

Keweenaw Bay Indian Community

Terrestrial Invasive Species Management Plan



June 2018



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Purple Loosestrife (KBIC NRD), Japanese Barberry (KBIC NRD), Leafy Spurge (USDA NISIC), Hemlock Woolly Adelgid (Michigan Invasive Species MDARD MI.gov), Emerald Ash Borer (Andrew Storer, MTU Center for Exotic Species)

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Terrestrial Invasive Species Management Plan

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1.0 Introduction

Keweenaw Indian Bay Community Terrestrial Invasive Species Management Plan

While holding great respect for all species, the goal of this Terrestrial Invasive Species Management Plan is to promote and protect the health and existence of native plants and animals of ecological, cultural, or subsistence significance upon which the Keweenaw Bay Indian Community depends by preventing, monitoring, and managing invasive species and educating the community about these plants and animals.

Vision Statement: *To enhance and sustain the resources of the Keweenaw Bay Indian Community by promoting the stewardship needed to prevent and control invasive species.*

Mission Statement: *To support, honor, and respect mutual relationships between thriving human and plant communities by maintaining, enhancing, and restoring ecologically diverse networks of healthy habitat and respectful interactions between people and land.*

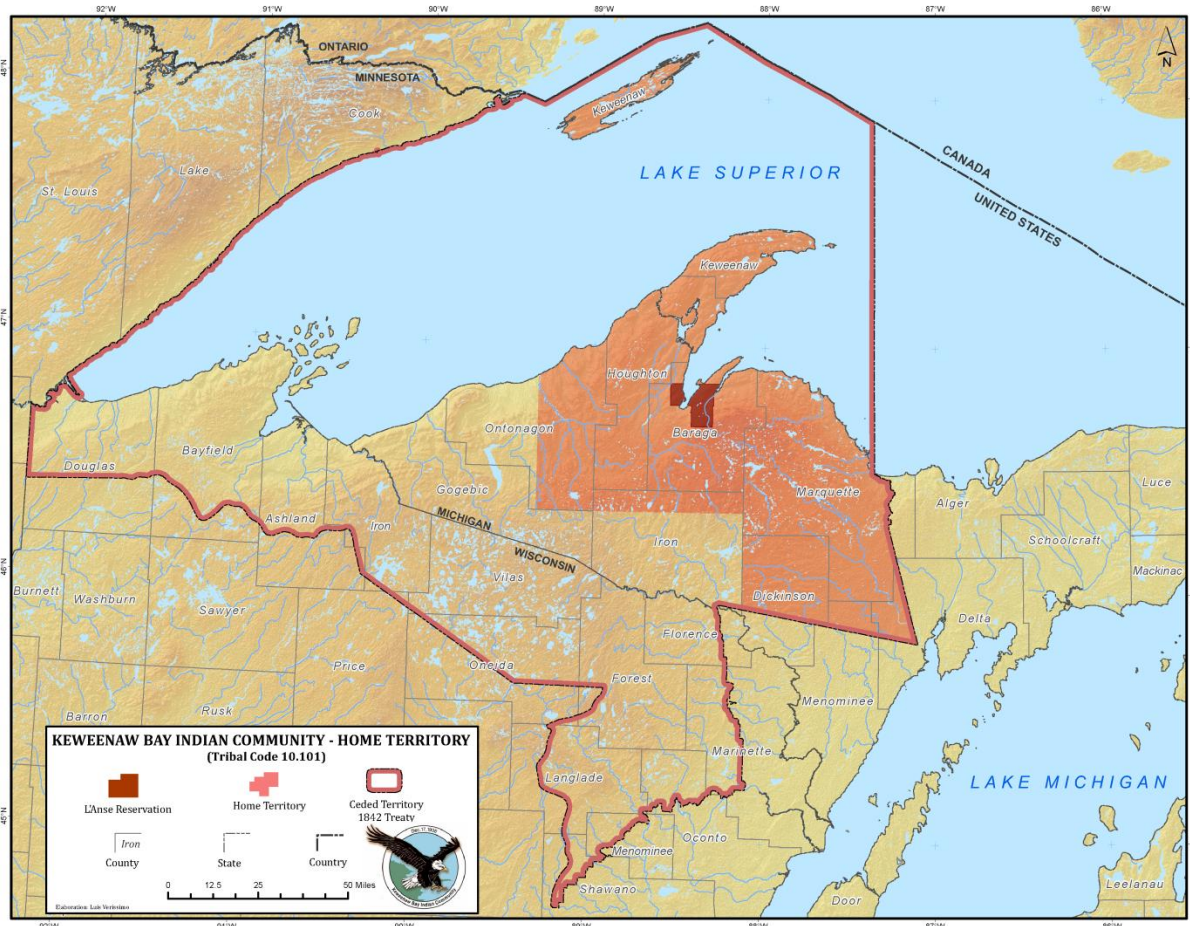
1.1 Purpose of the Terrestrial Invasive Species Management Plan

As invasive non-native species become established on our tribal lands they can alter the base of area ecosystems, diminish habitat quality, reduce forage availability, stress key native species populations, degrade water quality, and compromise availability of culturally significant species upon which tribal members depend. The purpose of this Terrestrial Invasive Species Management Plan (TISMP) is to outline an approach for the Keweenaw Bay Indian Community's Natural Resources Department (KBIC NRD) to better monitor and address issues of Terrestrial Invasive Species (TIS) within the reservation and ceded territory. This document will provide guidance to all Department programs regarding TIS prevention, assessment, monitoring, and control.

As our world becomes more connected, the potential for species to move from one location to another is increasing. Through intentional or non-intentional means, humans have been responsible for translocation of many species globally, enabling non-native species to colonize terrestrial and aquatic environments far away from their origins. While there are many terms and definitions related to invasive species, all of them focus on the concept that species that are non-native to an ecosystem may cause significant ecological and economic harm. The impact of invasive species is wide ranging and is one of the greatest threats to our native biodiversity. From a biodiversity perspective, invading non-native species may threaten the genetic integrity of native species, disrupt life history traits, alter geographic distribution, and reduce diversity of habitats on the landscape.

1.2 KBIC Overview: Cultural Considerations, Ecosystem Impacts

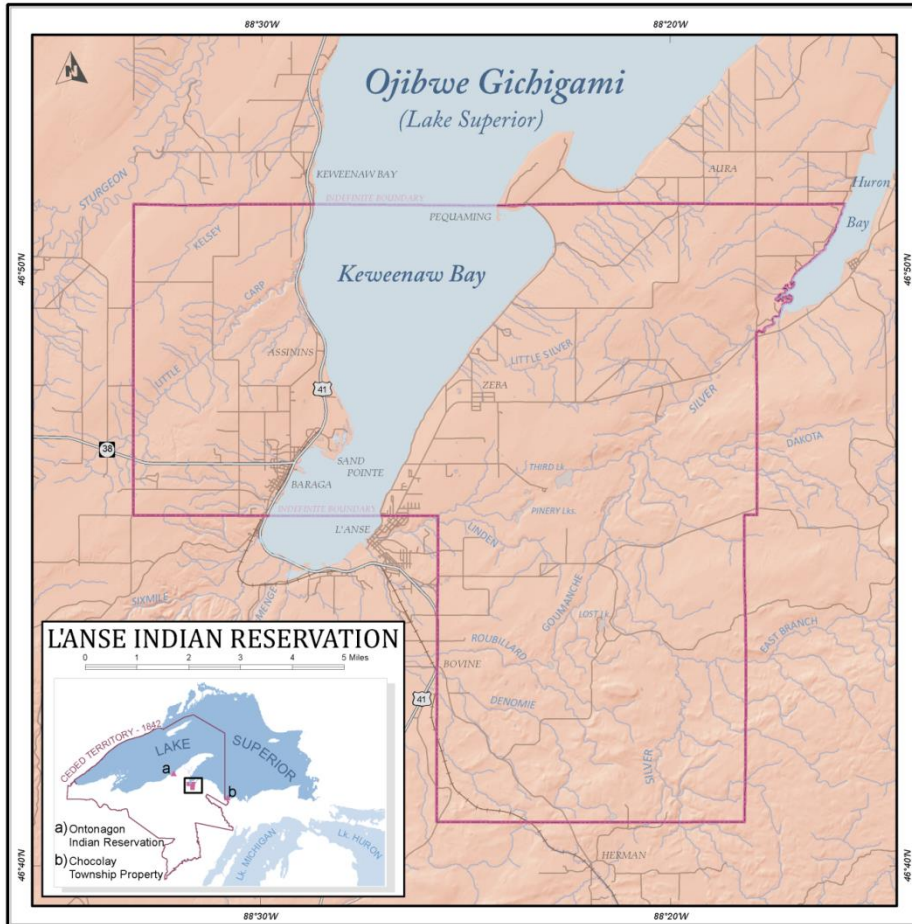
KBIC is a signatory to the Treaty of 1842 and the Treaty of 1854. The Treaty of 1854 established Reservation land bases which include the L'Anse and Ontonagon Indian Reservations. The primary land base is the L'Anse Indian Reservation, located in the western Upper Peninsula of Michigan along the shores of the Keweenaw Bay of Lake Superior.



Ceded territories covering the western Upper Peninsula of Michigan and northern portions of Wisconsin and Minnesota were defined by the Treaties of 1842 and 1854. KBIC retains hunting, fishing, gathering, and other usufructuary rights within these ceded territories, and tribal members and government staff exercise these rights for subsistence, spiritual, cultural, management, and recreational purposes.

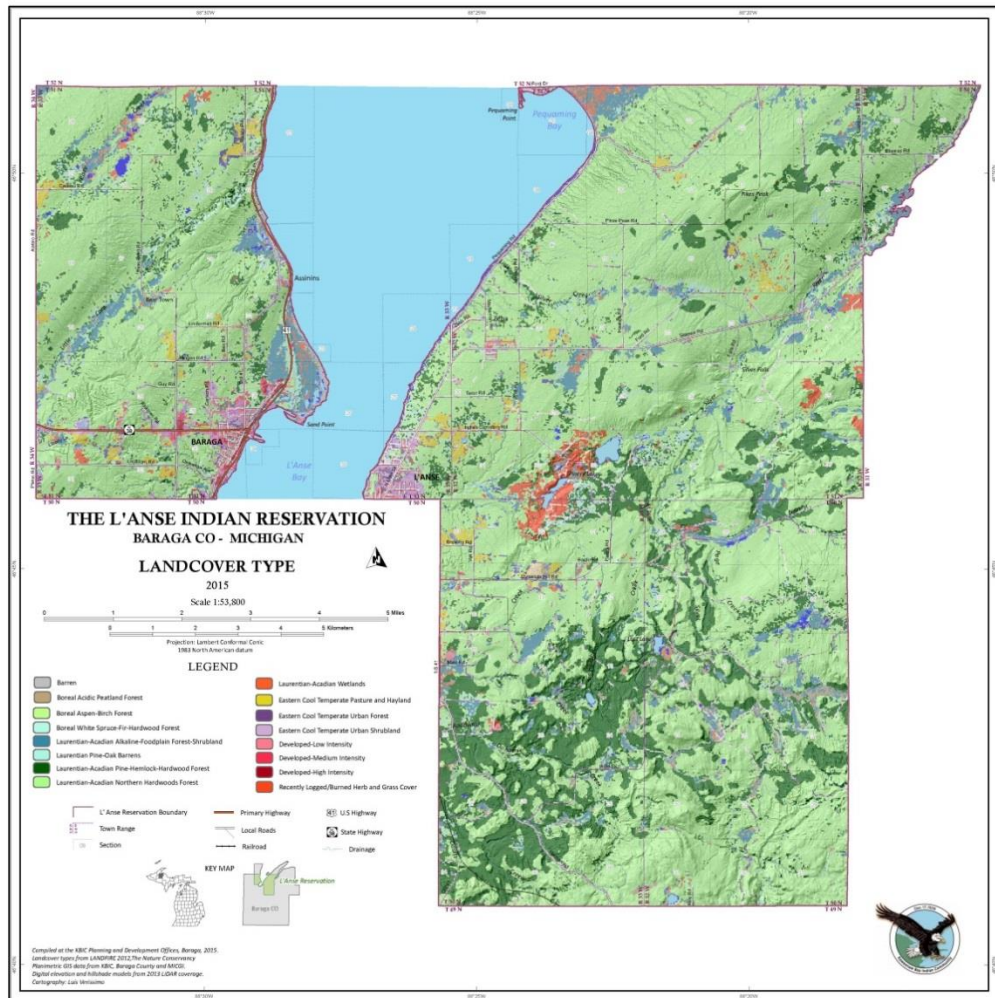
The L'Anse Indian Reservation consists of approximately 75,000 acres, 54,000 of which are land, and 21,000 of which is Lake Superior. There are approximately 19 miles of Lake Superior shoreline, 3,000 acres of wetlands, and 80 miles of rivers within five watersheds that are either wholly or partially within the L'Anse Reservation boundaries. The Village of Baraga and community of Zeba both lie entirely within the Reservation boundaries, while the Village of L'Anse lies partially within the Reservation.

The Ontonagon Indian Reservation, which is located in Ontonagon County along the Lake Superior shoreline, is approximately 3,000 acres in size, has about 2 miles of Lake Superior shoreline, and includes three watersheds partially within Reservation boundaries. KBIC also administers approximately 200 acres of land holdings and housing in Marquette County. The L'Anse Indian Reservation and the Ontonagon Reservation exterior boundaries are formally recognized by the Bureau of Indian Affairs (BIA).



This TISMP will guide efforts to prevent the introduction, to reduce the spread, and to promote appropriate management of terrestrial invasive species populations within the KBIC Home Territory. The “Actions” listed within the management section of this TISMP will focus primarily on Reservation land, while the “Education” objectives and others hopefully will address the far reaching goal to benefit management of invasive species in all of the KBIC Home Territory and Ceded Territory. Because invasive species disperse widely across the landscape and administrative boundaries, it is essential to work cooperatively towards management and control objectives. In addition, the number of new exotics being introduced into local ecosystems continues to out-pace control activities and is too much for any one agency to manage alone. This plan is designed with consideration of tribal, federal, state, regional, and local authorities and laws to focus on minimizing the negative impacts caused by invasive species to natural ecosystems and native plants and animals (including humans). Many invasive species

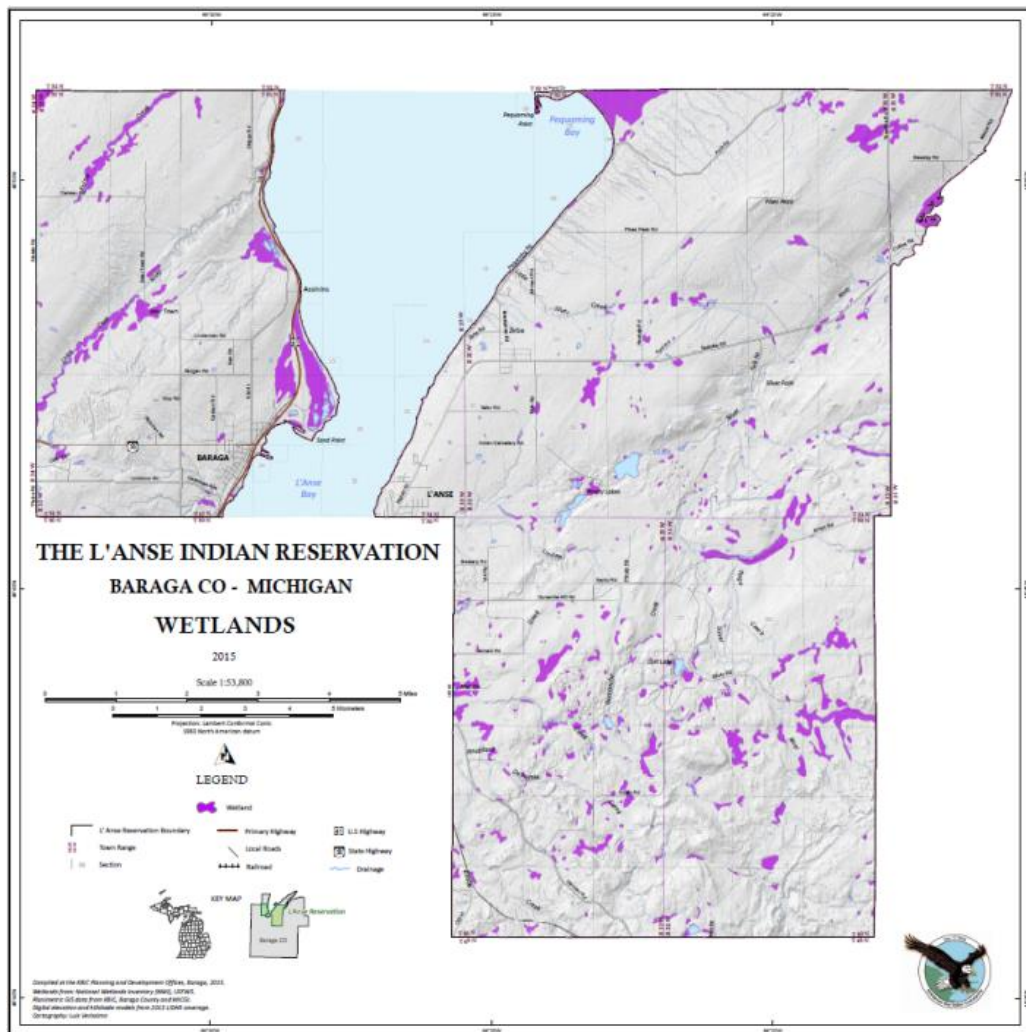
management plans are currently in place or being developed at the national, tribal, state, regional, and local levels and this plan is intended to work in conjunction with other plans and cooperating agencies to protect native species in the diverse landcover types of the Reservation.



The Keweenaw Bay Indian Community is dedicated to the protection of its plant resources and communities, preservation of its culture, and perpetuation of its traditions. The relationships we seek to nurture between people and habitat are those exchanging mutual benefits, with an emphasis on respect, reciprocity, and enduring sustainability recognizing that we cannot exist without the food, medicine, teachings, and shelter that our habitat provides. We approach “management” as caretakers and stewards of our natural communities and continue to incorporate centuries of Anishinaabe knowledge and values through shared guardianship of habitat. Plants have been here long before humans. Plants are our relatives. The wisdom of plants and the knowledge they share with us guide our approach to our plant resources. Food sovereignty and food security become more possible with the gifts of the earth and from home and community gardens, such as The Community People’s Garden in L’Anse, an initiative by the Keweenaw Bay Indian Community Natural Resource Department to promote gardening and natural foods.

As caretakers of their community, many Ojibwa people continue to harvest and use native plants in their traditional manners and there is a strong movement toward recovering knowledge fragmented by intergenerational gaps in inherited teachings. Traditionally, gathering of plants done by the Ojibwa people has been for food, medicine, ceremonial materials, dyes, tools, construction, and basketry. Always has the approach to the land been governed by the guiding principles of the Seventh Generation.

Wetlands provide enormous benefits and gifts for all species. In wetlands, invasive species management requires a combination of strategies using methods from both terrestrial and aquatic invasive species plans, such as with control of purple loosestrife, reed canary grass, phragmites, and European swamp thistle, to protect the precious wetlands on the Reservation.



Our protective stance teaches us to know that we are responsible to share our landscape with future generations and we follow guiding principles (KBIC IRMP 2016 draft Plant Section) that recognize that all life has value, including:

- Stewardship and Relationship – the land we belong to has shaped our lives. It has provided food, tools, construction materials, recreation, and inspiration. Proper stewardship of the land is a duty to the Seventh Generation and a vital part of the history of the tribe. Efforts to restore and protect it will vitalize the community.
- Biodiversity and Pristine Habitat -- the L'Anse Reservation is home to hundreds of plants and animals. A diverse ecosystem is more efficient in capturing energy from the sun and cycling nutrients in the soil. It is also less susceptible to disturbances and stresses such as drought and disease that may be brought on by climate change. A diverse plant community becomes home to a much more diverse group of animals than when only a few plants grow. By losing this diversity, we threaten the integrity of the ecosystem we live in and become more vulnerable to changes brought on by a quickly shifting climate.
- Future Resources and Security for Seven Generations – through honorable harvests, forest and wetland plants offer bountiful opportunities for enhancing the well-being of our people. Native plants are an important resource to rescue the loss of genetic biodiversity. As we receive teachings from more plants, we envision more members of the community preparing wholesome foods and effective medicines.
- A Foundation – Because vast tracts of land are in near pristine condition, KBIC lands can be used to measure fluctuations in our environment and record effects of climate change.
- Educational Resource – Our tribal lands help us learn about the environment we live in and the other organisms that we share with it. Our strong relationship with the natural world enables us to share our landscape and traditions with future generations
- Aesthetic Value – the beauty of the Great Lakes basin is unsurpassed. The forests, open wetlands, pristine inland lakes, living sky, deep snows and hidden valleys command a sense of place like no other.

Over 384 plant species are recognized as being of great importance to the Anishinaabe (*Plants Used by The Great Lakes Ojibwa* (Meeker *et al.* 1993 GLIFWC). Our relationships with those of the plant nation are interwoven in a complex way. A more protective stewardship stance is needed to assure careful consideration of decisions that may be beneficial to some species but not to others in order to protect biodiversity, keep expanses of pristine land available for all to enjoy, and to honor the sacred trust in assuring the safeguarding of all species for generations to come.

Although some of the plants listed as invasive species are among those included in the *Plants Used by The Great Lakes Ojibwa* for their beneficial qualities, they may have originated as exotic or introduced species that have the ability to displace other species of significance. Some non-native species have become so common and so well integrated that they have become naturalized or adopted, thus adding to the complexity of consideration. Botanist Robin Wall Kimmerer eloquently ponders the distinction between “naturalized” species in contrast to an invasive species that brings harm in *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants*. She writes:

This wise and generous plant, faithfully following the people, became an honored member of the plant community. It's a foreigner, and immigrant, but after five hundred years of living as a good neighbor, people forget that kind of thing.

Our immigrant plant teachers offer a lot of different models for how not to make themselves welcome on a new continent. Garlic mustard poisons the soil so that native species will die. Tamarisk uses up all the water. Foreign invaders like loosestrife, kudzu, and cheat grass have the colonizing habit of taking over others' homes and growing without regard to limits.

...Being naturalized to place means to live as if this is the land that feeds you, as if these are the streams from which you drink, that build your body and fill your spirit. To become naturalized is to know that your ancestors lie in this ground. Here you will give your gifts and meet your responsibilities. To become naturalized is to live as if your children's future matters, to take care of the land as if our lives and the lives of all our relatives depend on it. Because they do. (Kimmerer 2013 pp.214-5)

Additional recently published sources of Anishinaabe botanical knowledge include: *Our Knowledge Is Not Primitive: Decolonizing Botanical Anishinaabe Teachings* (Geniusz 2009) and *Plants Have So much to Give Us, All We Have to Do Is Ask* (Geniusz 2015) which use traditional storytelling to bring plants to life with narratives that place plants in cultural context as cognizant beings who help us create food, simple medicines, and practical botanical tools.

1.3 Companion Documents to Support the Development of the TISMP

The TISMP is a companion document to several existing documents that currently guide KBIC NRD in natural resource stewardship. Current KBIC documents that address invasive non-native species that were used to develop the TISMP include:

- Aquatic Invasive Species Management Plan (AISMP) – Adopted in 2014, the AISMP is designed to promote and protect the health and existence of native plants and animals of ecological, cultural, or subsistence significance upon which the Keweenaw Bay Indian Community depends by preventing, monitoring, and managing aquatic invasive species and educating the community about these plants and animals. http://nrd.kbic-nsn.gov/sites/default/files/KBIC%20Final%20AIS%20Plan%20Approved_Merged.pdf
- Integrated Resource Management Plan (IRMP) – KBIC's Integrated Resource Management Plan sets forth goals of protecting and expanding culturally significant native plants and identifying and controlling invasive species on the Reservation that threaten the existence of our native plants. Integrated resource management incorporates subsistence and natural resources, social, cultural, environmental, and economic aspects of importance to KBIC into management decisions. (KBIC 2016 draft).

- Wildlife Stewardship Plan (WSP) – Adopted in 2014, the WSP addresses invasive non-native species of plants and animals in the context of promoting native species. Objectives focus on reducing negative impacts that local non-native species have on the natural environment and directly or indirectly on native species. http://nrd.kbic-nsn.gov/sites/default/files/WSP12_18_14FINAL1EO%28mh%29v52915.pdf

KBIC NRD has already been making efforts in monitoring and managing invasive species, both aquatic and terrestrial. These efforts have included, but are not limited to:

- Sea lamprey control
- Fish forage base and diet work
- Monitoring for AIS in collaboration with USFWS
- Providing boat wash services at area boat launches in collaboration with the USFS
- Active control of specific plant species including Japanese barberry, purple loosestrife, Eurasian water milfoil, swamp thistle, garlic mustard, spotted knapweed, reed canary grass, Eurasian phragmites, various buckthorns, honeysuckles, and knotweeds.

1.4 Collaborative Efforts

Collaboration with other agencies and organizations has been a key part of KBIC’s efforts in preventing, monitoring, controlling, and providing education and outreach for invasive species. Collaborators include:

- Keweenaw Invasive Species Management Area (KISMA) is a Cooperative Weed Management Area whose mission is to facilitate cooperation and education among federal, state, tribal, and local groups and landowners in prevention and management of invasive species across land ownership boundaries within Baraga, Houghton, and Keweenaw Counties. KBIC NRD is a KISMA member and entered a Memorandum of Understanding (MOU) with KISMA (currently being renewed) for them to provide assistance and expertise with invasive species management. <http://www.michiganinvasives.org/kisma/>
- Michigan Department of Natural Resources (MDNR) plays a significant role in preventing, monitoring, controlling, and providing outreach on invasive species that threaten the state. With a large part of the Ceded Territory located in Michigan, collaboration with the MDNR in preventing, monitoring, and early detection of invasive species is crucial. MDNR also includes restoration treatments as part of their management goals. As part of their educational outreach, the MDNR engages volunteers, landowners and partner groups and also provide maps, brochures, identification cards, videos, and workshops that are available for use in addressing terrestrial and aquatic

invasive species. The newly released *Michigan's Terrestrial Invasive Species State Management Plan 2018* is a valuable resource for KBIC NRD working in collaboration with other state agencies on controlling terrestrial invasive species. See the full document at: http://www.michigan.gov/documents/dnr/Terrestrial_invasivesp_plan_618659_7.pdf

- Great Lakes Indian Fish and Wildlife Commission (GLIFWC) is an organization exercising delegated authority from 11 federally recognized tribes in Minnesota, Wisconsin, and Michigan, including Keweenaw Bay Indian Community. Because of GLIFWC's connection with the tribes of these northern states, they are aware of and have experience with the detrimental impacts invasive species can have on native species that are significant to the tribes' culture. GLIFWC has created a number of educational booklets, brochures and posters to inform the general public about important tribal topics. From information about treaty rights, to fisheries management, to wild rice, to invasive species, these media are essential to educating people about the importance of preventing and monitoring for invasive species. Educational materials are available in electronic form on their website, or as a hardcopy. Available on their website is an interactive mapping program for viewing where invasive species (among other species) are located. To find more information about GLIFWC, visit their website at www.glifwc.org
- U.S. Forest Service (USFS) has implemented an Invasive Species Program which strives to reduce, minimize, or eliminate the potential for introduction, establishment, spread, and impact of invasive species across all landscapes and ownerships. The USFS Invasive Species Program's website has many educational materials including: maps of current invasive species infestations, videos, flyers, reports and links to helpful resources. www.fs.fed.us/invasivespecies
- U.S. Fish & Wildlife Service (USFWS) is an agency within the Federal Government's Department of the Interior. Within the US Fish and Wildlife Service, the Office of the Native American Liaison was created to focus on areas where federal and tribal conservation efforts intersect. USFWS is organized into regions to work with the public and private sector to develop and implement invasive species projects. For more information see: www.fws.gov
- Midwest Invasive Species Information Network (MISIN) is a regional effort to develop and provide early detection and response resources for invasive species with the goal to assist both experts and citizen scientists in the detection and identification of invasive species in support of successful management. This effort is being led by researchers with the Michigan State University Entomology Laboratory. <https://www.misin.msu.edu/>
- Iron Baraga Conservation District is one of Michigan's 77 Conservation Districts which provides natural resource management services and information to help local citizens manage their lands and preserve our environment. <http://www.ironcd.org/>

2.0 Terrestrial Invasive Species (TIS)

2.1 Definitions

Invasive species can be plants, animals, pests, or pathogens and can be aquatic (in the water) or terrestrial (on the land) living outside their native range. Non-native species may not always cause harm but many invasive species are more aggressive and quickly out-compete native species for space and resources, as they are free from natural predators, reproduce rapidly, and aggressively compete with native species (KBIC NRD 2014). Invasive plants can cause dramatic ecological changes that impact both plant and animal communities. This is often due to landscape transformations that reduce the adaptability and competitiveness of more desired native species. Such transformations are linked to the excessive use of resources by invasive plants. There is a great variety in terms and definitions when it comes to TIS; following are relevant terms and their definitions.

Native (or indigenous) species is defined as native to a given region or ecosystem if its presence in that region is the result of only natural processes, with no human intervention. Every natural organism has its own natural range of distribution in which it is regarded as native (US Legal 2014).

Non-native (or nonindigenous) species is defined as a species living outside its native distributional range, which has arrived by human activity, either deliberate or accidental. Non-native species can have various effects on the local ecosystem. Introduced species that have a negative effect on a local ecosystem are also known as invasive species. Not all non-native species are considered invasive. Some have no known negative effect and can, in fact, be beneficial (MBL 2013).

Invasive species is defined as a plant or animal that is not native to a specific location (an introduced species). Invasive species have a tendency to spread, and are believed to cause damage to the environment, human economy and/or human health (NISC 2006).

Noxious species is defined as a species that has been officially declared by a federal, state, tribal, or county government entity to be injurious to native ecosystems and wildlife habitats, cropland, and rangeland agriculture, and/or humans, livestock, and wildlife, and to be the target of recommended or mandatory management efforts (BIA 2014).

Naturalized species is defined as a process by which a non-native organism spreads into the wild and its reproduction is sufficient to maintain its population (UCANR 2014).

A non-native plant that does not need human help to reproduce and maintain itself over time in an area where it is not native is considered naturalized (USDA). Many naturalized plants are found primarily near human-dominated areas and, sometimes the terms *naturalized* or *adopted*

are used to refer specifically to naturally reproducing, non-native plants that do not invade areas dominated by native vegetation.

Alien is a term used by The University of Michigan Herbarium to describe non-native species that are of great concern for natural communities, thought to have been accidentally or purposely introduced from elsewhere in the world. Many are plants that have escaped from managed settings in gardens or arboreta to spread and become established. The majority of species that have been introduced persist and increase, though it may not be obvious for decades. Often after they have become invasive, sensitive native plants are compromised. More than one third of Michigan's flora now is non-native and this number will increase. Species included in the Herbarium flora are updated frequently with notes about where and when a new alien has been collected and is an excellent reference tool for early detection. It is intended to be an evolving illustrated website incorporating updates and new discoveries as soon as they are documented and verified. Updated information about the diversity and occurrence of plants is essential to understanding and stewarding Michigan's environment and appreciating its natural heritage. (See <http://michiganflora.net/home.aspx>)

Some invasive plants are distinctive and easily recognized but many others are difficult to distinguish from species of our native flora. It is important to use helpful tips and photographs like those in Appendix A: Species Profile Factsheets and other valuable resources such as Mistaken Identity (Sarver et al. 2008).

https://www.nybg.org/files/scientists/rnaczi/Mistaken_Identity_Final.pdf

2.2 TIS Target List and Watch List

An important step to an effective TISMP is to identify which species are already established as invasive species within the KBIC Home Territory and which TIS are on the horizon. Species on the Target List are those that are known to be present in our area and species on the Watch List have been identified as being an immediate and significant threat. The KBIC TIS Target and Watch List (Appendix A) is composed of four sections: Invasive Plants Target List, Invasive Plants Watch List, Invasive Wetland Plants List, and Invasive Insects and Pathogens. Keeping in mind that the status of invasive species is always changing, these lists contain the species of concern at this present time. Although not currently found in the KBIC Home Territory, TIS on the Watch List are included because of the potential of these species to cause significant ecosystem, cultural, and economic impacts if found here in the future. This TISMP is a living document and will be updated as new species of concern/interest are identified.

For each species on the target and watch lists, the following information is provided: Description and photographs, Origin and Spread, Habitat, Impact and Ecological Threat, Prevention and Control, Reporting and Education.

2.3 Forest Pests and Pathogens

Invasive pests and pathogens pose a potential threat to the forests across KBIC Home Territory. KBIC Forestry Division works cooperatively with KBIC NRD, the BIA, United States Forest Service, and state and private forestry agencies for identification, monitoring, and management objectives, including prevention and management of invasive species.

While there are native insects and organisms that help maintain ecosystem function, non-native pest and pathogens pose threats to individual species and entire forested ecosystems. Because KBIC forests are extensive, yet located within a fragmented ownership landscape, Best Management Practices (BMPs) including Integrated Pest Management (IPM) are recommended approaches to protect forests from insects and pathogens through species diversification and reducing tree stress.

Specific infestations often have only one tree species or genus as a host (for example, Emerald Ash Borer, Oak Wilt, Hemlock Woolly Adelgid). By promoting tree species diversity, the risk of mortality by pathogens and pests is minimized. Current timber sale specifications often retain or otherwise promote minor tree species in the stand, and this practice should be continued.

Pests and pathogens are much more likely to attack and kill stressed trees. In contrast, healthy trees are more likely to compartmentalize an infection and survive. Therefore in stands where trees are obviously stressed and exhibit signs of decline, harvesting declining trees can prevent further mortality and loss.

Being aware of up-coming potential insect and pathogen issues can help minimize losses. Michigan DNR has updated forest health information which has been helpful along with other resources in this plan. The insects and pathogens on the target and watch list have been selected based on the tree species present or likely to occur in the near future on KBIC lands. Several pathogens and pests are of local and current importance to the L'Anse Reservation. While not all of the potential and current pests can be addressed here, the priority pests are identified because of their threat to forest and cultural resources for the KBIC.

2.4 Pathways and Vectors

Pathways are the means by which species are transported from one location to another. Natural pathways include wind, currents, and other forms of dispersal. Man-made pathways are those pathways which are enhanced or created by human activity. These pathways can be either intentional or unintentional. The term vector is viewed as a biological pathway for a disease or parasite to be transmitted from one source (plant or animal) to another. Vectors are the mode of introduction of pathogens.

Although it is conceivable that a TIS introduction might happen through entirely natural vectors and pathways, in most cases, humans are involved along every step of the way. Humans have developed pathways that make TIS introductions possible. Gardens, plantings, and human modes

of transportation combined with commercial and recreational practices, such as ATV and hiking and ski trails, act as mechanisms by which TIS-occupied vectors can move along a pathway fast enough to arrive at a new environment with the TIS still in a viable state. “Hitchhikers” can be carried by hikers, boats, tires, horses, pets, shipping material, highway or construction projects, firefighting equipment, even forest restoration projects can carry seeds, spores, or larvae from one place to another, unexpectedly introducing a pest species somewhere it has not existed before. Human influence in this process is so pervasive that a map of TIS colonies is also a map of where humans visit.

An invasive plant has the ability to thrive and spread aggressively outside its native range. A naturally aggressive plant may be especially invasive when it is introduced to a new habitat. Education and awareness actions can alert lay people, professionals, and law enforcement staff to sources, vectors, and pathways. Education can also inform people about the best ways to avoid introducing or transporting TIS and what laws and regulations may apply. Monitoring lands for presence of TIS plays a role in identifying new populations and potential sources. Systematic monitoring can provide early detection of TIS and, in some cases, provide opportunity for rapid response and early control or eradication of invasives.

2.5 Climate Change and TIS

Climate change refers to shifts in the long-term pattern of weather conditions for a region. These shifts can be due to natural phenomena and human-caused forces (such as burning fossil fuels). Climates have always changed, but in recent decades measurements have indicated climate is changing at increased rates. The KBIC NRD lists the following predicted climate changes for our area based on scientific models:

- more mild winters;
- hotter, drier summers;
- more frequent and intense rain events;
- longer growing season;
- change in migration timing and patterns of wildlife;
- ice on lakes will form later in the winter (if at all) and breakup earlier in the spring;
- change in abundance and distribution of coastal wetlands; and
- loss of native plant species; increase in non-native species.

Climate change and invasive species both influence environmental change in significant ways. Often thought of as independent forces, it is clear that these two factors can interact in causing environmental change. Climate change allows species that are indigenous to expand their range with possible detrimental effects on other native species. Although the invasion is a more local one, the effects on other organisms are real. There is considerable uncertainty about how climate change will manifest in specific regions of the country and how climate changes will influence the abundance and distribution of terrestrial organisms (native and non-native).

Scientific understanding is increasing in both areas and examples of how climate change is influencing TIS are accumulating. Given the potential interactions of climate change and TIS, it is strategic for the KBIC TISMP to consider this subject. The adaptive nature of the plan lends itself to the extremely dynamic nature of climate change and TIS with possibility of adding new information as it unfolds in the future. For more information on all of the above sections, see the companion document KBIC AISAMP: http://nrd.kbic-nsn.gov/sites/default/files/KBIC%20Final%20AIS%20Plan%20Approved_Merged.pdf

3.0 Management Goals, Objectives, and Actions

This TISMP takes a comprehensive approach to the prevention, early detection, assessment, monitoring, control, and education regarding terrestrial invasive species with capability to be an adaptive plan for the future as the need arises. The plan is based on two primary goals:

Goal 1 - Implement practices that prevent new TIS introductions and limit the spread of existing TIS populations in the KBIC Home Territory.

Goal 2 - Mitigate or eliminate ecological, cultural, economic, and health impacts of TIS within the Reservation.

The following objectives will help to achieve these goals: (1) education, (2) inspection and sanitation, (3) monitoring, (4) rapid response, (5) direct management, (6) laws and regulations, (7) coordination among agencies, (8) research, and (9) documentation of plan implementation. Adequate funding is necessary to accomplish the objectives and goals of the plan, which is an important first step in this process.

The actions are generally addressed toward the KBIC NRD staff or consulting professionals who could carry out specific actions. Some actions may require a more collective effort with other personnel and agencies. In other cases, actions could be carried out by lay people, volunteers, or others who are committed to protecting resources in the region.

The objectives and actions are far-reaching. This is a long-term plan. Some actions may be undertaken immediately. Others will be taken up later (even by future generations of stewards). The availability of time and funding will guide when some actions are undertaken.

Objective 1: Education – Educate resource professionals (including NRD, policymakers, and law enforcement staff), KBIC community members (emphasis on youth), recreationists (hikers, ATV users, and others), and commercial enterprises (tourism industry, foresters, garden supply, greenhouses, outdoor sports shops, contractors, and others) about terrestrial invasive species with emphasis on preventing new invasions and why this is important.

Educating others about terrestrial invasive species and about the KBIC's TIS activities is essential to the prevention and spread of new species in the KBIC Home Territory. Although many professionals are aware of invasive species and damages they cause, most community members, recreationists, and commercial enterprises do not recognize specific TIS or the threats they pose. The Species Profiles and Factsheets in this plan are tools for educating others about the TIS Target and Watch Species of concern to KBIC. Many additional outreach and education materials are available from other collaborating agencies such as KISMA, MISIN, and MDNR.

Action: Use the Target and Watch Species Factsheets in Appendix A to become familiar with TIS in the KBIC Home Territory and on the horizon.

Action: Attend public outreach events and collaborative educational forums that discuss TIS, such as KISMA and Upper Midwest Invasive Species Conference.

Action: Educate and encourage area wardens, sheriffs, and police to enforce the current TIS prevention laws. [Michigan Invasive Species - Invasive Species Laws](https://www.michigan.gov/invasives/0,5664,7-324-68071---,00.html) <https://www.michigan.gov/invasives/0,5664,7-324-68071---,00.html>

Action: Provide information and handouts concerning the threats of terrestrial invasive species to the native species at powwows, community gatherings, and other tribal events using the Species Factsheets and additional educational materials.

Action: Provide current information and updates regarding TIS in the KBIC and NRD newsletters and websites.

Action: Develop/maintain relationships with public and private schools to advance awareness, including KBOCC. Organize a traveling workshop on TIS. Encourage use of native vegetation in school landscaping.

Action: Use opportunities such as Annual Kids Fishing Derby, Lake Trout Festival, Environmental Fair, and Wild Rice Camp to do TIS education.

Action: Identify strategic audiences within the watershed for education on the spread of TIS and how to protect our native ecosystems (for example, garden shops, sporting goods stores, community associations, local park attendants).

Action: Develop a TIS billboard to be placed in a busy area in the KBIC Home Territory.

Action: Develop and distribute radio television and public service announcements about TIS and provide precautionary prevention tips to the community.

Action: Increase awareness of best choices in planting native plants in gardens and landscaping for our region utilizing the list of KBIC Greenhouse Native Plants. Work with nurseries and garden supply programs to eliminate known invasive plants and to recommend non-invasive alternatives.

Action: Increase awareness of the proper procedures for removal and disposal of unwanted invasive species using the factsheets and existing publications.

Objective 2: Inspect and Sanitize – Inspect and sanitize equipment (recreational and professional) that comes in contact with lands within the KBIC Home Territory.

Inspecting and sanitizing equipment that comes into contact with lands in the KBIC Home Territory is the first line of defense in preventing the spread of terrestrial invasive species. It is the most cost effective and environmentally sensitive method of managing TIS. This objective aims to identify high priority pathways and vectors, improve decontamination methods, and seek funding for assistance in inspecting and sanitizing equipment.

Action: Increase the awareness of NRD employees, KBIC community members, and contracting businesses of the importance of inspecting and cleaning all equipment, including protective clothing, boots, tools, tires, vehicles, and equipment that come into contact with land.

Action: Follow the KBIC NRD decontamination protocols and expand them to address specific terrestrial circumstances and as new information warrants. (See: https://www.michigan.gov/documents/deq/qol-wrd-policy-invasive-species-decontamination_476846_7.pdf)

Action: Educate on the proper gear sanitation used for field work, wild rice harvesting, vegetation enhancement, plantings, restoration, etc.

Action: Develop information for the public on hiking and ATV trails about the importance of preventing the spread of invasive species by cleaning boots, tires, and equipment before entering the trail.

Action: Work with MDOT and county road commissions to see if proper cleaning and planting is being done in regard to preventing TIS dispersal.

Action: Identify habitat restoration projects or landscaping projects in the KBIC Home Territory and encourage the use of native species, and educate on the proper steps to help stop the transfer of TIS.

Objective 3: Monitor – Monitor lands within the KBIC Home Territory for the purpose of early detection of and rapid response to new TIS populations and sources.

Monitoring lands for early detection of terrestrial invasive species is critical in keeping populations of TIS contained. Researching lands that are vulnerable to certain TIS invasions will help determine what areas should be a priority for early detection monitoring because prevention is far more effective than control once TIS are established.

Action: Determine what lands in the KBIC Home Territory are vulnerable to TIS and concentrate efforts for early detection monitoring.

Action: Examine current sampling efforts and determine if additional monitoring for specific species is needed. Develop a monitoring strategy that will identify which high priority species are to be sampled and what the frequency of the monitoring should be.

Action: Utilize standard field protocols for early detection monitoring.

Action: Work with KISMA and collaborating agencies to document when and what species are being monitored for TIS, and presence/absence in nearby locations in a well-maintained and up-to-date TIS database.

Action: Maintain a link between the KBIC NRD website and the TIS database.

Action: Become familiar with identifying TIS target species of concern and continue to educate staff on TIS on the watch list. Fact sheets are included in Appendix A describing how to identify species and prevent or control them. There are many other resources online and available at various agencies.

Action: Monitor and document TIS while in the field with photographs and document specific locations.

Action: Survey high risk and culturally important areas within the KBIC Home Territory for new TIS.

Objective 4: Rapid Response – Implement a rapid response plan that provides guidance to those who have discovered a new population of TIS within the KBIC Home Territory.

If new populations of terrestrial invasive species are discovered, a quick, coordinated response can eradicate or contain the TIS before it spreads. Rapid response to a new TIS introduction can also save on potential costs of long-term control. Implementing a rapid response plan is paramount for the KBIC. Coordinating and collaborating with other agencies will help in creating the fastest response to new infestations of TIS.

Eradication refers to the complete elimination of a TIS. The principle behind eradication is to kill the plant before it reproduces or spreads. After prevention, eradicating a small population of an invasive plant is the most cost-effective control tactic. Eradication has two components: early detection and rapid response (often referred to as EDRR). The gardening public can assist by learning to recognize when a new plant is expanding beyond where it was planted and either remove it right away or report it.

Action: Develop and follow KBIC NRD TIS Rapid Response Strategy and adapt it as warranted. KISMA is a good source for information and assistance.

Action: The KBIC NRD staff will act as Rapid Response Team. Identify points of contact, including KISMA, technical experts, and lead agencies that could be called upon for early detection and rapid response efforts.

Action: Create a contact list of collaborating agencies and organizations that may be involved in the implementation of the KBIC TIS Management Plan.

Action: Maintain and update the TIS Target and Watch Lists and Resources.

Objective 5: Management – Manage (where possible) existing populations of TIS within the KBIC Home Territory to prevent spread to other land areas and minimize impacts.

KBIC NRD has managed and controlled many invasive species on Reservation lands utilizing Best Management Practices; also locating and mapping locations of invasive plants for future control has been a high priority for plant program staff. KBIC NRD prefers to use manual, mechanical, and biological control whenever possible. Chemical control is only used when other control methods have not been successful. While the following methods can work for a variety of invasive species, it is important to know that each management and treatment situation must be tailored to worker safety and consider site-specific objectives in order to be most effective. Some treatments are appropriate in some situations while not in others. The following paragraphs provide a description of manual, mechanical, biological, and chemical TIS management techniques.

Manual – Manual treatments are beneficial because they allow the manager to be selective in which species they intend to remove. Manual treatments involve any non-mechanized technique, which includes, but is not limited to: hand-pulling, lopping, and cutting. Manual treatments can be used in a variety of situations. Generally, this method is used to treat small infestations of TIS most commonly conducted where a new infestation of TIS has been discovered. Manual treatments can also be used as for spot-treatments of larger settings, or in cases when other methods are not accessible or applicable. For example, if a known native species population or known endangered species are in a location where invasive species are present, a manual treatment can be beneficial so not to disturb the rare species and/or native communities. Another advantage of manual treatments is that they can involve volunteers who have little or no experience treating invasive species. Limitations of manual treatment include: it is labor intensive, can be costly due to reoccurring treatments, and is not ideal for every species.

Mechanical – Mechanical treatments are a less common method of treatment. Some examples of mechanical treatment include: scraping, suction harvesting of aquatic invasive plants, dredging, brush-cutting, mowing, and use of fire (by way of prescribed burns). This type of treatment is generally used in situations where the TIS is so widespread or dense that large amounts of the species need to be removed. Mechanical treatments are typically expensive, require equipment and knowledgeable operators, and can be dangerous to the managers and the surrounding ecosystem.

Biological – Biological treatments are a specialized type of treatment. Only TIS with a known biological host can be treated biologically. This method can be a preferred choice of treatment if the invasive species

has a natural predator. One well-known terrestrial biological treatment used by the KBIC is the use of loosestrife beetles (*Galerucella californiensis* and *G. pusilla*) on the invasive plant purple loosestrife. Another biological control commonly used is the milfoil weevil on Eurasian watermilfoil.

The native milfoil weevil (*Euhrychiopsis lecontei*) feeds on the EWM plants, helping minimize and maintain the infestation. Disadvantages to biological controls include:

- purchasing the host predator can be expensive,
- the host predator must continue to live and survive near or on the species in order to control it,
- the predator can generally never completely eradicate a population,
- the results may take multiple years before noticeable differences are observed.

Chemical – Chemical control methods can be very effective in controlling some invasive species, but generally at the cost of surrounding native species. Chemical treatments must be considered carefully and are not available for all invasive species. In the case of the KBIC NRD, chemical treatments are considered a last resort due to the negative effects it can have on the ecological and cultural resources.

Action: Identify and evaluate available management options for eradication, control containment, or impact mitigation associated with specific invasive species or taxonomic groups.

Action: Determine which control strategies are most cost effective and environmentally and culturally sound. Work with KISMA and collaborating agencies to implement those strategies for TIS in the KBIC Home Territory.

Action: During a rapid response to newly discovered invasions, work with KISMA and other agencies to determine which management options to implement by assessing the characteristics and requirements for using various manual, mechanical, biological, or chemical tools approved for application.

Action: Evaluate the effectiveness of control strategies that have been in place on the KBIC Home Territory and modify or discontinue if evidence supports.

Action: Work with KISMA and stakeholders to educate on containment plans where TIS are already established.

Action: Formulate a database of information for each site in the KBIC Home Territory where TIS are documented. This provides a baseline of shared knowledge necessary to make good management decisions.

Action: Prioritize management efforts based on resource risk and resources available for control.

Action: Provide assistance when possible to organizations, property owners, and other stakeholders managing established populations of invasive species.

Action: Maintain inventory and update species specific management tools to use.

Action: Pursue funding opportunities as available for TIS management efforts.

Action: Work with KISMA, MDNR, GLIFWC, USFS and others to ensure that appropriate authorities collaboratively engage in rapid response planning in order to provide the operational and legal support needed for evaluating, selecting and implementing management options.

Objective 6: Laws & Regulations – Employ existing laws and regulations to minimize the spread of TIS within the KBIC Home Territory.

Presently, many federal and state laws, regulations and policies apply to the introduction, distribution, importation, transportation, possession, propagation, planting, and sale and release of invasive plants and animals. These authorities are spread over several agencies. This objective aims to review regulations for gaps and overlaps, and explore the need for new TIS laws and regulations, including KBIC regulations for protecting species of cultural significance.

Action: Educate and encourage area wardens, sheriffs and police to enforce the current TIS prevention laws.

Michigan Invasive Species - Invasive Species Laws

<https://www.michigan.gov/invasives/0,5664,7-324-68071---,00.html>

Federal Laws: <https://www.invasivespeciesinfo.gov/laws/federal.shtml>

Action: Introduce TIS volunteers and staff to area wardens, sheriffs, and police to gain support if someone is in non-compliance.

Action: Work with governing bodies on necessary TIS concerns.

Objective 7: Coordination – Coordinate with other agencies and organizations regarding TIS education, information, monitoring, and management to increase efficiency and economy in implementation of the KBIC TIS plan.

Terrestrial invasive species management activities conducted by the KBIC will cross multiple jurisdictions. Types of jurisdictions could include, but are not limited to: federal and state government agencies, universities, Cooperative Weed Management Areas, volunteer organizations, local agencies, local vendors, stakeholders, and consultants. These actions seek to increase coordination and collaboration with these administrations to allow for the comprehensive assessment of TIS activities and ensure action on high priority situations. KISMA and KBIC NRD have entered into a MOU for TIS management.

Action: Coordinate with KBIC Management Divisions, KBIC Forestry Division, and KISMA especially during times of collaborative effort.

Action: Work with coordinating agencies to best educate stakeholders about TIS.

Action: Work with KISMA and other agencies to create effective databases and GIS maps that are compatible with, and responsive to, TIS management needs.

Action: Create a contact list of agencies and organizations that may be involved in the implementation of the KBIC TIS Management Plan.

Action: Collaborate with other agencies, such as KISMA, GLIFWC, USFS, and MDNR on efforts and share data for greater efficiency in addressing TIS. The wide variety of monitoring efforts by citizens, government agencies, and academics across the state and region contribute to successful TIS management.

Action: Create a Rapid Response Team with collaborating agencies to implement the plan when new TIS is found.

Action: Coordinate with others for funding and implementation of TIS management.

Objective 8: New Research – Review new research findings on specific TIS and participate in basic TIS research that relate to the KBIC Home Territory.

Increased knowledge of the biology of invasive species and connected early detection, rapid response, and control methods will improve KBIC's terrestrial invasive species management. It is important to learn about and prepare for the potential economic, environmental, cultural, and human health and safety issues associated with new TIS.

Action: Compile a reference list of any past or present research done in the KBIC Home Territory in regard to species specific TIS.

Action: Determine if there is a need for an Economic Impact Study on the effects of TIS in the KBIC Home Territory, including the costs and benefits of pathway prevention.

Objective 9: Review and Update – Conduct periodic review of the KBIC TIS Management Plan implementation including an analysis of progress and areas where adaptations are warranted.

This plan is based on the model of adaptive management. This means that when the plan is implemented, it comprises the best available information and well-defined goals

and objectives. As time passes, new terrestrial invasive species may be introduced, sources may change, and methods of prevention, early detection, rapid response, and control might be modified. This objective aims for a periodic review of the KBIC TISMP in order to adapt to the ever-changing world of TIS management.

Action: Develop a system of tracking what actions have been completed and the outcomes.

Action: Update the KBIC TIS Management Plan periodically and as needed, defined by the KBIC NRD staff.

Conclusion

Today, as in the past, every decision, and deliberation thereof, is governed by the guiding principles of the Seventh Generation. Our tribal lands yield many benefits and opportunities, and along with these services is the reciprocal need for protection of these resources. The rise in plants that out-compete native vegetation and lower the local plant biodiversity is an on-going concern. Climate change may provide an advantage for invasive species that are able to shift quickly into a new geographic range and/or tolerate a wider range of environmental conditions. Additional threats are of exotic insects and other pathogens gaining a stronghold in our forests due to introductions and compounded by rapid climate change events that lead to shifts in phenology. In response to these concerns, The KBIC IRMP Plant Section lists as its first objective “To develop a Terrestrial Invasive Species Management Plan”. This plan is in response to that objective.

This document is the first version of the Keweenaw Bay Indian Community Terrestrial Invasive Species Management Plan. At this point we are not at the end of a process, but at the beginning of one. This plan is intended to be a guiding document but is highly adaptable to revisions in response to changing environments, dynamic wildlife and plant communities, new scientific understanding, fresh insights from traditional knowledge, additional sources of funds and human resources, evolving cultural needs, and new terrestrial invaders. Like the closely related Aquatic Invasive Adaptive Management Plan, Integrated Resource Management Plan, and Wildlife Stewardship Plan, this TISMP provides priorities and describes actions. It can be considered a menu of opportunities to be undertaken as funding and human resources allow. The list of actions is not exhaustive and should be added to, modified, or deleted in future versions of the adaptive plan as warranted by prevailing conditions.

The KBIC TISMP is an educational vehicle. We have attempted to review and provide the best information available at the present time. This is, however, a very dynamic field and new information becomes available every day. An important task of those implementing the plan is to stay apprised of current TIS science and management. The hands-on implementation of various actions will be an educational journey. What is learned from that process will provide valuable feedback for how the plan can be adapted in the future. A nurturing stewardship stance is needed to protect biodiversity, keep expanses of pristine land available for all to enjoy, and to honor the sacred trust in assuring the safeguarding of these gifts for generations to come.

4.0 Promoting Native Species for Revegetation

KBIC Greenhouse Plants: Species Recommended for Revegetation

Native plants are best adapted to local conditions and naturally support native bees and other beneficial species. Biological control and resources for pollinators are ecosystem services that are generously provided for by native plants. In turn plants require pollination by insects or wind to grow fruit and reproduce. Without effective pollinators, we would have little to no fruit, fewer vegetables, and many plant species would not be able to complete their life cycle. Controlling pest populations in crops and gardens by employing beneficial predatory insects and parasites help maintain a healthy ecology. Native plants provide the food resources upon which native insects depend. Invasive plants deprive the native ecosystem of its vibrance and resiliency.

The BioDome located at the NRD Hatchery site is used to grow native plants from seed to maturity and then be planted at restoration, medicinal, and gardening sites with the tribal lands.

Following is a list of some of the plant species grown in our BioDome which are key to the KBIC NRD restoration efforts. Whenever possible, select valuable native plants with food or medicinal value to reduce or suppress the dominance of invasive species, especially after eradication measures.

Big bluestem *Andropogon gerardii*

A characteristic prairie species, but spreads along roadsides, railroads, and disturbed areas; found in oak forests, jack pine plains, old fields, fens and sedge meadows.

<https://michiganflora.net/species.aspx?id=2006>

Black eye Susan *Rudbeckia hirta*

Thrives in sandy or rocky openings; prairies, fens, sedge meadows, shores; gravel borrow pits, and other disturbed sites; fields, roadsides, railroads, clearings, fencerows; savannas with jack pine, aspen, oak. <https://michiganflora.net/species.aspx?id=436>

Bloodroot *Sanguinaria canadensis*

Usually found in rich deciduous forests and floodplain forests, surviving considerable disturbance and clearings. <https://michiganflora.net/species.aspx?id=1901>

Blue vervain *Verbena hastata*

Found in marshes, ditches, wet shores and stream banks; thickets and openings in swamps. <https://michiganflora.net/species.aspx?id=2770>

Butterfly milkweed *Asclepias tuberosa*

Likes dry open habitats and is very common in the prairies and grasslands of the Midwest and Great Plains. Does not transplant well as it has a deep woody taproot but is easily propagated from seed. Collect the seed from the pods as they just begin to open.

Butterfly Milkweed is one of the milkweeds beneficial to the monarch butterfly.

https://www.fs.fed.us/wildflowers/plant-of-the-week/asclepias_tuberosa.shtml

Canada milk-vetch *Astragalus canadensis*

Dry prairies, moist shores, river banks, marshy ground, and other open or partly shaded ground. <https://michiganflora.net/species.aspx?id=1272>

Common milkweed *Asclepias syriaca*

Grows in dry to somewhat moist soils, usually in sandy, often disturbed areas: roadsides and railroads, shores, dunes, fields; openings in aspen and pine savannas. Milkweed sap is the sole food source of the Monarch butterfly larvae.

<https://michiganflora.net/species.aspx?id=162>

Early sunflower/False sunflower/Oxeye Sunflower *Heliopsis helianthoides*

Easily grown in average, dry to medium, well-drained soil in full sun: prairies, fens, meadows, river banks, and other moist ground; savannas and thickets (especially at borders and clearings) with aspen, birch, and other trees; spreads along roadsides and railroads. <https://michiganflora.net/species.aspx?id=360>

Evening Primrose *Oenothera biennis*

Usually grows on dry often sandy roadsides, fields, clearings, and disturbed ground; on stream banks and at borders of forests; rarely on beaches or dunes.

<https://michiganflora.net/species.aspx?id=1758>

Fireweed *Chamaenerion angustifolium*

Dry forests (aspen, jack pine, etc.), fields, roadsides, rocky ground; clearings and borders of forests, upper shores; gravel pits and other disturbed ground; frequently in rather wet places; common name suggests it thrives in burned-over areas, blooming in profusion as soon as three months after a spring fire. <https://michiganflora.net/species.aspx?id=1744>

Green-headed coneflower *Rudbeckia laciniata*

River banks and floodplains, thickets and moist forests, swamps (including cedar), wet ditches in or by forests and marshy ground. <https://michiganflora.net/species.aspx?id=437>

Indian grass *Sorghastrum nutans*

Dry open forests (jack pine, oak, etc.), prairies, and moist shores, even sometimes in marshy places; spreads somewhat in disturbed ground, as along roadsides and railroads.

<http://michiganflora.net/species.aspx?id=2222>

Joe-pye-weed *Eutrochium maculatum*, synonym *Eupatorium maculatum*

Marshes, meadows, swales, wet prairies and fields, shores, bogs and fens, cedar swamps, thickets, moist clearings and roadsides, moist hollows, borders of lakes and streams.

<http://michiganflora.net/species.aspx?id=330>

Lance-leaf Coreopsis (Sand Coreopsis) *Coreopsis lanceolata*

Found on sand dunes along great lakes and adjacent dry to moist shores, and borders of forests; open sandy banks and bluffs, grasslands, roadsides, oak-pine savanna. Some populations may represent escapes from cultivation; this showy native does well in gardens and spreads readily. <https://michiganflora.net/species.aspx?id=296>

Little Bluestem *Schizachyrium scoparium*

A characteristic prairie species, but more often seen in Michigan on jack pine plains, sand dunes, and shores; spreading along roadsides and railroads, in sandy old fields.

<https://michiganflora.net/species.aspx?id=2214>

Meadow rose (Wild rose) *Rosa blanda*

Dunes, sandy bluffs, and shores; jack pine savanna, river banks, and borders of forests and thickets; rocky openings and outcrops; fields and fencerows.

<https://michiganflora.net/species.aspx?id=2537>

Pale purple coneflower *Echinacea pallida*

Needs well-drained soil in full to partial sunlight; dislikes soil that is kept excessively moist or has poor drainage and will start to rot in these situations. Once the taproot is established it is extremely drought-tolerant and needs little care, but then also may be difficult to move. Also easy-to-establish is its cousin, Purple Coneflower (*Echinacea purpurea*), with a deeper purple flower. <https://michiganflora.net/species.aspx?id=309>

Pearly everlasting *Anaphalis margaritacea*

While sometimes in moist ground, usually found in dry sandy or rocky open places such as shores, dunes, fields, roadsides and railroads; in dry savannas of aspens or mixed conifers and hardwoods, especially along borders and in clearings (following logging or fire) and on trails. <https://michiganflora.net/species.aspx?id=216>

Rose (swamp) milkweed *Asclepias incarnata*

This is our only milkweed of truly wet ground, often found in several centimeters of water: edges of rivers and streams; shores, wet prairies; openings in conifer swamps, fens (less often bogs); depressions in forests, swales and ditches; attracts a profusion of butterflies, especially the monarch butterfly. It will thrive in average garden soil as long as it does not dry out completely in spring. <https://michiganflora.net/species.aspx?id=157>

Showy sunflower (Stiff sunflower) *Helianthus pauciflorus*

Likes full sun and mesic to dry conditions; average to dry prairies, roadsides, along railroads, fields; found in situations that suggest they are adventive from farther west or escapes from cultivation. <https://michiganflora.net/species.aspx?id=356>

Smooth aster *Symphotrichum laeve*

Dry open forests (oak, aspen, jack pine) and thickets, especially at borders and clearings; fields and roadsides; sandy plains, bluffs, stabilized dunes; prairies, meadows, shores; rarely in wet places such as fens. <https://michiganflora.net/species.aspx?id=484>

Tall Boneset *Eupatorium altissimum*

Found in medium moisture to dry habitats; starts blooming later in the season along railroads and roadsides, including adjacent prairies and sedge meadows. <https://michiganflora.net/species.aspx?id=321>

Thimbleweed *Anemone cylindrica*

Dry sandy barrens, savannas (jack pine, oak, aspen), dunes; fields, roadsides, shores; borders of forests. <https://michiganflora.net/species.aspx?id=2358>

Tobacco *Nicotiana rustica*

Requires warm temperatures for germination of about 75-80 degrees; grows in warm climates with rich, well-drained soil. Native to the Americas and is a member of the *Solanaceae* (nightshade) family.

Western sunflower *Helianthus occidentalis*

Characteristic of dry, very open, usually sandy savannas, such as jack pine and oak plains; also spreads along railroads and in fields, and is found in dry prairies. <https://michiganflora.net/species.aspx?id=355>

Wild Bergamot (Bee balm) *Monarda fistulosa*

Usually found in dry, open, sandy, gravelly, or rocky ground; oak or jack pine savanna, prairies, fields, and roadsides; occasionally in sedge meadows or other moist places; often

at edges of forests and thickets, on open stream and lake banks and stabilized dunes; spreading into disturbed places. <https://michiganflora.net/species.aspx?id=1574>

Wild Columbine *Aquilegia canadensis*

Grows in deciduous or mixed forests and thickets, but usually at borders or clearings, river banks, roadsides, or excavations; gravelly shores, ridges, and banks; occasionally in swamps. It is pollinated by hummingbirds, as one would expect from a red flower with long nectar-filled spurs. <https://michiganflora.net/species.aspx?id=2362>

Yellow coneflower *Ratibida pinnata*

Found in or near prairie remnants (including roadsides and fencerows), at margins of swamps, and in dry open ground or in rocky fields.
<https://michiganflora.net/species.aspx?id=434>

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KBIC NRD
Terrestrial Invasive
Species
Target/Watch List
&
Species Profile
Factsheets

Terrestrial Invasive Species

Target and Watch Lists

Common name	Scientific Name
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Invasive Plants Target List

Japanese barberry	<i>Berberis thunbergii</i>
Leafy spurge	<i>Euphorbia virgata</i> ; <i>Synonym: Euphorbia esula</i>
Winged pigweed	<i>Cycloloma atriplicifolium</i>
European Honeysuckles: Hybrid Honeysuckle (Bella honeysuckle), Morrow honeysuckle, Tartarian honeysuckle	<i>Lonicera xbella, Lonicera morrowii, Lonicera tatarica</i>
Common buckthorn	<i>Rhamnus cathartica</i>
Glossy buckthorn	<i>Frangula alnus</i> ; <i>Synonym: Rhamnus frangula</i>
Japanese knotweed (Mexican Bamboo)	<i>Fallopia japonica</i> ; <i>Synonym: Polygonum cuspidatum</i>
Giant knotweed	<i>Fallopia sachalinensis</i> ; <i>Synonym: Polygonum sachalinense</i>
Spotted knapweed	<i>Centaurea stoebe</i> ; <i>Synonym: Centaurea maculosa</i>
Thistles: Canada thistle and Bull thistle	<i>Cirsium arvense, Cirsium vulgare</i>
Wild parsnip	<i>Pastinaca sativa</i>
Goutweed (Bishop's weed)	<i>Aegopodium podagraria</i>
Garlic mustard	<i>Alliaria petiolata</i>
Common tansy (Garden tansy)	<i>Tanacetum vulgare</i>

Invasive Plants Watch List

Giant hogweed	<i>Heracleum mantegazzianum</i>
Japanese honeysuckle	<i>Lonicera japonica</i>
Russian and Autumn olive	<i>Elaeagnus angustifolia</i> ; <i>E. umbellata</i>
Crown-vetch	<i>Securigera varia</i> ; <i>Synonym: Coronilla varia</i>
Tansy ragwort	<i>Jacobaea vulgaris</i> ; <i>Synonym: Senecio jacobaea</i>
Brittle willow (Crack willow)	<i>Salix fragilis</i> ; <i>Synonym: Salix euxina</i>
Germander speedwell	<i>Veronica chamaedrys</i>
Dame's rocket	<i>Hesperis matronalis</i>
Multiflora rose (Japanese rose)	<i>Rosa multiflora</i>
Oriental bittersweet	<i>Celastrus orbiculatus</i>

Invasive Wetland Plants

Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Purple Loosestrife	<i>Lythrum salicaria</i>
European Swamp Thistle	<i>Cirsium palustre</i>
Phragmites (Common Reed)	<i>Phragmites australis subsp.australis</i>
Curly-leaf pondweed	<i>Potamogeton crispus</i>
Narrow-leaved cattail	<i>Typha angustifolia</i>
Flowering rush	<i>Butomus umbellatus</i>
Reed canary grass	<i>Phalaris arundinacea</i>
Yellow iris	<i>Iris pseudocorus</i>

Invasive pests and pathogens

Emerald Ash Borer	<i>Agrilus planipennis</i>
Hemlock woolly adelgid	<i>Adelges tsugae</i>
Asian Longhorned Beetle	<i>Anoplophora glabripennis</i>
European gypsy moth	<i>Lymantria dispar</i>
Oak wilt	<i>Ceratocystis fagacearum</i>
Beech Bark Disease	<i>Cryptococcus fagisuga + Neonectria spp.</i>
Heterobasidion Root Disease	<i>Heterobasidion irregulare</i>
Spotted Wing Drosophila	<i>Drosophila suzukii</i>
Common Earthworm	<i>Lumbricus terrestris</i>
