland Associated Natural Communities: Lowland Deciduous (>50% hardwood), hardwood-conifer swamp, poor conifer swamp (nutrient poor forested peatland), rich conifer swamp, and mesic conifer

Forested Wetland Associated Wildlife Species: A wide variety of wildlife use forested wetlands depending on the growing stage and level of water inundation (Weber et al. 2007). Animals that may be detected in forested wetlands include black bear, long tailed weasel, river otter, beavers, muskrat, mink, snow shoe hare, bobcat, American marten, fisher, moose, white-tailed deer, American woodcock, dragonfly, damselfly, green frog, red-spotted newt, turtles, snakes, wood ducks, great blue heron, red-winged blackbird, bald eagles, and fox .

Forested Wetland High Priority Considerations: Black ash protection and seed collection, gathering potential for medicinal and edible plants (i.e. swamp tea, fiddleheads), native species protection and enhancement, preservation of hydrology, vernal pools. While silviculture is the major threat to northern forested wetlands (i.e. soil compaction, loss of coarse woody debris), the impacts from mining and vacation home development could increase over time. Emerald Ash Borer will likely impact the ash resource in this area within the next decade.

Forested Wetland Stewardship Actions

- Work with partners to achieve a better understanding of management needs and methods for improving lowland forested wetlands
- Identify invasive species and diseases that may negatively affect native species
- Control invasive species and disease
- Aid in cedar regeneration

- Protect contiguous stands for thermal and protective cover and travel corridors
- Retain coarse woody debris, snags, and cavity trees particularly of larger size (≥18")
- Use selective cut methods when timber is harvested
- Retain patches of mature trees
- Retain buffers of trees around vernal pools

5.5 Emergent Wetland (484 total acres)

Emergent Wetland Description: Marshes, swamps, fens, lowland shrub or even wet meadows are also called emergent wetlands. These habitats support dynamic plant communities. Whether supplied by surface water or ground water, they can experience extreme hydrological variability as a result of climatic conditions, natural disturbance events, or in the case of Great Lakes coastal marshes, adjoining lake water levels and seiche events (Barry et al. 2004). A wetland more than one meter deep generally does not support most emergent plant species, but rather transitions into a submergent plant community (Hoffman 1990). Bottom substrate and water chemistry also can be critical factors in determining which plants will be successful at a given location.

Emergent Wetland Associated Natural Communities:
Floating aquatic marsh, fen/bog, alder/willow lowland shrub, wet meadow, swamp

Emergent Wetland Associated wildlife Species: Least weasel, river otter, muskrat, coyote, waterfowl, bald eagle, great blue heron, green heron, sandhill crane, rails, American bittern, amphibians, and reptiles.

Emergent Wetland High Priority Considerations: Wild rice, aquatic invasive species, gathering potential for medicinal and edible plants (i.e. cattail, cranberry), obligate wetland species of plants and wildlife

Emergent Wetland Stewardship Actions:

- Protect and/or expand a variety of wetland types, sizes and conditions including but not limited to riparian habitats, wooded swamps, marshes, and bottomlands to support a diversity of wildlife species.
- Retain large diameter cavity trees within 300 feet of water bodies and promote nest trees
- Create and maintain herbaceous emergent plants, flooded shrubs, and downed timber providing cover and food sources
- Discourage beaver only where essential to maintain higher priority conservation values
- Protect wetlands from development, degradation, toxic sediments and pollutants
- Create or preserve wetland complexes that increase overall wetland connectivity and provide important post-breeding foraging habitat for juvenile marsh birds such as rails, herons, bitterns and coots.

- Minimize impervious surfaces, development, and reduce soil loss and nutrient delivery within watersheds to maintain wetland function.
- Monitor for water quality, invasive species, mammals, waterfowl, amphibians, bats and secretive marsh birds by establishing a KBIC Wetland Program
- Enhance wetlands with loafing platforms and nesting structures
- Work with partners and assess various wetlands for potential wild rice propagation

5.6 Grassland (332 total acres)

Grassland Description: Climate and the element of fire are necessary to establish and maintain grasslands. Historically, fires by lightening or purposely set helped grasslands to grow by stimulating them to reproduce, reducing competition from invasive weeds, and discouraging the growth of shrubs and trees. Grasslands support a variety of wildlife species and some cannot live in any other place. Grasslands provide nesting, roosting, and brood rearing cover for animals like wild turkeys and specific grassland dependent bird species (Sample and Mossman 1997). Deer and rabbits use grasslands for food and for cover while rearing their young. Native grasses such as Indiangrass and the bluestems are suitable for winter shelter for some species because they stand up to snow. Grasslands may broadly include all native grasslands, from sedge meadows and open bogs to prairies, savannas, and barrens communities. We can also include surrogate grasslands, which represent the majority of grassland habitat within the reservation. Surrogate grasslands are habitats that are similar to and replace the former prairie grasslands that historically occurred in Michigan. Surrogate grasslands include fallow fields, old fields, pastures, old orchards, and set-aside fields. Usually, idle grasslands are composed of non-native grasses and forbs but they can include of one or several native species. Wet meadow also called sedge meadow is an open grassy wetland habitat particularly important for birds and amphibians.

Grassland Associated Natural Communities: Herbaceous open land, upland shrub, low density forest, sedge meadow

Grassland Associated wildlife Species: Reptiles, northern harrier, wild turkey, white-tailed deer, swallow species, bats, woodchuck, red and gray fox, gray wolf, badger, black bear, kestrals, upland sandpipers, bluebirds, bobolink, woodcocks, mice, shrews, voles, owls, raccoons, rabbits, skunks, opossums, coyotes

Grassland High Priority Considerations: Sweet grass, gathering potential for medicinal and edible plants, nesting and foraging for grassland bird species, insect populations for wildlife food sources, native species enhancement potential, invasive species inventory and control, habitat for small mammals (i.e. voles, shrews, mice), important feeding habitat for herbivores and omnivores, potential food and orchard production.

Grassland Stewardship and Monitoring Actions:

- Maintain large contiguous sparsely vegetated grasslands for courtship, nesting and feeding areas for birds and other wildlife
- Where possible consolidate patches into larger opening complexes
- Restore existing grasslands to full productivity by eliminating as much competition as possible and inter-seeding native grasses
- Conduct regular maintenance to control natural succession
- Develop and implement maintenance for openings that mimic historic disturbance regimes such as prescribed fire. Mow or burn patches every 2-3 years to eliminate woody encroachment but avoid burning during May – July (breeding and fledging season) and allow undisturbed refugia while disturbed areas recover
- Coordinate with fire crews for controlled burns to maintain open grassland and native vegetation
- Discourage conversion of grassland features to residential and industrial development; discourage parcelization and reduction in patch size (MI Wildlife Action Plan 2006)
- Preserve abandoned farmland for increased grassland habitat on the landscape and to use, if/when necessary, for future food production (food security)

6. Rare or Sensitive Forest Communities and Other Habitat Considerations

> "I have to be reminded - just like Nanabozho - that the plants are our oldest teachers." R. Wall Kimmerer 2013

Some forest communities or conditions are rare and precious remnant locations of historical conditions that should be recognized and maintained. Other communities or conditions are preferred for wildlife breeding or dispersal but may be overlooked during the land management decision process. For example, seasonal dry conditions for areas such as vernal pools or intermittent streams may cause these areas to be overlooked as important wetland or aquatic habitat. Meanwhile large areas that encompass multiple ownerships such as riparian corridors receive piecemeal treatments that cause further fragmentation.

Rare or Sensitive Forest Community Goal: To include special considerations for rare or sensitive forest communities and other important habitat components into land altering activities to ensure protection or enhancement of these unique and important elements.

Rare or Sensitive Forest Community Objective 1: Identify rare or sensitive forest communities and provide them with special preserve status within KBIC land use designations to protect these areas from being altered.

Rare or Sensitive Forest Community Stewardship Actions:

- Inventory and define boundaries of communities that may be rare or sensitive
- Confirm rare, endangered or threatened species of plants and animals with outside expertise (i.e. send plant samples for confirmed identification)
- Work with cultural leaders, partners, and contractors to inventory plants in all habitat types to identify rare, sensitive and culturally important species

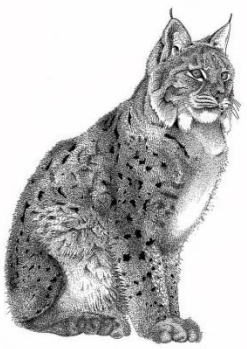
- Enhance these locations by identifying and controlling invasive species of plants and animals

Rare or Sensitive Forest Community Objective 2: Educate land owners and forest harvesters about ecologically important components of forest habitat to avoid disturbance or removal.

- Design and distribute information about the importance and how to recognize specific forest components such as vernal pools, den habitat, coarse woody debris etc.
- Retain coarse woody debris, snags, and cavity trees particularly of larger size (≥18")
- With the tribal forester(s) and other partners, develop specific guidelines for forest managers to use when harvesting including buffers, recommended size and quantity of residual wood and leaving areas of old age forest or old age forest components (i.e. cavity trees, snags, CWD)
- Work with partners on regional initiatives to provide an ecological perspective and highlight the importance of sensitive forest components to try to avoid unintended consequences

6.1 Riparian Corridors

Riparian Corridors Description: Riparian corridors are border habitat found along the banks of a river, stream, or other body of water. It is the interface between upland and aquatic habitat. Riparian areas can be a variety of habitat types including meadow, wetland and forest environments. Typically on and around the KBIC L'Anse Reservation, riparian corridors are forested wetland along rivers and streams. Shade provided by conifers in particular, help maintain the cool temperatures of the streams. Studies show that the removal of the riparian vegetation, especially within 80 feet of the stream, can cause a temperature elevation of 6 to 9 degrees Celsius (Lapin 1994). Riparian corridors are important for a wide variety of birds (Bub et al. 2004), mammals (Brown et al. 2008), amphibians (Perkins and Hunter 2006), and the state protected wood turtle (Brewster and Brewster 1991).



Riparian Corridors Associated wildlife Species: Riparian habitats are ecologically diverse and home to a wide range of plants, insects and amphibians that make them ideal for different species of birds as well. Riparian corridors are often the only avenue for large animals to travel and disperse undisturbed by people. Wolf, bobcat, coyote, black bear, fisher, pine marten, snow shoe hare, wood turtle and moose have all been detected in riparian corridors within the L'Anse Reservation. Riparian areas are important feeding areas for various bat species as well.

Riparian Corridors High Priority Considerations: Connectivity for large mammal dispersal, bat foraging areas, wood turtle habitat, connectivity for aquatic species, free flowing watershed for storm water runoff, gathering potential for medicinal, cultural and edible plants, native species enhancement, older age trees that provide shelter and shade, invasive species inventory and control

Riparian Corridors Stewardship Actions

- Follow Best Management Practices for riparian zones as described in Water Quality Management Practices on Forest Land by the MI DNR.
- Work with partners and private land owners to connect corridors that lead in/out of the reservation and across the entire upper peninsula
- Provide sizeable buffers along riparian corridors where logging takes place (minimum 150')
- Restore conifer components that die out to ensure shade and cover
- Manage invasive species of plants along riparian corridors
- Monitor and improve bank stabilization with root wads and native vegetation
- Evaluate riparian conditions with innovative tools such as Light Detecting and Ranging (LiDAR) technologies
- Improve stream crossings (i.e. culverts, bridges) along roads and logging trails
- Retain coarse woody debris, snags, and dying trees particularly of larger size

6.2 Isolated Wetlands

> "We give thanks to all the waters of the world for quenching our thirst, for providing strength and nurturing life for all beings." R. Wall Kimmerer 2013

Isolated Wetlands Description: Wetlands that are not connected by streams to other surface-water bodies are considered to be isolated. Tiner et al. 2002 states that 'isolated' can be geographical, hydrological, or ecological isolation from other wetlands or water. Such wetlands and ponds typically form in depressions in the landscape and are 'isolated' because the higher elevation of the land around them keeps water from flowing further downhill and downstream through even small rivulets. The term 'isolated' is generally a matter of degree and for this reason there is no accepted scientific definition of 'isolated' ponds or wetland.'' In their report on wetland characteristics and boundaries, the National Research Council defines an isolated wetland simply as a ''wetland not adjacent to another body of water'' (Downing 2003). Although the definition is based on surface-water connections to other water bodies, isolated wetlands commonly are integral parts of extensive ground-water flow systems, and isolated wetlands can spill over their surface divides into adjacent surface-water bodies during periods of abundant precipitation and high water levels. A basic question is whether isolation is an important property in the functioning of isolated wetlands.

Isolated Wetlands Associated Wildlife Species: Bird and wildlife species vary depending on the resulting wetland type. Isolated wetlands are important for amphibian reproduction (Whitfield 2003, Snodgrass et al. 2000). Locally, Pinery Lakes, a depressional wetland was once a thriving open water habitat for waterfowl with high numbers of hooded mergansers (KBIC Waterfowl Index Reports). It has since dried up and now attracts more shorebird activity than waterfowl due to exposed mud flats. Amphibians and turtles remain active despite the shallow waters and beavers that used to be residents all year, now appear to be passing through.

Isolated Wetlands High Priority Considerations: Wetland loss or degradation, gathering of medicinal, cultural and edible plants, native species enhancement, invasive species inventory and control, flood control, sedimentation, potential decrease of coarse woody debris, direct or indirect altered hydrology

Isolated Wetlands Stewardship Actions:

- Evaluate hydrology
- Seek to enhance water influx as warranted
- Control invasive species
- Monitor changing conditions
- Monitor bird, mammal, and waterfowl use
- Maintain ample coarse woody debris

6.3 Intermittent or Ephemeral Wetland (Vernal Pools, Intermittent Streams)

Intermittent wetlands are usually seasonal areas of standing or running water for only part of the year, whereas ephemeral contains flowing or standing water only for a short period after a rain.

6.3.1 Vernal Pools

Vernal Pool Description: Vernal pools are seasonal depressional wetlands that are covered by shallow water for variable periods from winter to spring, but may be completely dry for most of the summer and fall. These wetlands range in size from small puddles to shallow lakes and are usually found in a gently sloping topography that can be subtle. Vernal pools are sometimes connected to each other by small drainages known as vernal swales, forming complexes. Beneath vernal pools lies either bedrock or a hard clay layer in the soil that helps keep water in the pool. Climatic changes associated with each season cause dramatic changes in the appearance of vernal pools. The pools collect water during winter and spring rains, changing in volume in response to varying weather patterns. During a single season, pools may fill and dry several times. In years of drought, some pools may not fill at all (Thomas et al. 2010). Each vernal pool has a unique profile affected by climate, weather, hydrology, water chemistry, soil chemistry, vegetation, fauna and the surrounding landscape. These pools are dynamic ever changing habitat which is why they provide such a wide variety of ecological services (Colburn 2004).

Wildlife Species Associated with Vernal Pools: The unique environment of vernal pools provides habitat for numerous rare plants and animals that are able to survive and thrive in these harsh conditions. Many of these plants and animals spend the dry season as seeds, eggs, or cysts, and then grow and reproduce when the ponds are again filled with water (Colburn 2004). In addition birds and mammals use vernal pools as a seasonal source of food and water. Insects and many local species of amphibians depend on vernal pools for reproduction. Vernal pools are important for breeding habitat by Michigan amphibian species including wood frogs (*Rana sylvatica*), blue-spotted salamanders (*A. laterale*) and two rare species of the spotted salamander (*Ambystoma maculatum*) and four-toed salamander (*Hemidactylium scutatum)* (Thomas et al. 2010).

Vernal Pool High Priority Considerations: Important breeding habitat for amphibians, gathering of medicinal, cultural and edible plants, potential loss of habitat through land alteration

and forestry, climate change, inventory and control of invasive species, maintaining ample coarse woody debris

Vernal Pool Stewardship Actions:

- Conduct inventories for vernal pools to become familiar with their characteristics, locations, and be able to identify them during all times of the year.
- Avoid or minimize activities (i.e. logging, development, ATV use) that disturb soil, water quality or canopy cover in and near vernal pools.
- Maintain a buffer of native vegetation and trees around vernal pools to protect water quality and soil conditions (minimum of 50')
- Retain coarse woody debris, snags, and dying trees particularly of larger size (≥18" dbh)
- Maintain as much natural connection as possible between vernal pools or other sources of water such as wetlands or seeps to allow for amphibian and reptile dispersal.

6.3.2 Intermittent Streams

Intermittent Streams Description: Intermittent streams may be located at headwaters where wetland overflows run toward larger streams. Typically intermittent streams flow during spring thaw but later dry up. They are extremely important for flood control and a water source for wildlife.

Intermittent Streams Associated wildlife Species: Aquatic invertebrates, crayfish, amphibians, turtles and even small fish utilize intermittent streams when flowing. Insects often breed in pools and bats are often present along intermittent streams to feed on resulting insects. Raccoons are common along these streams and other wildlife use them for water sources.

Intermittent Streams High Priority Considerations: Insect and bat populations, gathering potential for medicinal, cultural and edible plants, flood control, invasive species inventory and control, native species enhancement, bank stabilization/protection, runoff and sedimentation, maintaining ample quantities of coarse woody debris

Intermittent Streams Stewardship Actions:

- Maintain or reestablish connectivity throughout the watersheds
- Maintain buffer of tree cover over intermittent streams to maintain shade and keep waters cooler temperature
- Retain coarse woody debris, snags, and dying trees particularly of larger size
- Inventory and control invasive species
- Plant native species

6.4 Coastal Wetlands

Coastal Wetlands Description: Great Lakes **c**oastal wetlands are recognized by Federal agencies as wetlands located in coastal watersheds and within 2 km of the Great Lakes. They are considered especially important for maintaining water quality of the Great Lakes, in our case, Lake Superior. There are multiple initiatives underway to protect and enhance health and biodiversity of coastal wetlands. Mud Lakes on the L'Anse Reservation is one example of a coastal wetland complex in need of restoration for industrial waste from highway renovations and illegal dump sites.

Coastal Wetlands Associated Species: Waterfowl, bald eagle, wolf, otter, marsh birds, shore birds, amphibians, fish

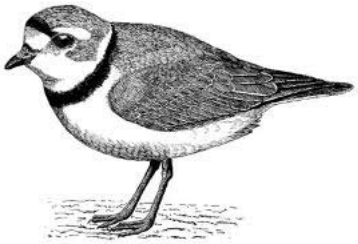
Coastal Wetlands High Priority Considerations Waterfowl habitat, gathering potential for medicinal, cultural and edible plants, wild rice, invasive species inventory and control, native species enhancement, flood control

Coastal Wetlands Stewardship Actions

- Clean up debris and garbage from Mud Lakes and other coastal wetlands; improve the area(s) for waterfowl habitat and community recreation
- Monitor waterfowl and marsh birds
- Monitor amphibians and other wildlife
- Evaluate water quality
- Control invasive species
- Restore areas of mine waste accumulation with native species of vegetation
- Retain ample coarse woody debris, snags and cavity trees

6.5 Beach and Bedrock Lakeshore

Beach and Bedrock Description: Great Lakes shorelines have a complex of distinctive natural communities. The Lake Beach is a dynamic community that is strongly influenced by water level changes and storms. It supports a suite of specialized organisms, although unprotected shorelines may be entirely unvegetated.



Associated wildlife Species: Insects, shorebirds, waterfowl, bald eagle

Beach and Bedrock High Priority Considerations: Mining waste (stamp sand) issues, public access, historically important shorelines, invasive species control, native plant enhancement

Beach and Bedrock Stewardship and Monitoring Actions

- Clean up debris and garbage regularly
- Evaluate erosion potential
- Restore or protect against high erosion potential
- Promote public use over privatization of shorelines

- Monitor shorebirds and waterfowl use of shoreline habitat
- Protect and monitor important rookery areas for birds
- Control invasive species
- Discourage motor vehicle use

6.6 Alvar

Alvar Description: In Michigan, alvar is a rare community type found near northern Great Lakes shores where flat bedrock pavement is often exposed. Alvar is typically a grass- and sedge-dominated community, with scattered shrubs and sometimes trees where soil depth allows or where cracks provide additional moisture needed by woody vegetation (Albert 2006). Mosses and lichens dominate in the driest areas and on exposed bedrock. Dominant grasses and sedges include little bluestem (*Andropogon scoparius*), prairie dropseed (*Sporobolus heterolepis*, state special concern), and bulrush sedge (*Carex scirpoidea*, state threatened). Where soil-water availability is greater, flattened spike-rush (*Eleocharis compressa*, state threatened), big bluestem (*Andropogon gerardii*), mat muhly (*Muhlenbergia richardsonis*, state threatened), and cordgrass (*Spartina pectinata*) sometimes dominate. Alvar occurs on broad, flat expanses of calcareous bedrock (limestone or dolostone) covered by a thin veneer of mineral soil, often less than 25 cm deep (Lee et al. 1998).

A paper written for the International Alvar Conservation Initiative by Resche et al. (1999) specifies quite well that although Alvar communities can look quite different, they do share several key characteristics:

- Areas occur on flat limestone or dolostone bedrock
- Soil is very thin or absent
- Naturally open landscape with restricted trees and shrubs
- Subject to seasonal droughts, some types to flooding
- Contain distinctive species of plants and vegetative characteristics
- Often contain rare species of plants, mollusks and invertebrates

Alvar Associated wildlife Species: Insects, bears, beaver, bobcat

Alvar High Priority Considerations: Classification of rare habitat, meditation areas, potential for medicinal plant gathering, rare species potential, invasive species control

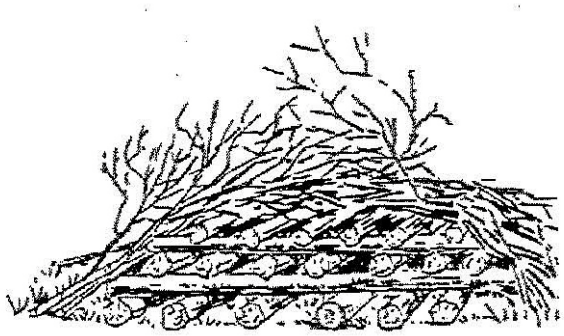
Alvar Stewardship Actions:

- Evaluate existence and specific classification on and near KBIC Reservation (i.e. possibly Pikes peak, Herman areas)
- Protect from development including road construction, atv use, recreational homesteads, mining exploration
- Inventory and control invasive species

6.7 Coarse Woody Debris and Snags

Coarse Woody Debris Description: Coarse woody debris (CWD) is an important but often neglected component of many terrestrial and aquatic ecosystems.

Primarily in the form of standing dead trees (snags), fallen trees (logs), and large fallen branches, coarse woody debris provides functional habitat for small mammals, drumming sites for ruffed grouse and spruce grouse, den sites for marten, fisher, bobcat, black bear, raccoon, and porcupine (Bull 2002). CWD provides habitat for insect larvae which in turn is a critical food source for birds, bats, bears, and small mammals (Harmen et al. 1986). CWD provides energy flow, nutrient cycling, and influences soil composition and sediment transport helping to maintain healthy watershed function and forest health (Harmen et al. 1986). Logs often act as "nurse" logs where tree seedlings establish. Snags are critical reproductive habitat for woodland bats, American marten, fisher, raccoons, squirrels, and a wide variety of cavity nesting birds. Crevices formed in snags between the trunk of a dead tree and peeling bark provide protection from the sun for bats and amphibians (Menzel et al. 2002, Johnson et al. 2012, Bull 2002). Snags that are large enough and hollow are used by hibernating black bear (Bull 2002). In streams, CWD creates a variety of habitat including debris dams, plunge pools and creation of gravel or sand bars.



Living cavity trees are typically more scarce than dead tree snags; they should be given preference when choosing trees to meet cavity objectives for wildlife habitat benefits. For best results cavity trees and snags should be left in openings and in contiguous forests (Miller 2011). Larger snags and logs (≥18" dbh) are preferable because they last longer and can accommodate a wider variety of animal needs.

Coarse Woody Debris Associated wildlife Species: Species of Greatest Conservation Need (SGCN) that use snags and a wide variety of cavity trees include northern flying squirrel, red-headed woodpecker, black-backed woodpecker, northern long eared bat, silver haired bat, and hoary bat. SGCN's that are associated with large sized older trees include the bald eagle, osprey, great blue heron, northern goshawk, red-shouldered hawk, cerulean warbler, and prothonotary warbler. SGCN's that are dependent on coarse woody debris include four-toed salamander, pine marten, and snow shoe hare. In addition to these SGCN's other species depend on CWD, large cavity trees, logs, and snags such as insects, small mammals, porcupine, raccoon, fisher, amphibians, reptiles, black bear, bobcat, wolves, coyotes, as well as fish and invertebrates in aquatic environments (Silviculture and Forest Aesthetics Handbook 2010) (Michigan's Wildlife Action Plan 2005).

Coarse Woody Debris High Priority Considerations: Wildlife habitat enhancement potential by preserving CWD (Best Management Practices), critical breeding and roosting habitat for a wide variety of animals, declining populations of fisher and pine marten, declining populations of cavity nesting bird species, high mortality of all bat species due to disease and further complicated by potential loss of critical habitat offered by CWD, effects of cellulosic biofuel harvest and resulting increased market value for "residual" wood, effects of less coarse woody

debris on insect populations utilized as wildlife food sources, maintenance of fungi species diversity, gathering of medicinal fungi, plants, and zagataagan (fire starting burls on mainly birch trees).

It is important to note from a forest product approach that removing trees already being used by wildlife may transfer damage to other trees as they seek alternative sources. One example is the woodpecker called a Yellow Bellied Sapsucker; it will return to utilize the same tree year after year. If that tree is removed, the bird will move to another undamaged tree and transfer feeding damage. Therefore retaining trees with noticeable wildlife use is recommended (Silviculture and Forest Aesthetics Handbook 2010).

Coarse Woody Debris Stewardship Actions:

- Leave behind a range of sizes of snags, logs, and larger sized CWD (≥18" dbh) (Ont. Ministry of Nat. Res. 1986) (Silviculture and Forest Aesthetics Handbook 2010)
- A guideline of three or more cavity trees and as many snag trees as possible per acre should meet the requirements of most cavity-dwelling wildlife (Silviculture and Forest Aesthetics Handbook 2010).
- Create brush piles for wildlife especially near edges of forest cuts
- Retain trees, snags, logs and CWD that show signs of wildlife use and/or cavities that may be used.
- Work directly with forest managers to determine the most appropriate quantities and sizes of coarse woody debris and snags to enhance wildlife habitat for various forest community types on a site to site basis
- Work with partners to avoid fire fuel potential in dry forest communities such as red pine
- Educate the public and private land owners on importance of coarse woody debris for wildlife and soil health

7. Affecting Policy and Decision Making;

History:

Subsistence harvesting naturally promotes conservative resource utilization, management, and stewardship (Bogue 2000). Rooted in Anishinaabe traditions and legends for nearly a millennium, the region's culture originates from the people's relationship with the environment and all its resources, all things living and non-living, all things physical and spiritual, all things mutually respected and dignified (Vecsey 1983). Centuries of environmental knowledge, beliefs, and values would (remain) become the foundation for protecting homelands, expressions of sovereignty, and affirming treaty rights (Wilkinson 2005). Over the course of several decades the Anishinaabe people have faced powerful opponents: discriminating and decimating federal policies, commercial fishing exploitations and the export of a subsistence resource, the discovery of copper and logging industries, and a desperate attempt to survive within a foreign worldview (Bogue 1987, 2000; Doherty 1990). Leadership would arise among Lake Superior Bands of Chippewa, within the Great Lakes region tribes, and would set the precedence for Indian revitalization and political self-determination within the United States (Wilkinson 2005). The Tribe would define their own sovereignty and authority; specify reserved rights in the 1842 Treaty of La Pointe; combat removal and termination by establishing a homeland in the

Chippewa Treaty of 1854; achieve federally-recognized self-government on December 17, 1936; and later, stand up for and reaffirm their treaty rights in the landmark Michigan Supreme Court decision of 1971, the *People v. Jondreau*.

Present:
To affect policy and decision-making, projects and initiatives are influenced by KBIC in a number of ways, including KBIC and KBIC-NRD staff participation in state, federal, tribal, and Binational planning, oversight and review, including but not limited to:

1) Leadership roles in regional initiatives: KISMA, Partnering for Watershed Restoration, LCC
2) GLIFWC's Board of Commissioners, Voigt Intertribal Task Force, and the Great Lakes Fisheries Committee
3) Grant Reviews (USFWS, ANA)
4) Mining Permits reviews and comments
5) Reviews of Water Quality standards, human health criteria, and EPA's Environmental Justice policy implementation
6) and several Committees (e.g. USFWS Committee for long-eared bat; SWG's Chemical and Mining Committees, Western Upper Peninsula Citizen's Advisory Council)

Additionally, KBIC develops and implements a number of governance mechanisms including, but not limited to, the KBIC IRMP, Tribal Strategic Plan, KBIC Hunting, Fishing, Trapping and Gathering Code of Law, Land Use Management Plan, Aquatic Invasive Species Adaptive Management Plan, Wolf Management Plan, and Fisheries Management Plan.
KBIC aims to affect policy and decision-making for newly-arising and the following ongoing concerns:

- Unknown sources of pollution (on top of the known sources such as legacy mining and current or future mining)
- Lack of resources and capacity to identify and monitor pollution
- Devaluation of Treaty Rights
- Loss of traditional homelands, resources and ceremonies
- Protection of wildlife and natural resources for the seventh generation
- Zero "acceptable risk" tolerance in water, air and fish contaminants – KBIC does not allow any level of risk when it comes to the health and safety of their people
- Climate change

Currently, KBIC is in the process of seeking TAS (Treatment as A State) so to allow a more formal seat at the table when discussing threats and protection of the water resources on and around the KBIC reservation. Achieving TAS would allow KBIC a formal means of setting and enforcing water quality standards for reservation waters and waters flowing into the reservation. The KBIC acknowledges the need to look to manage resources as partners in non-biased, non-political ways, recognizing that we all care about the same resources and want them to be available for future generations—compromise and collaboration will always be essential to this goal.

Future:

The WSP will help KBIC be more effective in caring for and living in harmony with our wildlife resources. Our continuing efforts to monitor, preserve, enhance, and support thriving wildlife provides a promise for the future of the resource. It also provides us with current, first-hand knowledge of the state of our environment in and around the Reservation. Armed with this knowledge, it places KBIC in a better position to affect regional and Tribal policies.
More specifically, we will continue to partner with other Tribes, agencies and organizations to monitor health and populations of wildlife, restore and enhance aquatic and terrestrial habitat, protect the Great Lakes and our watersheds. We strive to participate in and contribute to state and regional conservation initiatives and to meet a number of the 63 lake wide sub-strategies in the Lakewide Action and Management Plan (LAMP) through the Great Lakes Lake Superior Binational Forum. Some project examples we intend to continue and expand upon include but are not limited to:

- Landscape Conservation Cooperatives (Partnering)
- Stream Connectivity Restoration
- Watershed Restoration and Enhancement
- Superior WorkGroup (SWG) and LAMP Program
- Aquatic Invasive Species Control
- Invasive Species Management
- Native Plant Propagation
- Wild Rice Planting
- Wolf Monitoring
- Waterfowl Monitoring
- Bird Surveys
- Frog/Toad Surveys
- Bat monitoring

KBIC activity in policy and decision-making are a necessary component of protecting wildlife resources and traditional subsistence. This lifeway represents the cultural continuity from the past to the present—KBIC's long tradition of resource harvest and consumption from both Lake Superior and inland areas; many plants, fish, and wildlife species are harvested by tribal members for subsistence purposes (berries, wild rice, deer, fur bearers, fish, waterfowl and upland game birds) (EPA-KBIC TAS 2013). All of these harvest resources and the way of life upon which KBIC tribal members rely, and have relied upon since ancient times, depend upon *high quality ecosystems*. These systems in turn rely heavily on *high quality water and air*. Affecting policy and decision-making therefore is a responsibility, a KBIC *obligation* to protect the wider ecosystem and all life—human, fish, wildlife, plant, and tree communities—that depend on it.
From the Creation Story, and included in KBIC's recent application for "Treatment as A State" to the EPA, stewardship recognizes the interconnections and obligations to the wildlife and its habitats is additionally an extension of stewardship to its people:

> Most notably, water is a primary element in the creation story of the Anishinabe people which describes the creation, out of nothing, of rock, water, fire, and wind.
> Into each one was breathed the breath of life and each was bestowed a different essence and nature. Each substance had its own power which became its soul/spirit. Waters were given powers of purity and renewal. Water, or *nibi*, is the life blood of existence. Ceremonies are conducted to give thanks to the water. The protection of the life of the water is the essence of survival for KBIC, both physically and spiritually. As noted by

> tribal member Debra Williamson, "Water is the life blood of our Mother Earth. …Mother Earth gives us our medicine, her strength. If she is sick or weak, we will become sick and weak people."

KBIC policy and decision-making activities will continue to strengthen and grow into the future. We will continue to assert that the federal government not only legislate stricter regulations and enforcement concerning environmental quality and wildlife protection, but additionally, to honor their trust responsibilities to the Keweenaw Bay Indian Community laid out in the 1842 Treaty of La Pointe, the Treaty with the Lake Superior Chippewa Indians (see GLIFWC 2009, *Fulfilling Ojibwe treaty promises*).

8. Tribal Updates and Public Education

The KBNRD will continue to keep the Community informed about environmental issues and progress on wildlife and habitat projects through:

- KBIC NRD website
- Presentations at professional conferences (i.e. Native American Fish and Wildlife, Midwest Fish and Wildlife, Wildlife Society, Michigan Wetlands Association, Wildlife Disease Association, etc.)
- Hosting workshops (i.e. Ash basketry, Crop Wild Relatives, Wild Rice Camp, Traditional Hunters Stories, Native Plants Workshop etc.)
- Newsletters (KBIC Tribal Newsletter, KBNRD Newsletter etc.)
- Newspaper articles
- Informational pamphlets and other materials (i.e. Living with brother wolf, Invasive species identification, Aquatic Invasive Species Fact Sheets, Bird identification, Frog and toad identification, Wildlife Stewardship Plan, etc.)
- Community events (i.e. Michigan parks, Michigan Tech University, Ottawa Sportsman Club, L'Anse and Baraga Area schools, KBIC Fishing Derby, KBIC Environmental Fair, KBIC Environmental Forum, KBIC Powwow etc.)
- Collaboration (i.e. KBIC Departments and Committees, Michigan Technological University, Grand Valley State University, University of Minnesota, Suffolk University Boston, Keweenaw Bay Ojibwe Community College, Michigan Tribes, Wisconsin Tribes, The Nature Conservancy, National Wildlife Federation, Save the Wild UP, Superior Watershed Partnership, Partnering for Watershed Restoration, Yellow Dog Watershed Preserve, Great Lakes Indian Fish and Wildlife Commission, Michigan Department of Natural Resources, Natural Resource Defense Council, Western Mining Action Network, U.S. Forest Service, U.S. Fish and Wildlife Service, USDA Animal Plant Health Inspection Service, USDA Natural Resources Conservation Service, Keweenaw Land Trust, Trust for Public Lands, Michigan Department of Transportation, Baraga County Road Commission, etc.)

9. Plan Review

The WSP is a living document that may be updated or revised whenever the Tribal Council and the NRD feel it is necessary. At minimum, the plan will be officially reviewed every ten years to ensure current values and issues are being addressed.

10. Conclusion

We are happy that you have taken time to read the KBIC Wildlife Stewardship Plan. There remain gaps in knowledge that we seek to improve upon in both ecology and culture. These sections will continue to grow as we obtain more traditional knowledge from the community and collect more data about the wildlife with which we share this earth. Partnerships are being built and resources will continuously be sought to continue our work at promoting a harmonious mutual relationship with the community, wildlife, and habitats. Miigwech!

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Appendix

Appendix 1. KBIC Home Territory and Reservations Map

Appendix 2a. Landcover map of *western (Baraga) side* of KBIC L'Anse Reservation

Appendix 2b. Landcover map of north eastern (L'Anse) side of KBIC L'Anse Reservation

Appendix 2c. Landcover map of southern (L'Anse) side of KBIC L'Anse Reservation

Appendix 3. Map showing wildlife study locations on and near the L'Anse Reservation