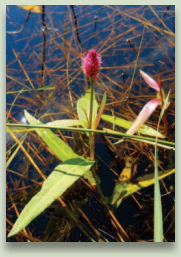
CLIMATE CHANGE IMPACTS ON ODAWA CONTEMPORARY USE PLANTS AND CULTURE AT SLEEPING BEAR DUNES NATIONAL LAKESHORE



FINAL REPORT

October 5, 2015

Bureau of Applied Research in Anthropology

School of Anthropology, University of Arizona

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Climate Change Impacts on Contemporary Odawa Use Plants at Sleeping Bear Dunes National Lakeshore

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We also wish to extend our thanks to Dr. Michael J. Evans for all of his help. Dr. Evans was very supportive of this study and directed the UofA research team to a variety of articles and publications that were useful in conducting background research for this report and arranging the Plant Checklist. Additionally, we thank Dr. Evans and the Midwest Regional Office for the National Park Service for the funds for the 2013-2014 SLBE study. Many thanks for your continued interest in the work that our research team produces.

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CHAPTER ONE
EXECUTIVE SUMMARY

The University of Arizona (UofA) was tasked with facilitating a project, developed for the Midwest Regional Office (MWRO) of the National Park Service (NPS) and Sleeping Bear Dunes National Lakeshore (SLBE) regarding an ethnographic study of American Indian (Odawa)[1] traditional use plants as they occur at SLBE. The study specifically focused on potential impacts on plants that have recently occurred or may occur, due to climate change, collection, or lack of traditional management. This was a multi-year study, which allowed for iterative improvements and appropriate refocusing of the research design. This project is multidisciplinary, combining ethnobotany, ecology, traditional ecological knowledge (TEK), and American Indian gathering rights into a single study under regional and park management. The UofA conducted this study in collaboration with three culturally associated Odawa tribes who find these ethnobotanical resources to be central to the preservation of their culture.

1.1 Introduction

The MWRO and SLBE collaborated with the Grand Traverse Band of Ottawa and Chippewa Indians, the Little Traverse Bay Bands of Odawa Indians, and the Little River Band of Ottawa Indians, to plan a study of the contemporary plant use, cultural needs, and possible environmental effects of Native American plant collecting for plant species found at SLBE. The project pursued multiple objectives. First, the documentation of contemporary Odawa plant use, cultural knowledge regarding plant use, and possible future cultural plant resource needs. The second goal of project sought to document the presence of culturally significant Odawa plant species at SLBE and the specifics of cultural use (e.g., quantity needed, seasonality, cultural use restrictions). The third goal of the project was to evaluate the ecological effects of culturally significant plant gathering on collected species and the habitats in which they are found. Study results provide a firmer empirical foundation to evaluate long-term ecological effects of traditional plant collection practices sufficient to withstand legal scrutiny if necessary.

These results are directly germane to a proposed change to 36 CFR 2.1 to allow American Indian traditional plant collection on all park lands subject to the non-impairment clause of the NPS Organic Act. Due to this imminent proposed change in federal regulations regarding the collection of culturally significant plants from NPS and National Lakeshore (NLS) units by American Indian tribes, it is vital that the NPS acquire baseline ethnobotanical information regarding contemporary plant use. The foundation for this information will include answers to questions such as: which species, how much is desired, collection by whom, seasonality of collection, quantity required for cultural uses, cultural restrictions (if any), traditional plant management techniques and knowledge, and any potential ecosystem or species impacts.

[1] There are various spellings for Odawa. These spellings include Ottawa is a common alternate spelling, and may be used interchangeably based on tribal preference.

The UofA research team conducted two similar projects (Zedeño et al. 2001; Zedeño et al. 2011) that served as a partial foundation for this study. The earlier NPS studies focused on the natural and cultural resources of contemporary significance for American Ojibwe tribes and Canadian Ojibwe First Nations that are or were once present within the immediate vicinity of four NPS units in the Midwest Region. These units include SLBE, Michigan; Pictured Rocks National Lakeshore (PIRO), Michigan; Apostle Islands National Lakeshore (APIS), Wisconsin; and Voyageurs National Park (VOYA), Minnesota.

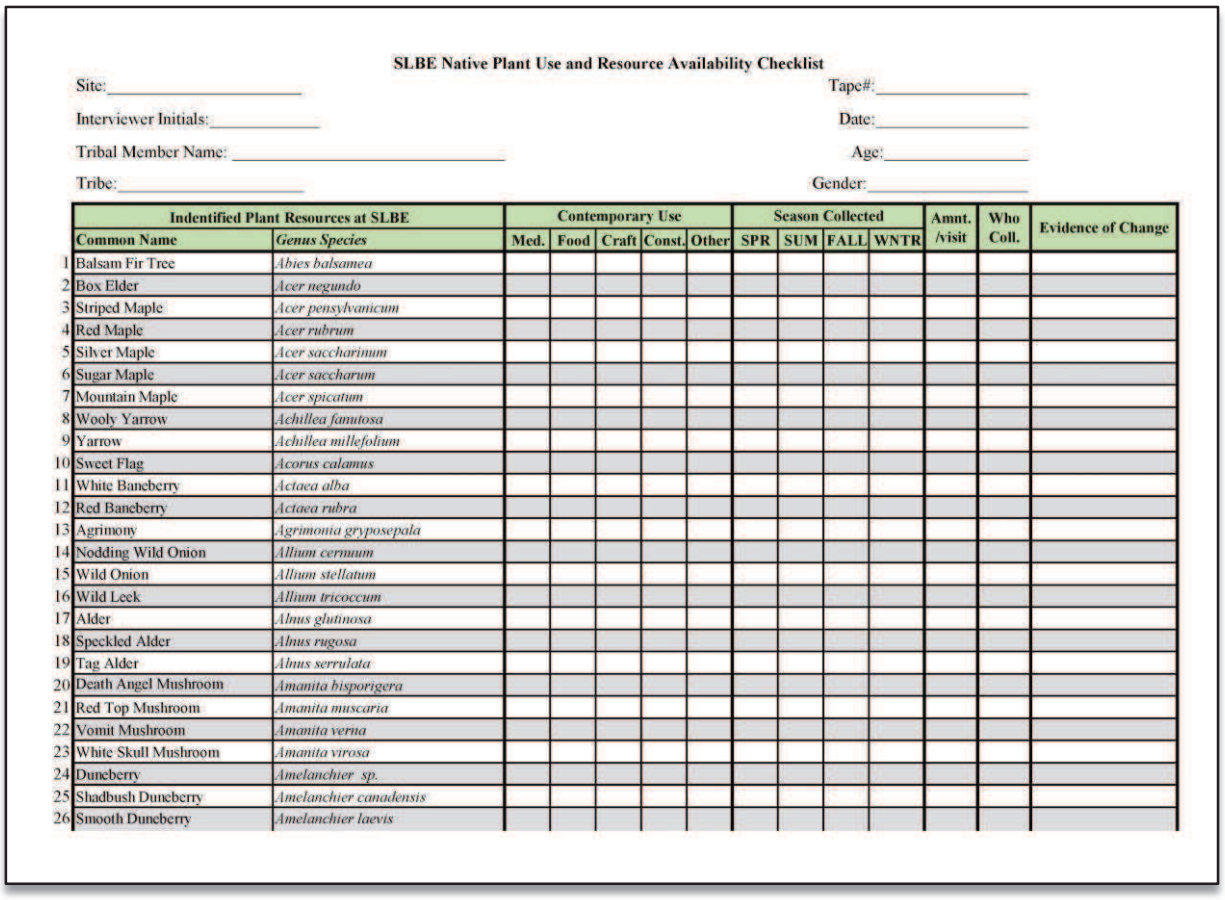
The main objective of these earlier studies was to develop a documented knowledge base regarding historic and current use of resources by culturally affiliated American Indian tribes. The findings from this 2014 study are intended to help SLBE park managers anticipate Native American plant gathering needs and use issues that may confront them in the future, and thus be better prepared to deal with them in an informed and culturally sensitive manner.

Due to the significant influence that climate change may play in plant and animal communities in and around SLBE, it was a priority of the 2014 study to provide background information and discuss potential impacts with Odawa representatives. Climate change data for the Great Lakes region was available from various document and database sources. The Michigan Department of Natural Resources and Michigan State University have detailed records of weather events covering the past century.

Another consideration of this study is the fact that The Grand Traverse Band, the Little Traverse Bay Bands, and Little River Band have treaty rights that pertain to some resources found within SLBE. This project will add needed information into the decision-making matrix required to fulfill the treaty rights obligations, while maintaining the integrity of park resources.

1.2 Summary of Findings

While visiting a series of sites at SLBE, Odawa representatives identified ethnobotanical resources and explained some of the current problems effecting these culturally significant plants. The seven sites visited included: 1) Platte River Point; 2) Platte Plain Swales; 3) Otter Creek Mouth; 4) Otter Creek Fens; 5) Glen Lake Sugarbush; 6) Pyramid Point; and 7) Good Harbor Beach and Wetlands. Each of these sites was selected based on its unique ecozone and diversity of plant life. Discussions between UofA researchers and Odawa representatives examined the various uses for ethnobotanical resources found within SLBE, as well as quantity needed; who is able to gather; and what time of year gathering should take place. A sample of the Native plant use and resource availability recording form is displayed in Figure 1.1. This form was designed for quick, in-field use while recording Odawa responses about plant resources. The entire Native plant use and resource availability recording form is included in Appendix B.



SLBE Native Plant Use and Resource Availability Checklist

Site:_____ Tape#:_____

Interviewer Initials:_____ Date:_____

Tribal Member Name: _____ Age:_____

Tribe:_____ Gender:_____

	Indentified Plant Resources at SLBE		Contemporary Use					Season Collected				Amnt. /visit	Who Coll.	Evidence of Change
	Common Name	*Genus Species*	Med.	Food	Craft	Const.	Other	SPR	SUM	FALL	WNTR			
1	Balsam Fir Tree	*Abies balsamea*												
2	Box Elder	*Acer negundo*												
3	Striped Maple	*Acer pensylvanicum*												
4	Red Maple	*Acer rubrum*												
5	Silver Maple	*Acer saccharinum*												
6	Sugar Maple	*Acer saccharum*												
7	Mountain Maple	*Acer spicatum*												
8	Wooly Yarrow	*Achillea famutosa*												
9	Yarrow	*Achillea millefolium*												
10	Sweet Flag	*Acorus calamus*												
11	White Baneberry	*Actaea alba*												
12	Red Baneberry	*Actaea rubra*												
13	Agrimony	*Agrimonia gryposepala*												
14	Nodding Wild Onion	*Allium cernuum*												
15	Wild Onion	*Allium stellatum*												
16	Wild Leek	*Allium tricoccum*												
17	Alder	*Alnus glutinosa*												
18	Speckled Alder	*Alnus rugosa*												
19	Tag Alder	*Alnus serrulata*												
20	Death Angel Mushroom	*Amanita bisporigera*												
21	Red Top Mushroom	*Amanita muscaria*												
22	Vomit Mushroom	*Amanita verna*												
23	White Skull Mushroom	*Amanita virosa*												
24	Duneberry	*Amelanchier sp.*												
25	Shadbush Duneberry	*Amelanchier canadensis*												
26	Smooth Duneberry	*Amelanchier laevis*												

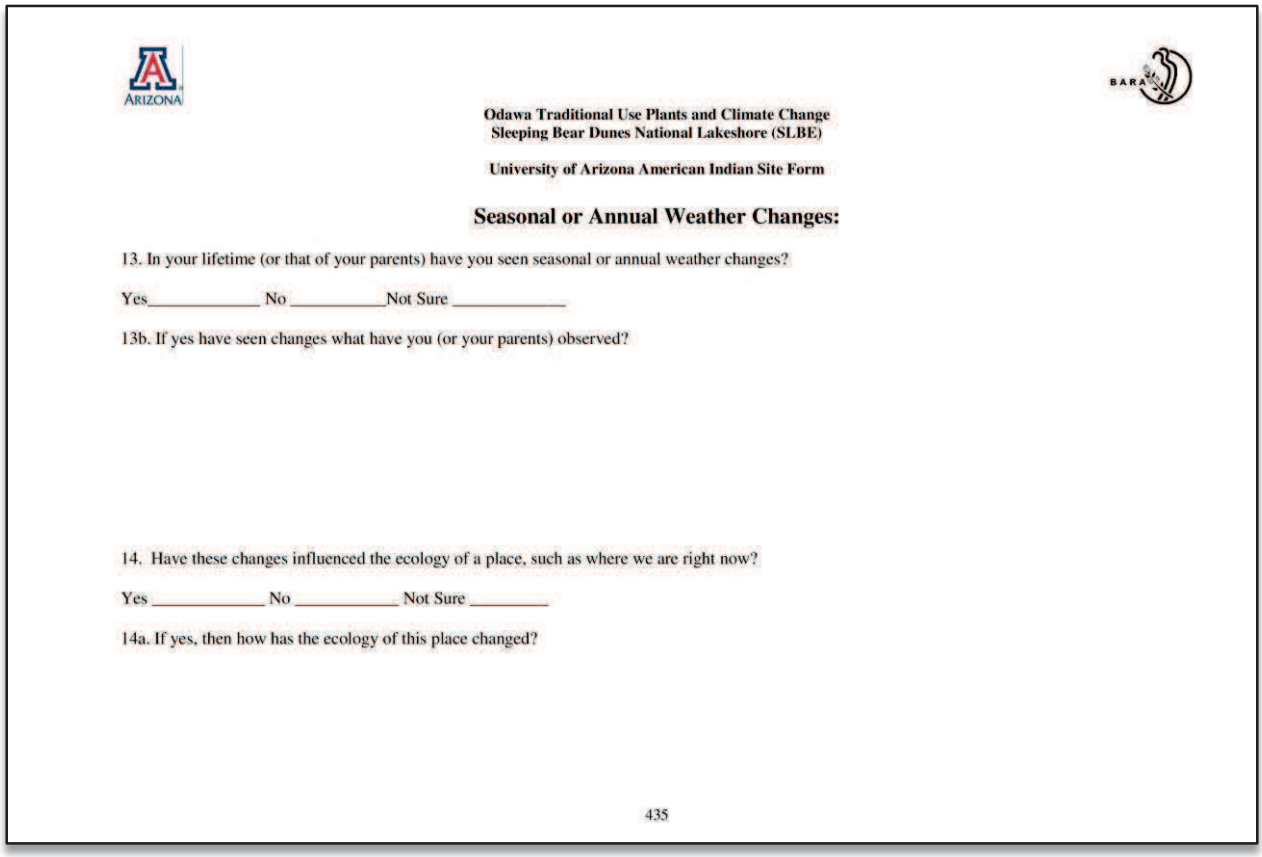
Figure 1.1 Sample of Native Plant Use and Resource Availability Recording Form (Appendix B)

Odawa representatives expressed their concerns relating to climate change, pollution, and pests in the availability and health of ethnobotanical resources found in the SLBE vicinity, based on personal observations throughout their lifetime. These observations were documented within the 'Evidence of Change' column on the Native Plant Use and Resource Availability Recording Form (Figure 1.1 and Appendix B). The UofA researchers created a key, which assigned numbers to types of visible environmental and human changes. These categories included: 1) climate change, 2) lack of traditional use, 3) overuse of plants by people, 4) over grazing/ over foraging, 5) pests; and 6) pollution.

Seventy-seven percent of the 210 Odawa identified ethnobotanical resources found at SLBE were documented as showing evidence of change. Of the types of plant resources with identified environmental impacts, climate change was documented as affecting 55 percent of the 210 ethnobotanical resources in the park. Pollution and pests were also documented as having a heavy impact on plants in and around SLBE. Chapter seven presents the findings on types of environmental impacts affecting Odawa ethnobotanical resources in greater detail.

As a follow-up for discussions on the impacts of climate change within SLBE and northern Michigan, a second form was used to record more detailed responses. The UofA American Indian Site Form provides a place for recording tribal representative's comments about the area that they are visiting. A sample page from the site form is displayed in Figure 1.2. The

site form asks about geographic features, previous American Indian use of the place, and natural and cultural resource use at the site in the past and present. For the purposes of this study four questions were added on evidence of seasonal or annual weather changes (Figure 1.2 and Appendix C).



Odawa Traditional Use Plants and Climate Change
Sleeping Bear Dunes National Lakeshore (SLBE)

University of Arizona American Indian Site Form

Seasonal or Annual Weather Changes:

13. In your lifetime (or that of your parents) have you seen seasonal or annual weather changes?

Yes_____ No _____Not Sure _____

13b. If yes have seen changes what have you (or your parents) observed?

14. Have these changes influenced the ecology of a place, such as where we are right now?

Yes _____ No _____ Not Sure _____

14a. If yes, then how has the ecology of this place changed?

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Figure 1.2 UofA Site Form Example (Appendix C)

The responses gathered using the site form regarding changes in weather, seasons, and effects on plant resources provide the foundation for portions of chapters seven and eight (Figure 1.2 and Appendix C). In contrast, the information gathered from the Native Plant Use and Resource Availability Recording Form (Figure 1.1 and Appendix B) served as the foundation for Appendix A.

During the site visits around SLBE, 210 Odawa ethnobotanical resources were identified These 210 plants, serving both traditional and contemporary uses, are the foundation of this study. Appendix A presents detailed information on each of the 210 plants, providing the name in *Anishinaabemowin*, uses, habitat, evidence of change, and required gathering amounts. A selection from the plant appendix is displayed in Figure 1.3.

Appendix A presents data that can easily serve as the foundation for future government-to-government discussions about Odawa plant collection within SLBE (Figure 1.3). By gathering and assembling information on collection amounts, seasons when collection should occur, and who can gather plants, much of the necessary information for the proposed change to 36 CFR 2.1

is available for future discussion between SLBE and culturally affiliated Odawa communities. The plant appendix also offers evidence of the changes that Odawa representatives identified as effecting ethnobotanical resources. Discussions between Odawa representatives and UofA researchers also generated several sustainable use and management recommendations for gathering plants, and these are included within chapter eight.

Scientific Name	*Abies balsamea*	**Contemporary Use Category:**
Common Name	Balsam Fir Tree	☒Medicine ☒Food ☒Craft ☒Construction ☒Other
Odawa Name	A'niinaandak' (Densmore 1974) Aniinaandag, -oog, Ininaandag – 'fir tree, spruce', Bigiwaandag, Zhingob, -iig, Zhingobaandag, -oog, Zhingob bigiwaandag (GLIFWC 1993)	**Description of Uses:** • *Balsam boughs and needles are bound tightly together used in construction of sweat lodge and starting ceremonial fire.* • *Balsam, we use all the pines. We call balsam, big-gew, those little blisters we pop them and pitch comes out, so we call balsam big-gew and it means gum. It's a medicine and other.* • *We use probably 40 lbs a year of pitch.* LTBB Native Plants Initiative (2009) • Medicine; crafting; utility- aromatic balsam pillows made from the leaves.
Ecosystem	Boreal Forests	
Status in Park	Present	
 USDA Plant Database.		**Evidence of Change to This Plant in This Area:** ☒Climate Change ☐Lack of Traditional Use ☐Overusing by People ☐Over-Grazing or Over-Foraging ☒Pests ☒Pollution ☐No Influence ☐Combination
		Seasons When this Plant is Collected: ☒Spring ☒Summer ☒Fall ☐Winter
		Amount Collected at One Time: ☐Handful ☒Bucket ☐Bushel Basket ☒More

Figure 1.3 Sample Page from Plant Appendix Showing Summary of Ethnobotanical Data Gathered (Appendix A)

Gathering traditional and contemporary plant resources within SLBE is of great interest for culturally affiliated Odawa communities. Difficulties in accessing healthy contemporary ethnobotanical resources was noted by Odawa representatives as a problem. This lack of accessibility was discussed in relation to environmental factors such as climate change, pollution, and lack of traditional management. Collecting plants near heavily trafficked areas, such as roads and highways, is not a viable option due to the effects that vehicle emissions have on the health of plants. Likewise, the edges of highways are sprayed with chemicals, such as herbicides, and receive winter salt brine splashes. Places like SLBE provide an environment where plant resources are less disturbed than other locations that Odawa people visit to gather medicines, food plants, and other ethnobotanical resources. By collecting healthy plants, the medicines they are used to make become stronger. Chapter seven of this report provides a detailed assessment of the findings relating to ethnobotanical resource use and availability.

1.3 Chapter Summaries

The report consists of eight chapters and four appendices. This section presents brief summaries of the chapters within this report to help guide readers.

A short summary of key events in Odawa culture and history is narrated within the second chapter. These events, traditions, and histories were told by Odawa representatives and are recounted in their own voice, thus the title of chapter two is Odawa Voices.

Within chapter three, a discussion of climate change in North America over the last 2,000 years is presented. Extreme weather events, based on their severity and frequency, have the potential to affect the climate in broad and unpredictable ways, in turn impacting plants and other natural resources. The chapter examines many extreme weather events in North America, with a more detailed look at Michigan and the Upper Great Lakes region.

The fourth chapter outlines the methodologies used during the study. It explains how the project was carried out and the logic behind these research decisions. The assessment of climate change and gathering ethnobotanical resources demanded several types of data collection instruments.

Within chapter five, data from interviews conducted during the 1998-2001 study on traditional Ojibwe resources in the Western Great Lakes throughout Michigan, Minnesota, and Wisconsin is presented (Zedeño et al. 2001). The incorporation of unpublished data from the earlier study benefits this report. Through tiering, or building one study off of another to reach a conclusion, the 2014 SLBE study was able to learn more about changing climate by using information acquired previously in 1998. This is roughly an 18 year time span from the data collection events that took place in 1998, to the return of UofA researchers to SLBE in 2014 (Figure 1.4). In addition to providing previously unpublished information from these 1998-2001 interviews about changes in climate and threats to ethnobotanical resources, the data offers views from Ojibwe representatives, not just Odawa representatives involved in the 2014 study. The 2014 study focuses predominately on the views of Odawa representatives, but through the use of tiering, multiple ethnic groups have their voices included within the 2014 study.



Figure 1.4 UofA Researchers and Odawa Representatives at SLBE during the 2014 Study

Within chapter six, site descriptions for the seven different study areas visited within SLBE are provided. These seven sites represent diverse ecozones, with each area supporting a unique number of plant species and key Odawa ethnobotanical resources.

Chapter seven presents the data and study findings relating to ethnobotany and climate change. A detailed analysis of each category of collecting requirements, seasons, and uses is present.

A summary of climate change findings within chapter eight presents the study findings and the impacts that climate change is having on Odawa ethnobotanical resources. Pollution, invasive species, and changing climate all pose a threat to Odawa contemporary use plants, in turn threatening the continuance of their culture and traditions.

The four appendices contain additional data and analysis. Appendix A provides an inventory of Odawa identified contemporary use plants at SLBE. This document is very useful but simply too long to be included in the main body of the report. Appendices B and C present data collection forms used to record plants and associated use information while visiting sites in SLBE with Odawa representatives. The information included in Appendix D is the Bureau of Applied Research in Anthropology (BARA) methodology. The BARA method is unique in its application and approach, setting the collaborative research that UofA researchers participate in apart from other research teams in the country.

CHAPTER TWO
ODAWA VOICES

The Odawa people have shared a connection with the waters, forests, and lands, in and around Sleeping Bear Dunes National Lakeshore (SLBE) since time immemorial. Odawa communities continue to flourish in the region today, sustained by the same natural and cultural resources as their ancestors. This chapter presents an overview of the history and culture of the Odawa people in their own words (Figure 2.1).



Figure 2.1 Odawa Cultural Representatives Telling UofA Researchers about Regional History

All statements in this chapter were provided by Odawa people participating in this study, unless otherwise referenced by a book or another published source. Certain types of information required published sources, such as origin narratives, because Odawa cultural regulations prohibit the telling of stories, except during the winter. This is a brief history of the region and culture as told by Odawa representatives.

2.1 Niinwe Odawak Ndaawmi (We are the Odawa)

All people are taught about how and where they were created, and how they came to be at the place that they reside in today. For the Odawa, there are different teachings depending on

what lodge a person belongs to, the *Wabano*, the *Midewiwin*, even from the *Jessakkid* have a unique perspective.

2.1.1 Creation

Creation narratives and other stories can only be told during the winter months. Therefore, the Odawa representatives participating in this study were not able to tell us their creation narrative in their own words. The following origin narrative is published by Basil Johnston in his book titled, *The Manitous* (1995).

> According to tradition *Gitchi-Manitou*, the Great Spirit, created the world, plants, animals, fish, birds and all of the other *manitous* in the fulfillment of a vision. This world was flooded, but while earth was underwater and life was coming to an end, a new life was beginning in the skies. *Geezhigo-Quae*, Sky Woman, was married to a manitou in the sky and she soon conceived. As she grew heavier with the child she became tired, so the remaining animals on the flooded earth asked Turtle if he would come to the surface and let Sky Woman sit down on his back. Turtle offered his back to Sky Woman and she came and sat down. Upon settling on his back, Sky Woman asked for a handful of soil. Only muskrat, the least of all the animals was able to dive to the bottom of the flooded earth and retrieve the mud. When he returned, Sky Woman took the soil and etched it around Turtle's back. She then breathed the breath of life, growth, and abundance into the soil and infused into the soil and earth the attributes of womanhood and motherhood, that of giving life, nourishment, shelter, and instruction. Only after she did these things did she give birth to twins, whose descendants became the Anishinaabeg people, meaning the Good Beings (Johnston 1995: xv-xvi).

The creation stories are all a little different, but it remains consistent that Anishinaabeg people are the original people. They are and have always been here [Michigan]. That always resonates out of those creation stories.

The word *Anishin* is good, and *Naabe* or *Yaabe* is the man, the being, who we are as people. Together it means the good people, good man, woman, or child. The other translation for Anishinaabeg is to *anishe*, to be lowered from above. The Creator lowered the people down from [above], so we were lowered to Mother Earth. To be lowered to Mother Earth. So, there are those translations for what that means. Original people is what some folks have heard it means too.

Our oral history traces us back to the eastern coast of Turtle Island where our spiritual leaders told us that we should travel to the west until we found the food growing on the water. Our people traveled until we found wild rice growing on the water and we knew we were home (Grand Traverse Band of Ottawa and Chippewa Indians 2014: Our History). Figure 2.2 shows wild rice growing in the water, and the process of gathering and harvesting the rice.



Figure 2.2 *Gathering Wild Rice*, Watercolor by Mary Eastman, 1853 (Newberry Library, Ayer 250.45.E2)

One spiritual belief is that we were given direction from the Creator to head east until we found where the food grows on the water, which was wild rice as I understand it today. And stop, make camp you know, start our life here. We are talking thousands of years, but when we finally came to the Great Lakes region, we did have the wild rice growing here too at one time, not just over in Wisconsin and Minnesota.

2.2 Odawa Traditional Lifeway's and Culture

Bedmodzowin is the Odawa word for life, but also when we say *bedmodzowin'naw* we are talking about our way of life. This is not just life as a human, breathing and alive, but our culture and the nature of who we are, and our way of life. That includes everything all around us. The following section examines the Odawa bedmodzowin'naw, with attention directed toward the role of humans in the world, women's and men's roles, ceremony, and sacred lands.

2.2.1 Humans Role in the World

The Creator made a special role for the Anishinaabeg people, we are supposed to be caretakers. We learn from the things we see in nature, on Mother Earth, they already have their sacred responsibility and they know what to do. It is just as humans, we went astray from our sacred duty of keeping the Mother Earth, and balance and harmony. This is how we see it as Anishinaabeg people. So, that is why we were able to live in balance and harmony for centuries with mother earth, because we understood that, and we followed the teachings from nature, from the earth. We weren't greedy, we saw ourselves as a part of the sacred creation.

Many times in lodges, people have spoken about us being pitiful in our place amongst everything. When they speak to the Creator, they refer to themselves as pitiful, because we are the weakest of all these beings.

Everything is connected and we see everything as living. Everything is animate rather than inanimate. This is another commonality in differing creation stories. I think this lends a lot of credence to why we show so much respect to mother earth, the plants, and the animals, because one of the facts in those creation stories is they always show us as being created last. We view everything else as an elder, a spiritual elder, and so we are taught to respect our elders, but we view the tree, the mother, everything as a spiritual elder.

We feel everything is alive and we show respect for that. We show respect because the land, trees, water are our spiritual elders, in the sense that we were created last, and the we also understand as people that we need everything else in order to live. Spiritually, everything is connected, including all of us, all the people. We are connected to these plants and these animals. When we stray from the earth, from our connectedness to nature and things like that, the plants, the animals, birds, and then we lose sight of our teachings. Actually, a lot of our teachings we learn from the animals, we learn from the plants, we learn from the things in nature.

2.2.2 Women's and Men's Roles

As women, we have a special and sacred responsibility for the water. Even right now as we speak they have a water walk up ceremony on Manitou Island and Ontario, and that is what they do, they go around and just pray for the water. They go around the whole island. We have done that here, we have some elder ladies that get together once a month and pray for the water, they hold a water ceremony. We go to different water areas and pray for the water.

If they follow the traditional ways or follow some of the teachings, then they [women] do care for springs. In fact, the ones that we do find we try to maintain and at least keep the brush clear, and the women traditionally are keepers and carriers of the water, so for any ceremonial thing the women are the ones who pray for the water and take care of the water. In ceremony, the women are the ones that bring water and it is their responsibility. Especially as women, we bring forth life, but we are all water, that is all in the placenta.

At the marl springs, within SLBE near Otter Creek, one Odawa woman explained: When we learn from nature we see women as caretakers of the water, so cedar is on medicine used and gathered by women. It does not surprise me that this special spot is surrounded by cedar (Figure 2.3).



Figure 2.3 Marl Springs at SLBE, Observed as Culturally Important by Odawa Representatives

Traditionally, only women that have gone through their change can grow tobacco. That is one of the main restrictions that we have, women are not supposed to pick plants when they are on their menstrual cycle. In the Upper Peninsula (UP) there are a lot of blueberry plains, but there are never blueberries growing, so we feel that women were picking during their cycle, so that is why there are no berries. Women are very powerful during that time.

2.2.3 Sacred Lands

Any unusual earth formations, tree formations, even the hollowed out kind, those are all sacred spots for us actually. So these different formations that we see in our area, they are very sacred spots for us, maybe not for medicinal, but for spiritual vision type quest areas, or just to put our offerings out.

We call cold water that comes from natural springs, *tick-a-beh*. If you ever find a natural spring it is really cold, and it never freezes, even in the winter, that water is what we use for our medicines. Whenever people need a doctoring or anything, we would go and find that natural spring and use that water.

Water ties into everything, the creation of the world, the destruction of the world, rebirth, there is always a source of water. The Platte Plain Swales at SLBE are for everyday use, rather than healing springs that are used for cleaning face and washing with before ceremony. Different sources of water have different meanings and purposes.

A lot of times we tend to gravitate toward unusual natural phenomenon. Unusual shaped trees, like this [Marl Spring at Otter Creek Fens] with the water bubbling up, this would be a very special place to fast or to put your tobacco offering.

Those crevices under the trees, hollowed out areas, those are the places where Little People live, *Nim-e-gwe-suk*, little people (Figure 2.4). They are like little fairies. This forest would be a good place for them. They like to play tricks and hide things from you, they are mischievous. They will take your tools and hide them, you'll never see it again.



Figure 2.4 Nim-e-gwe-suk (Little People) Dwelling Observed in SLBE near Glen Lake

Burls, those big knots on trees are important to us, they are the watchers of the woods. These are the types of features we would say to leave alone, these are non-consumptive resources.

Springs are very sacred sites for us, we use them for everyday things like drinking water, but we also use them to make our medicines because of the strong healing natural energy coming up from mother earth. So, any place we have natural springs, those are really sacred spots for us. We may not be able to drink the water but it is still a sacred place for fasting and ceremony. We use the clay from springs for different ceremonial purposes. We use the spring water as medicine. Spring water has important healing properties.

2.2.4 Ceremony

Very powerful times are the changing of the seasons, first day of winter, spring, summer, and the equinoxes. We have a lot of ceremonies, fasting and feasting, things like that around those special times.

In our teachings, if you are seeking knowledge, or some type of wisdom, we have what we call a fast. Others call it a vision quest. Vision quests occur when a spiritual leader, a pipe person, even an uncle or a grandpa, take you out and we call it putting you on the hill. They will find a spot in the middle of nowhere and set you up for four days, and leave you out there. No food, no water, and then they come back and get you on the fourth day and you sit down with whoever took you and put you there and they will help you decipher what you have dreamt. They will help you decipher what you thought about. You also seek that that type of guidance through a sweat lodge ceremony, where a sweat lodge conductor will take you and put you though a sweat lodge ceremony if you are seeking specific information. Sometimes you can try that first and if you do not get the knowledge you're seeking then you go through your four day fast, and if that doesn't get you there, then you go for a seven day, if that doesn't get you there they put you out for ten, and then if you do not know it, you are not supposed to know it.

We feel that there would be a fasting site on top of that hill over there, the big sand dune bluff (Figure 2.5). The higher the spot, the more powerful, especially when located near water.



Figure 2.5 View from Otter Creek Beach of Fasting Site on Dune Bluff Overlooking Lake Michigan

If we are fasting women build a little lodge. We use those lodges for different types of things, fasting, teaching, and etcetera. By bending saplings that is how we would make our lodges. We leave an opening in the top at the center of the lodge for the smoke to escape.

Even picking medicines or food requires some ceremonial things. Our general philosophy when we pick things is that we only pick what we need. First, we address the Creator, lay *asama* [tobacco], and then talk to the spirit of that medicine. We only pick what we need, and even when I do cedar, if there is a clump of cedars around I do not just take all my cedar from one tree. I will take a little bit here, then I go to the next tree, so it is not just all in one location. That would apply for anything, for berries or whatever, we just take a bit here, so we never deplete the whole thing, if there is just a clump of berries I would not pick all the berries, I would leave some because we know that animals and other things need to eat too. We just take what we need, or what we are going to use. That is one of the first things we learn about when we gather and harvest medicines, plants, and other things.

2.2.5 Rivers, Lakes, and Water Trade/Travel

We would have used that entire river for hunting, fishing, trapping, gathering, camping, ceremonial use, I can imagine villages and everything. We would have used it like a roadway, like a highway, or travel route. From Lake Michigan toward the inland. You could name waterfowl, beavers and muskrats, deer, turkey. Everything needs a source of water, so that is why people gather all along that river corridor. It is a food source, it is a water source, so that is where we hunt because we know animals are going to make use of it as well. The reasons have changed over the years why you want to live next to the water. Now it is because of the view and the recreational activity. You know, back pre-contact it was a different reason why you live near the water. Your life depended on it. That was your source of water and that was your source of food.

Spring camps would have been near Platte River, and near other good fishing sources because you would have spring runs of fish. They would also have camps near sugar trees, because that is a springtime activity, and you would have fall camps where the deer or rabbit, elk, woodland caribou, where they would congregate in the fall, so you would have a fall camp. Then you would have a summer camp where the berries were located. So all of the camps were strategically located based on whatever item we were gathering for sustenance that was in season, so to speak. There were fall runs of fish, so you could have camps near, maybe this area was good in the fall for sturgeon or salmon, it would not have been salmon because those are non-native, but in the springtime maybe this river here was good for walleye. So, it was just based on subsistence.

We were traders and established trade routes as far east as the Atlantic Ocean, as far west as the Rocky Mountains, as far north as Northern Canada, and as far south as the Gulf of Mexico. We were a wealthy nation respected by all our neighboring Nations. When the French arrived in our land, we established trade with them and when the English came to our land they

also sought us out as trading partners (Grand Traverse Band of Ottawa and Chippewa Indians 2014: Our History).

The Odawa were really known as traders, and they would trade goods all over the Great Lakes in their birch bark canoes. It is very feasible that 200 years ago a group of guys and women would make a canoe out of birch bark right here. They had all the resources. The trees, the cedar to make the ribs, and then the spruce tar to use as your glue (Figure 2.6).



Figure 2.6 Birch Bark and Cedar Rib Canoe (Little River Casino Resort Cultural Display at Manistee, MI)

Our people would travel one way to Montreal to trade, and that is 800 miles in a birch bark canoe, and you would leave somewhere like here, with furs you've collected all winter, from creeks just like Otter Creek but multiple creeks all over the great lakes. When the springtime comes, and the weather breaks, and you're making your run to Montreal, you shoot out from here and go get your guns and knives and kettles and so forth. They take those guns and kettles and shoot all the way out west to Saskatchewan and Manitoba, and trade with Cree's and Ojibwe's there. Then come back with more furs from, so it is a big hub of trade up here in Northern Michigan, particularly Mackinaw, which was the center of the commerce, which was Odawa territory with the Ojibwe. This area just reminds me of how easy it would have been for them to use their resources and just get out on the water and go for it. The Odawa tribe document travel out of the site of land. Other tribes that had canoes would always stay within sight of land. But the Odawa's island hop and get to some very remote places. They knew the water, they

knew the currents, they knew how to travel, and it was just engraved in their identity as water people.

Father Bonnecamp describes a massive Cottonwood tree in his journal from the Celeron Expedition, which they identified along the banks of the Ohio River in 1749. Bonnecamp notes, "we dined in a hollow cottonwood tree, in which 29 men could be arranged side by side" (Bonnecamp, Galbreath ed. 1920: 86). Robert Griffing's painting (Figure 2.7) illustrates the large canoes used by the expedition to transport over two hundred men, guides, supplies, and trade goods. Such amounts of cargo made large birch bark canoes indispensable for the travel of the Great Lakes and large rivers.



Figure 2.7 *We Dined in a Hollow Cottonwood Tree*, Painting by Robert Griffing, based on the artist's interpretation of Father Bonnecamp's 1749 journal entry.

I was told we would take off and canoe to Beaver, and then the men would help establish a camp, and the women would plant gardens on this island with the younger children. Then the men would get in the canoe they used to portage here, and they would go to Naubinway. There was a trail and it had logs laid down like a road, about six feet long, and they would roll the canoe across the Upper Peninsula, to Lake Superior where they would put in and canoe to Keweenaw Peninsula and mine copper. They would come back down for the fall, come down here, and they would gather everything up and they would have a camp there, or they would go back and camp over there. We brought the copper down with us, and then got all of our harvest from the gardens. We would go to a winter camp where we would do trapping and hunting, but

then we had all of the copper that to smith into tools, bowls, or offer for trade along with all the pelts and stuff that we trapped. We could use the pelts for clothing or blankets or trading as well.

That word Odawa actually means traders; we have been all over the place. We have things that show that we were down at the Gulf of Mexico, and of course the East Coast, and I've heard stories of us being from the Northwest. So we did travel, and haul a lot of things from Michigan, we had copper up there in the Upper Peninsula, which was a great trade item. We hauled copper, and that showed up all over the place. Also, we have chert over there on the eastern side of Grand Traverse Bay, almost straight across from our reservation, there is a place over there called Norwood. There is chert that was used for points, and cutting utensils and stuff. Chert for this region is one of the better stones to use for that. It is not as good as obsidian.

I would say in the olden days they used this water route. They would walk down here and they came across Long Lake and continued down. They traveled all over, they were always on the water. We consider Michigan all of our territory, the same with Grand Traverse. A lot of the people, the government came along and were going to remove everybody and they called it the Removal. And they moved people out to Kansas and around that way. So a lot of them took off and headed up to Canada, up to Manitoulin Island. There's a whole lot of Odawa's that live up there. When we had our encampment at White Camp Lake, there used to be van loads of elders that would come down to our campground. They remembered their ancestors talking about how beautiful this whole stretch was between Petoskey, Traverse City, Good Hart, Cross Village, and Aetna.

2.2.6 Crooked Trees

We have trees back home, I mean we are all one tribe, but further north, we have trees like this and we call them crooked trees. They would use them as trail markers. They are always made from pines, maples, or oaks, all hardwoods so that they will last a long time. There is a message within those trees because they mark areas of significance.

Waganakising (Land of the Crooked Trees) is the traditional name of our homeland, so crooked trees are embedded into our identity. There are several types of crooked trees. One tree was a large bent pine tree, jutting out over the lakeshore near present day Good Heart, Michigan, so anyone travelling in their canoe along the shoreline would see this crooked tree and know that they had arrived in Waganakising. The councils, meetings, lots of prominent events took place there, but unfortunately somebody chopped down the actual tree. The name of the area is alive and well, but the tree is gone. The other type of crooked tree, I call spiders, because it looks like a spider on its back with its leg sticking up. These trees were modified, or deformed at an early age and they denote different trail markers. These were like road signs, so if people were traveling on foot and saw the different crooked trees they knew that they were going to the right area. They are vastly different from the crooked tree out over the shoreline. The shoreline tree was thought to be created by divine powers, it was not people who created that tree, so it was a little more prominent. Outside of Charlevoix, there is a circle of trees that stand to this day near

the Methodist church and community of Green Sky Hill. It is shaped like an L, like the one we saw today in SLBE (Figure 2.8). All of the trees in that circle are L shaped, and I would say there are about a dozen trees, they represent all of the different villages, Silver Springs, Good Hart, Pine River, Bear River, and all the councils were held there. On your way, you see the spider trees that lead you to the circle of bent trees, so depending on what village you were coming from the spider trees pointed the direction. Those are the three types of crooked trees.



Figure 2.8 Crooked Tree Observed Growing within SLBE

There is a tree in Traverse City that I remember my mom said her parents told her about. The city has a fence around it, and that is how a lot of our trails were marked, they would take probably a new tree or whatever, that was alive and growing, then they would somehow shape it. I think that there is one in Cross Village too, in Little Traverse, that crooked tree actually was one major meeting spot for the Anishinaabeg people. At least once a year they would all gather at the council of trees, and we would gather over there. So you see we identified as 12, but really we are all one people. But see that is what happened, as we are living in different parts of the region. Depending on what we are doing, you know, maybe it is maple sugar time or maybe its winter so we are down south. Regardless of where we were at, at the time, we would all, well, not the whole tribe, or not the whole village. Usually leaders from each band would come and go to that council of trees, and there they would have their meeting. Their meeting at the council of trees, and bands and people from all over the area would come, and then they would share. I saw it as a grand council meeting, because each tribe has their tribal council for their band. This was people from each band that all came, so then we talked about issues relating to the region and not just their area. So that happened up in Little Traverse, they would probably be able to tell you

more about that. Actually, I think there is still a group that meet, they have that every year, they have a fire and they have teachings and things like that. So, yes, we would mark those trees as trail markers.

2.3 Historic Events: The War of 1812 to 1850, End of the Middle Period

Historic events of importance to the Odawa people include a range of topics and periods. The following section touches on key events of cultural and historical significance beginning with the protection of Odawa lands during the War of 1812.

2.3.1 War of 1812

The Iroquois Wars, Fox War, French and Indian War, Revolutionary War, and War of 1812, in all of these, the Odawa fought Americans at different times to protect our resources.

The French sold the area north of the Ohio River, known as the Northwest Territory, to the British in 1767 as a way to acquire more funds to support the cost of the wars occurring in Europe at that time. The Odawa first met the Americans in battle from the 1790's to the early 1800's, fighting the Americans in raids to prevent the former British colonists from entering the Great Lakes region (McClurken 1991: 6).

By the early 1800's the American Indian communities in the Northwest Territory, as well as the Americans, and the British were all involved in hostile relations with one another based on land ownership (Diedrich 1990; McClurken 2009). The hostile relationship resulted in a war lasting from 1812 until 1815, referred to as the War of 1812.

2.3.2 Treatise and Land Cession

Throughout the first century of settlement in the Traverse Bay region (1742-1838), the bands were isolated. At times, however, they lent their aid to other tribes that were struggling to spare their lands from Euro-American settlement and colonization, but in 1818, the sales of public lands began at Detroit, Michigan thus opening immigration from the East (Weeks 1992: 8).

We were slated for removal to Kansas in 1830. They wanted to push us out, but they did not succeed. We had some crafty leadership. They initiated a treaty in 1835 and 1836 to secure these areas. The government was pushing us out, and we said, no, we are going to choose these pockets [of land]. Little Traverse was one and Grand Traverse was the other. So, we managed to survive, and I would like to think our ancestors were thinking about our future generations and we needed these areas. It was that important. In the 1836 treaty we ceded 22 million acres which makes up two-thirds of the state. These areas were important because they were our last attempt to hang on to our lands.

While several treaties affecting the tribes of Michigan directly had been signed after the American Revolution, the Treaty of Washington, signed by Henry Rowe Schoolcraft on March 28, 1836, ceded the northwestern section of the Lower Peninsula (Zedeño, Miller, and Hollenbeck 2011: 11-12). The 1836 Royce Treaty map shows the land that the Anishinaabeg tribes gave up to stay in Michigan (Figure 2.9).



Figure 2.9 Royce Treaty Map, 1836 Displays Ceded Lands (Bureau of American Ethnology 1899)

The Treaty of 1836 ceded to the United States nearly 16 million acres of land in the Upper and Lower Peninsula. Reservation lands would be chosen within those ceded lands. Hunting and fishing rights, education, money and services were also important stipulations of the treaty. The treaty was by no means favorable to the Odawa and Ojibwe. It was the best the tribes

could do with tremendous odds against them (Hemenway 2015: It is a heart-rending thought to think of leaving our native country forever).

The word for reservation is *shkwaanagan*, meaning leftovers in the Odawa language. Reservations were indeed the leftovers of a once vast territory that had supported large Odawa populations for centuries (McClurken 2009: 53).

If you look at Michigan, the way it is shaped, today we say it is a mitten, but for Anishinaabeg people North America is Turtle Island, the head of the turtle is Michigan. So, when the settlers came they asked what we called different parts of the land, and we said this is *Mi-she-can* which means turtle. So we are like the turtle's head. So that is how we got Michigan today, they could not say *mi-she-can,* so today we know it as Michigan.

By 1837, Michigan had become a state, and by 1842 all of the Indian lands within the state had been relinquished. Governor Cass wanted the land surveyed and platted for sale, beginning with two lines. One running north and south, along the 84th meridian, and a second line running east and west through Wayne County to Lake Michigan. All Michigan property transactions have been described by those two lines ever since (Cardinal and Cobb 2012: 30).

2.4 The Late Historic Period 1870 to 1940

The Late Historic Period spans a tumultuous period in Odawa history. The implementation of land allotment policies and the loss of natural resources denote some of the negative activities affecting Odawa communities in the late 19th and early 20th centuries. Likewise, the rise of government funded boarding schools for American Indians further contributed to challenges experienced by the Odawa during this time frame.

2.4.1 Allotment

The start of this period, in 1870 was the end of cash payments from the Treaty of 1855. This caused some disruption to the economy of the *Waganakising Odawak* (Little Traverse Band of Odawa Indians). A large number of Odawa had to rely solely upon the land and water to make a living. Many of the land allotments that were obtained were quickly lost again through taxes and swindlers (Little Traverse Bay Bands of Odawa Indians 2005: 36).

Close to 90 percent of allotted reservation lands passed into non-Indian possession, usually before the patents were even received. In the Little Traverse Bay Bands region, Indians were taxed at a rate of $32.85 on each unimproved 80-acre parcel, twice the amount levied on non-Indians. Another scam that was often implemented was to sell Indians cheap sewing machines or parlor organs using their land as collateral, and non-repayment meant both the land and the item were confiscated (Cardinal and Cobb 2012: 33).

2.4.2 Logging

With the logging, a lot of the old materials [artifacts] were crushed or pushed down into the ground. I have photo of my family sitting with a couple of baskets, and behind them you can see the loggers, totally clear cutting the whole thing, not a tree left.

The Aral Mill was idle during the winter, but the woods were alive with loggers working the logging camps (Figure 2.10). Charles T. Wright employed about 150 workers throughout the winter, and about 50 in the summer, to run his sawmill and dock. Many of the other men went home to run their farms during the summer (National Park Service 2014: Aral Interpretive Panel).



Figure 2.10 Aral Sawmill at Otter Creek, c. 1885. Courtesy of National Park Service

The 20th century brought hardships for American Indian communities across the United States, with new policies implemented by the government to promote assimilation and eradication, such as the adoption of log cabins (Cardinal and Cobb 2012). In addition to the continued persecution, removal, and relocation of Anishinaabeg people throughout the Great Lakes region, the loss of traditional lands and resources became increasingly troublesome in the 20th century.

2.4.3 Burt Lake Burnout and Removal

The Sheboigan Band has been trying to get recognition. They have got that Burt Lake Burnout. There used to be a Burt Lake County, then they came down to Burt Lake. Well one time, we had land all up through here that would be our Burt Lake Reservation, but they mostly

settled right here, then they wanted this land so they told all the adults that there was a meeting they had to attend, and when the adults left they came in and burnt out the whole village. The whole village was burnt down and wiped out. There are still some that are still fighting to be federally recognized. They used that burnout as their base of termination.

Well, around the turn of the century settlers in the region kept moving in and needing more land for their farms and things. Sometimes they would wait for the Odawa people living nearby to leave their houses. Even in the 1880's and 1900's we would still leave for a few days or weeks to go gather berries, or fishing, whatever. While we were out following our traditional practices the non-Native people would come in and get rid of all of our belongings, and sometimes torch our homes. So we would have to move on, move away. Then they would take the land as their own because nobody was living on it. That was common, happened pretty regularly.

2.4.4 Assimilation

To provide for their families' basic needs, Odawa people began participating in the growing wage labor economy and they integrated their traditional activities unto their yearly cycle. Odawa's became farm laborers, lumbermen, and commercial fishermen. They harvested wild berries and produced crafts for sale (McClurken 2009: 113).

With the coming of the boarding school experience and how people were hiding, things are lost now, a lot of people that knew many of things. I do not know if anybody's really talked about [medicine] bundles, but, many of those people knew a lot of the stronger medicines, and there are people now-a-days that carry the *poagan* or pipe. They have bundles and they have certain things that they use in their ceremonies in that bundle. I have heard stories that a lot of those [older] people, when they could not practice their ways, were taking their bundles and hiding them somewhere. Sometimes those people would walk on without passing that bundle onto their nephew, or somebody to whom they would be teaching those things.

After the boarding school era, it was either shut-up and assimilate or be killed basically, and that oppression lasted for at least 100 years With the acculturation and assimilation of a lot of the people from our region, we really missed out on some important information being passed down.

My grandpa was born in 1923, and he went to boarding school until he was in the 8th grade. When they started their family they chose not to teach the language or cultural things to their children. This is the point where a lot of our elders who went to the boarding schools are today. Either their parents went to the boarding schools, or they did, and they just chose not to pass on the language (Figure 2.11).



Figure 2.11 Mount Pleasant Industrial Indian School, Michigan c. 1900. Courtesy of Ziibiwing Center of Anishinaabeg Culture and Lifeways

Many of our elders are leaving us and taking the language with them. My grandparents were fluent, but because of the boarding school experience, they chose not to teach my mom, or my aunts and uncles. So today, we only have a few elders that are fluent. Most of our elders, they understand it and can speak some, but as far as first language fluency, we only have a couple.

The Odawa remained religiously distinct from their American neighbors well into the 20th century. For decades, Catholic and Protestant missionaries had vied for Odawa converts. The Catholics at the town of Elbridge built a church that became a central feature of the reservation community, but the Catholics had little spiritual influence on the Odawa people. Many Odawa's held their own beliefs, traditions, and culture more resolutely than they accepted Christian lifestyles and ideologies (McClurken 2009: 108).

2.5 Returning to Traditional Ways

We are starting to return to our traditional ways, and that means we are remembering the past. We are still learning and reawakening those old ways. They are not lost, people still know some of the old traditions. More and more of our people are trying to learn the old ways, maple

sugaring, black ash basket making, even ceremonies. We have been suppressed and have not had the land or the access to resources to do these things.

2.5.1 Sharing Knowledge

Our elders have a lot of stories about growing up, and now they are talking about it. That was probably in the 1920's or 1930's, for the ones that are still alive today. They have a lot of family stories, or they are remembering things from their grandparents. And from their great grandparents, from the late 1800's or early 1900's. So, I can see a little healing taking place.

Today, I see a lot of elders are feeling more comfortable and opening up and sharing (Figure 2.12). They actually know a lot, but they are now starting to share, so I'm seeing a lot of our people returning back and learning those old ways.



Figure 2.12 Odawa Representative Sharing Ethnobotanical Knowledge at Pyramid Point, SLBE

I go out and do cultural and language presentations. The main purpose of that is for outside organizations to share in our philosophy, or our worldview of who we are as Anishinaabeg people. I feel that brings awareness to other Nations, and non-Natives, and by sharing that awareness that helps bring understanding, and with understanding you get your acceptance, and when we all come together as many races and Nations with one goal of helping Mother Earth and living in balance and harmony, then that is where we are going to see change on a global level. So even though you are here talking with us that is our big worldview as Anishinaabeg, because we see everything as connected (Figure 2.13).



Figure 2.13 Odawa Representative Sharing Cultural Knowledge at Platte Plain Swales, SLBE

I found out somewhere around here, up near what is now Peterson Park, that is where the Wabano lodges were. It is a powerful place. I would love to be able to come over to the park and do the spring or a fall or summer Wabano ceremony. The thing about the Wabano ceremonies is they were, as a part of the boarding school thing went away from this area, and there had not been a lodge run in Grand Traverse Band reservation area in over 83 years until we brought it back home. It was 83 years almost to the season from the last time that we have had one. And what's unique about that ceremony is at 8:30 at night there were 83 people. I didn't even realize it, and it was pointed out to me, there are 83 people in here, it is 8:30 pm and here it was 83 years almost to the date that we had not had that ceremony in our area, so that was kind of neat. It was just came together like that and that was something I had dreamt. That lodge was something I had dreamt and shared with some pipe people, and it came to be.

Some of our ceremonies, our culture, it is just put away or sleeping until the right time to come back, you know. Until it is the right time to come back. Some of it I even feel is not going to come back. Parts of our ceremonies are not going to come back until the people are ready. Even our own people, I am not talking about non-Native people and them accepting, but even our own people accepting particular parts of ceremony. You know, when the time is right, when it is right for the people. When it is either needed, or when it is at the point where it will be accepted.

CHAPTER THREE
THE CLIMATE OF NORTH AMERICA OVER THE PAST 2,000 YEARS

This chapter examines the prehistory and history of climatic shifts in North America (Figure 3.1), particularly the United States, from AD 0 to present day. Earth's climate has continuously shifted over time, with temperatures and precipitation levels constantly fluctuating. Shifts in weather patterns, extreme weather events, and climate change are all part of a normal global ecosystem. Over time, humans have always been affected by and adapted to changing weather. This chapter is a review of past weather events and climatic shifts that have affected human populations. Understanding past weather impacts is imperative in comprehending how current climate change will impact human populations. Bradley and Jones (1993: 367) suggest that, "in order to understand future climatic changes, it is necessary to have an understanding of how and why climates have varied in the past".



Figure 3.1 Satellite Image of North America

Climate change is not a new phenomenon, nor is climate change inherently negative for human populations. However, current predictions of environmental and social impacts based on the rate of climate change present tremendous challenges. Green and Raygorodetsky (2010) explain:

> anthropogenic climate change is perhaps the ultimate manifestation of humans' growing disconnect with the natural world, although not all societies share the same burden of responsibility for its creation. Compared to the dominant industrialized societies whose activities in the last 200 years or so have caused most of the climate impacts currently observed, Indigenous people living on their traditional lands bear little responsibility for current and future projected consequences of a changing climate. Despite this, they are likely to suffer the most from direct and indirect climate change due to their close connection to the natural world and their reduced social–ecological resilience (239).

This study focuses on the documented effects that environmental change has had on Odawa ethnobotanical resources in Northern Michigan. An assessment of how changing weather patterns affect human populations and biotic communities, will assist in providing a better understanding of climate change. This chapter describes how past climatic events caused crop failure, spread of disease, and forced relocation. Chapter eight will further discuss some of the cultural impacts of climate change. The purpose of this chapter is to contextualize past extreme weather events and climatic changes to better understand the severity of the predicted future impacts.

3.1 Climatic Shift Versus Weather Pattern

Though weather events may dramatically impact an ecosystem, they are not necessarily an indicator of climate change. Climate change can be measured by an increase in the severity and frequency of individual weather events, as well as a general shift in global temperature, sea level, and precipitation. By definition,

> Climate and weather are closely related terms, but there is a real and important distinction between them. Weather refers to the state of the atmosphere, with special emphasis on the local and short-term variations of temperature, wind, cloudiness, precipitation, and humidity. Climate, by contrast, comprises the totality of weather. When we speak of climate, we are concerned with conditions defined over large areas, long times, or both (Schneider et al. 2011: 9).

The duration and intensity of these temperature fluctuations are indicators of shifts in climate, rather than weather. Human adaptation to these climate changes are evident in the archaeological record. The rise of agriculture follows the warming trend of the Medieval Warming Period. Similarly, the Little Ice Age is aligned other sociocultural shifts including decline in agriculture, decreased community size, and migration.

This chapter will review a selection of weather events in the United States that indicate a global climate change. The role independent weather patterns play in the larger scheme of climate change can be measured through human experiences in terms of resource availability, health, economy, agriculture, etc. Humans interact with their environment, and as the environment changes, populations must adapt.

3.2 Climate Change Terminology

Climate changes and significant weather events have occurred in North America over the past 2,000 years. Changes to regional weather, however, are often linked to larger global patterns. It is important to distinguish that significant climatic shifts can result as a reaction to either weather pattern shifts or natural disasters. For example, the latitudinal movement of jet streams will result in regional shifts in temperature and precipitation, which in turn impact ecosystems. Similar weather impacts can also occur in correlation to volcanic eruptions, since air pollution impacts the amount of sunlight and rainfall, as well as plant, animal, and human populations.

Significant ecological impacts can take place as a reaction to shifts in weather patterns or natural disaster. These dramatic shifts are often referred to as extreme weather events. Extreme weather can be measured through time, and "by definition, the term 'extreme' refers to a departure from what is considered the norm" (Greenough et al. 2001: 191). Examples of extreme weather that are associated with climatic change are often measured in terms of spatial scale, intensity, frequency, timing, and duration (Greenough et al. 2001; Stephenson et al. 2008). However,

> extreme events are generally easy to recognize but difficult to define. This is due to several reasons. First, there is no unique definition for what is meant by the word extreme: several definitions are in common use. Second, the concept of extremeness is relative and so strongly depends on context. Third, the words severe, rare, extreme, and high-impact are often used interchangeably (Stephenson et al. 2008).

For the purpose of this report, the following terms, weather event, weather episode, and climate change, will be used to discuss "meteorological events that have a significant impact upon a local community or ecosystem," (Greenough et al. 2001: 191). These terms are listed in an ascending order based on spatial scale, intensity, frequency, timing, and duration. A weather event is an isolated and temporary shift in precipitation and temperature to an area or region, such as a flood or blizzard. A weather episode addresses the same meteorological impacts, but differs from a weather event in the spatial or temporal scale, duration, intensity, etc. An example of a weather episode would be the Dust Bowl in the American Midwest in the early to mid-1900's. Climate change, such as the Little Ice Age, is distinguished from the previous two terms as causing the most extreme ecological impacts due to the spatial scale, intensity, frequency, timing, and duration of a shift.

These weather and climatic shifts have impacted the livelihoods of human populations and have caused them to adapt. Weather and climate events affect humans by impacting food and water resources, migration, health, etc. Dramatic fluctuations in temperature and precipitation in terms of floods or drought can greatly impact the variety and abundance of plants and animals species. Similarly, weather and climate events can affect the settlement patterns of human populations based on resource and land availability (Figure 3.2).

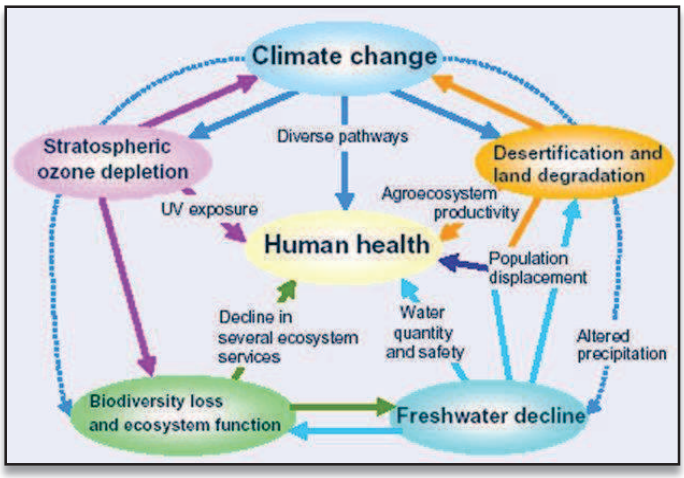


Figure 3.2 Social and Environmental Impacts of Climate Change (World Health Organization 2014)

Cavanaugh et al. (2013: 1) provide a basic review of ecological and biological effects of weather and climate events:

> the biological impacts of climate change—temperature increases in particular—have been documented across a large number of terrestrial ecosystems. For example, increasing annual mean temperatures are associated with shifts in the abundance and distributions of hundreds of plant species toward higher latitudes and elevations. Although most investigations into the response of ecosystems to climate change have focused on the impacts of gradual increases in mean temperatures, there is growing recognition that changes in the frequency of extreme weather events can also have profound impacts.

According to Greenough et al. (2001: 191) (Figure 3.3), "The potential health impacts of extreme weather events include both direct impacts, such as traumatic deaths and injuries. Similarly, extreme weather events present indirect impacts, such as illness associated with ecological or social disruption".

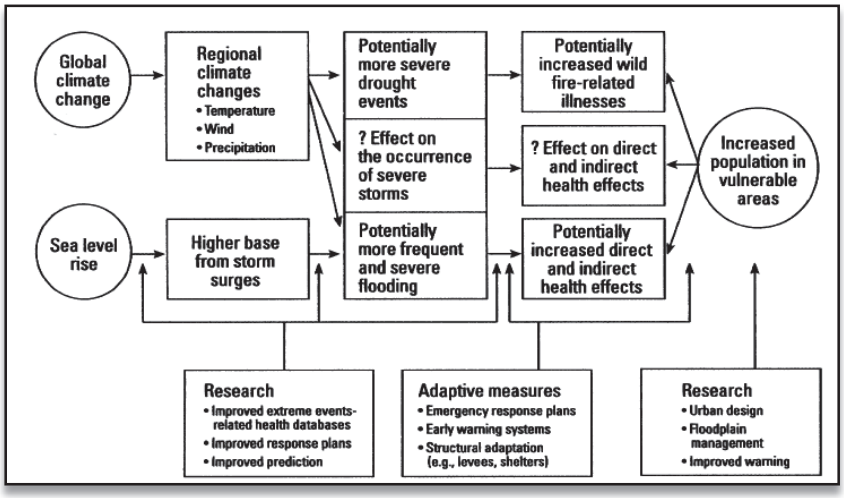


Figure 3.3 Extreme Weather Events and Health Effects of Climate Change (Greenough et al. 2001: 192)

In order to understand the implications of climate change, one must first be familiar with the associated terminology. This chapter reviews extreme weather events that had significant effects of the physical landscape and living populations. These extreme weather events contextualize how unpredictable events can have broad and far-reaching implications.

3.3 Climate Changes in North America

Extreme weather events, like volcanic eruptions, droughts, and cooling periods, have triggered ecosystem shifts, and have caused human populations to adapt. Table 3.1 lists several significant weather events, episodes, and climate changes over that last 2,000 years that have had an impact in North America. These events are ordered chronologically, and are also regionally categorized.

Year	Climatological Event or Climatic Change	Summary of Event	Region
AD 0	Post-Algoma Flood Phase	500 years of substantial flooding ends at AD 0 leaving Lake Michigan at all-time high water level (Lovis et al. 2012:19).	Great Lakes
536	Volcanic Eruption	Dust Veil	Worldwide
1000 to 1350	Medieval Warming Period	Warming	Worldwide
1075	Little Springs Volcanic Eruption	Cooling	American Southwest
1050 to 1150	Sunset Crater Volcanic Eruption	Cooling	American Southwest
1130 to 1180	Droughts	Dry Period	American Southwest
1258 to 1259	Major Volcanic Event Impacts Climate Worldwide	Cooling	Worldwide
1300 to 1640	Pre-modern Flooding/ Little Ice Age Start	High levels of Great Lakes due to Little Ice Age/ Pre-modern flood phase (Lovis et al. 2012:19).	Great Lakes
1500	Multi-decadal Droughts	Dry period	American Southwest
1350 to 1850	Little Ice Age Event	Excessive Cooling	North America
1783	Volcano Eruption	Dim and cool period	Iceland
1780	The Great Hurricane	Storms and flooding	Caribbean
1816	Volcanic Eruption in Dutch East Indies	Extremely cold summer with freezing temperatures also called the Forgotten Summer of 1816	North America/South America
1835	Blizzard	Snowstorm with rain and sleet caused ships on the Great Lakes to sink, capsize and over 250 lives were lost.	Great Lakes

1850	Little Ice Age Event/ Excessive Cooling	Excessive cold interval at 1850	North America
1902	Volcanic Eruption	Mt. Pelée, Martinique, Lesser Antilles. May 8, 1902, Eruption killed 30,000 people and lasted until July of 1905. Cooling episode in United States follows eruption (Richardson 1997)	Caribbean
1902	Volcanic Eruption	Sufriere, St. Vincent, Lesser Antilles. May 7, 1902 Eruption killed 1500 people and lasted until March 1903. Cooling episode in United States follows eruption (Richardson 1997)	Caribbean
1889 to 1904	Extended Drought Period	Most persistent time of drought in Arizona in 300 years, with above average temperatures throughout the Northern Hemisphere (Figure 3.7)	American Southwest
1903 to 1904	Record Cold Temperatures	Coldest recorded winter ever in Michigan's history with an average temperature of 18.7 from December to February.	Michigan
1900	Galveston Hurricane	8,000 People Killed	American Southeast
1904	Precipitation	Early Spring warming caused snowpack to melt and caused massive flooding.	Michigan
1908	Precipitation	Early Spring warming caused snowpack to melt and caused massive flooding.	Michigan
1913	Cold Front/ Precipitation	Worst winter storm to strike the Great Lakes region in recorded history.	Lake Huron and lakeshore areas around peninsula
1930	Dust Bowl	Extreme dust storms and drought	American Midwest
1930-1938	Severe Drought	Excessive drought years	Midwest
1938	Precipitation	Extreme flooding after nearly decade of drought	Michigan
1940	Cold Front/ Precipitation	Armistice Day Blizzard with sudden temperature change and record snowfall.	Upper Midwest
1947	Precipitation	Massive rains and melting snowpack caused a once in 50 years flooding event.	Michigan
1957	El Niño	Warming trend/ average annual temperature increase	Global/ North America and Pacific
1960 to 1967	Severe Drought	Seven year drought	Michigan
1965	El Niño	Warming trend/ average annual temperature increase	Global/ North America and Pacific
1972	El Niño	Warming trend/ average annual temperature increase	Global/ North America and Pacific
1973	La Niña	Cooling trend	North America
1975	La Niña	Cooling trend	North America
1976 to 1977	Record Cold Season	2nd coldest recorded winter in Michigan history.	Michigan

1982 to 1983	El Niño	Warming trend/ average annual temperature increase	American West Coast
1988	La Niña	Cooling trend	North America
1988	Severe Drought	Summer of 1988 noted for tremendous heat and dryness experienced across Midwest.	Upper Midwest and Great Lakes
1993	Flooding	Flooding	American East Coast and Midwest
1995	Destructive Hurricane Season	Flooding	American East Coast
1997	El Niño	Warming trend/ average annual temperature increase	North America
1999	La Niña	Cooling and drought, except for the Pacific Northwest where there was an increase in precipitation	North America
2000	Major Wildfires	Fire	American Northwest

Table 3.1 Some Major Climatic Events Impacting North America

Though some of these weather patterns originated elsewhere on the planet, there were direct and indirect ecological and social impacts within North America. Because these variations in seasonal weather patterns, extreme weather, natural disasters, and climate change caused widespread impacts, they are relevant for framing this study and understanding changing ecosystems and human environment interactions. Several of these events will be described in greater detail to contextualize the chronology of climate change, as well as the impacts that these climatological events had on human populations. Northern Michigan is the focus of this study, but it is important to explore global events and episodes to contextualize how the planet has changed over time. The timeline of weather events begins at AD 0, however, human-environmental relationships were shifting and adapting much earlier than that.

3.4 Significant Climatic Event Impacts Worldwide

Over the past 2,000 years, some major climatic events have occurred that had significant ecological impacts worldwide. A few of the most substantial climatic changes on a global scale include extreme temperature fluctuations, changes to the air quality, seasonal warming and cooling trends (Table 3.2).

Date	Climatological Event or Climatic Change	Region
AD 536	Dust Veil	Worldwide
AD 1000-1350	Medieval Warming Period	Worldwide
AD 1258-1783	Major Volcanic Event Impacts Climate Worldwide	Worldwide
AD 1350 to 1850	Little Ice Age Cooling Periods	Worldwide

Table 3.2 Some Significant Global Climatic Events

Humans interact with their environment, and these ecological changes in turn influence human livelihoods in a variety of ways. Similarly, plants and animals are faced with the need to adapt to shifting environments. When plant and animal populations cannot adapt they risk extinction, which in turn impacts the human populations that depend on them for sustenance.

Weather and climate transitions that have had worldwide impacts often affected both the physical place and ways in which human populations could survive.

3.4.1 Dust Veil and Climate Impacts, AD 536

In AD 536, a dust veil significantly affected the climate of the earth's northern hemisphere. Past theories explained the dust veil as occurring due to the impact caused by an asteroid or some other object. However, evidence from an ice-core dating to this time in Greenland has indicated that a volcanic eruption along the equator caused this dim and cool period. Tree-ring dating efforts have exposed that the cooling effect caused by the dust veil was the harshest, cold episode in the last two million years. The effects of the dust veil can be found in a series of fossil tree-rings that indicate how the summers in the northern hemisphere, from Siberia in the east all the way to the western United States, were unusually cold from AD 536-545, in places even until AD 550 (Gräslund and Price 2012: 430). This event not only had environmental impacts, but is also thought to have contributed to social stress (Figure 3.4) (Larsen et al. 2008).

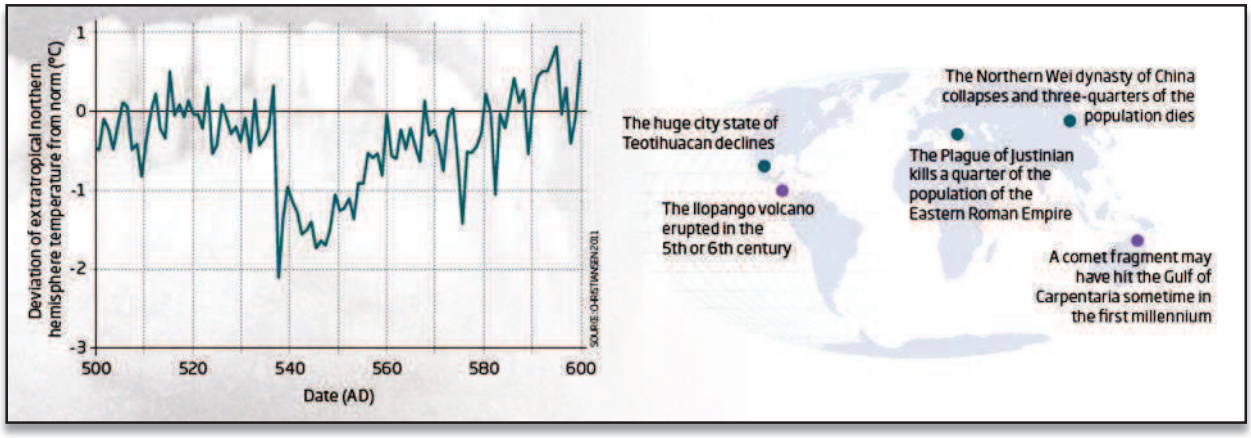


Figure 3.4 Global Impacts of the Dust Veil of AD 536 (Barras 2014: 36)

Documents from China and Europe demonstrate how devastating the impact of the dust veil was on humans. Chinese texts indicate that "about 75 percent of the population died due to cold, crop failure, starvation, and drought" (Barras 2014: 36). Along with cold temperatures and fruitless crops, it is also thought that the AD 536 dust veil triggered the Justinian Plague, which is recognized as causing 10,000 deaths of per day, due to poor health and malnutrition experienced by the European people in the years following the event (Barras 2014: 37).

Written records from China and Europe also document the ways in which the dust veil of AD 536 caused human suffering. Tree ring data, however, also shows evidence of impacts in North American. Although it was not documented by populations living in North America, the evidence suggests that American Indians also suffered from the dust veil's physical and social impacts. An archaeological study based in North Carolina suggests that:

> it is conceivable that the environmental changes that occurred following the AD 536 event were sufficient to disrupt the subsistence strategies of the local Middle

> Woodland society, reducing the economic attractiveness of, and ultimately bringing about general abandonment of, the Tidewater estuarine zone (Gunn 2000: 111).

This AD 536 event had worldwide impacts. The social impacts experienced at the site in North Carolina, China, and Europe are not unique, and can be generally applied to other American Indians communities across North America.

3.4.2 Medieval Warming Period, AD 1000-1350

The Medieval Warming Period and subsequent Little Ice Age are examples of climatic shifts (Figure 3.5). Beginning in AD 1000, temperatures increased in the northern hemisphere. This gradual warming trend, known as the Medieval Warming Period, peaked by AD 1200. After this date, temperatures declined until AD 1450. Between AD 1450 and AD 1500 there is a slight rise in temperature, but then the northern hemispere experienced a second cooling trend reaching the lowest temperatures of the Little Ice Age around AD 1600-1650 (Figure 3.5). A rapid increase in temperatures occurred between AD 1650 and AD 1700, which was followed by a slight cooling phase between AD 1700 and AD 1850. Temperatures in the northern hemisphere began to increase again, and by AD 2000 the Little Ice Age had ended.

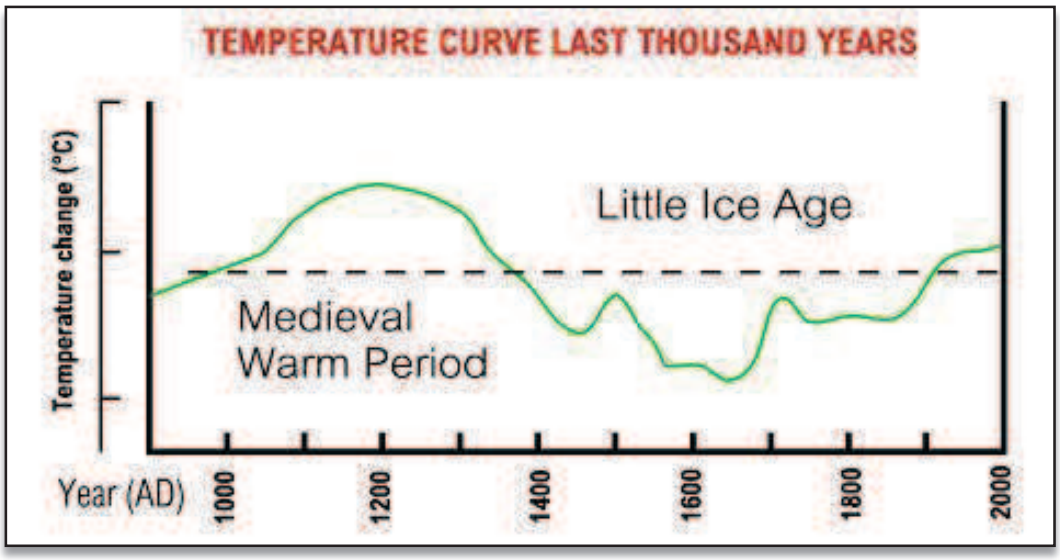


Figure 3.5 Temperature Fluctuations between AD 1000 and AD 2000 (Press Dispensary 2011)

The Medieval Warming Period affected Europe and North America between AD 1000 and AD 1350. These impacts can be observed through the archaeological record.

> Norse seafaring and colonization around the North Atlantic at the end of the 9th century indicated that regional North Atlantic climate was warmer during medieval times than during the cooler "Little Ice Age" of the 15th-19th centuries. As paleoclimatic records have become more numerous, it has become apparent that "Medieval Warm Period" or "Medieval Optimum" temperatures were warmer over the Northern Hemisphere than during the subsequent "Little Ice Age", and also comparable to temperatures during the early 20th century. The regional patterns and

> the magnitude of this warmth remain an area of active research because the data become sparse going back in time prior to the last four centuries (NOAA 2008).

In the United States, the Southwest is noted for human adaptation to the Medieval Warming Period. Climate change events that took place worldwide also caused regional changes in the landscapes, rainfall, and temperatures on the Colorado Plateau. In this region, there was much higher temperatures and rainfall during a period from AD 950 to 1130, as well as droughts from lasting from AD 1130 to 1180 (Anderson et al.1999). These were followed by the Little Ice Age that lasted from AD 1350 to 1850. Some locations in the North America were affected so dramatically by past climatic changes, that "temperature anomalies of the scale of the Medieval Warm Period and Little Ice Age in North America… effectively shut down high-elevation maize production in areas like the Mesa Verde cuesta" (Bocinsky and Kohler 2014: 6).

The Medieval Warming Period caused a series of global climate changes. Warmer temperatures and increased precipitation in North America led to human adaptation. As agriculture developed, human populations began to grow, thus leading to large societies and cultures. These advances, however, were often stunted or reversed by the onset of other extreme weather events, like volcanic eruptions or the Little Ice Age.

3.4.3 The Rise of the Little Ice Age, 1350-1850

An equatorial volcano eruption in AD 1258 caused similar global reactions as the dust veil from AD 536. This eruption, however, caused a global covering, rather than only veiling the northern hemisphere. Ice cores were also used to investigate the severity of this volcanic event, and revealed, "this was the world's largest volcanic eruption of the past millennium" (Stothers 2000: 361). This event caused impacts worldwide.

> According to contemporary chronicles, the stratospheric dry fog possibly manifested itself in Europe as a persistently cloudy aspect of the sky and also through an apparently total darkening of the eclipsed Moon. Based on a sudden temperature drop for several months in England, the eruption's initiation date can be inferred to have been probably January 1258. The frequent cold and rain that year led to severe crop damage and famine throughout much of Europe. Pestilence repeatedly broke out in 1258 and 1259; it occurred also in the Middle East, reportedly there as plague. Another very cold winter followed in 1260–1261. The troubled period's wars, famines, pestilences, and earthquakes appear to have contributed in part to the rise of the European flagellant movement of 1260, one of the most bizarre social phenomena of the Middle Ages (Stothers 2000: 361).

Blanton (2004) described that the direct climate impacts of volcanoes rarely last more than a few years, however volcanic eruptions (Figure 3.6) can cause subsequent climate changes, such as periods of cooling, which will last much longer.

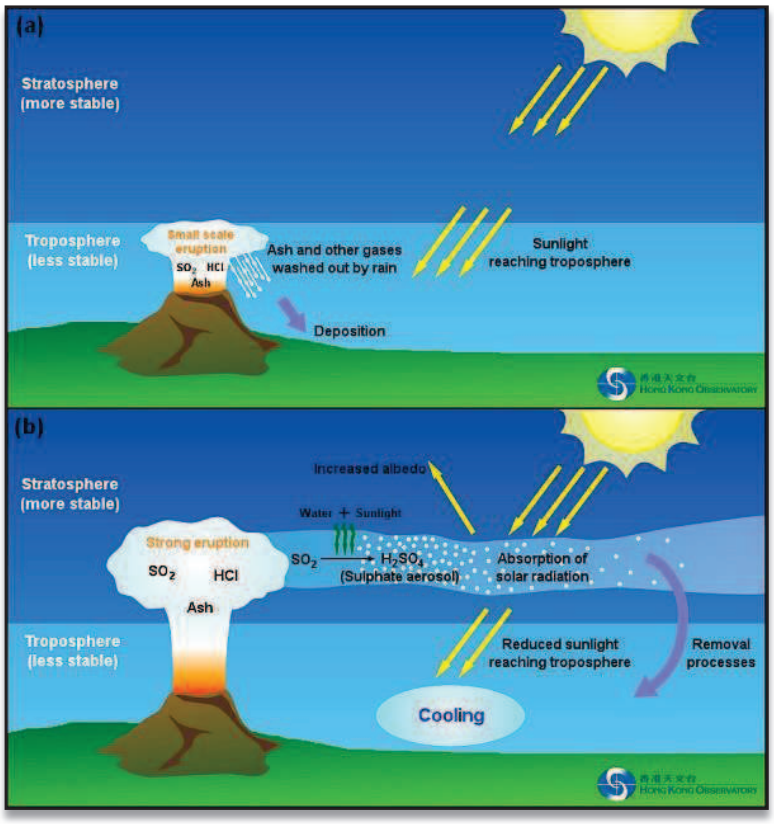


Figure 3.6 Diagram of Climatic Reactions to Small Scale and Large Scale Volcanic Eruptions (Hong Kong Observatory 2011)

A large scale cooling era beginning in AD 1350 in the northern hemisphere termed the Little Ice Age (Free and Robock 1999: 19,057). The Little Ice Age is marked as climate change, due to the scale, duration, and severity. Bradley and Jones (1993: 374) explain how, "the term 'Little Ice Age' is often used to describe a world-wide, 400-500-year long, synchronous cold interval, but it was a period of both warm and cold climatic anomalies which varied in importance geographically".

> Current evidence suggests that explosive volcanism has played an important role in modulating summer temperatures in at least the Northern Hemisphere over the last few centuries. However, since the 1920's, temperatures in this hemisphere have been higher than those reconstructed, for at least 500 years, suggesting that other factors may have come into play during recent decades. Anthropogenic greenhouse gases are the most probable explanation (Bradley and Jones 1993: 374).

The Little Ice Age spanned from around AD 1350-1855, however the cold temperatures during this time fluctuated, with "the coldest conditions of the last 560 years were between AD 1570 and 1730" (Bradley and Jones 1993: 367).

Another significant volcanic event that took place during the Little Ice Age took place in Iceland in 1783. The eruption has been recently linked to global environmental episodes. The event has been described as follows:

> the ash it pumped into the atmosphere blanketed most of the Northern Hemisphere in a sun blocking fog, causing one of the most severe winters for hundreds of years. Many people across Europe froze to death, and crops withered, leading to mass famine. In Africa, the monsoons failed to come, and the Nile did not flood as usual, causing one sixth of Egypt's population to starve or leave the country. The official death tally in Iceland from Laki was around 9,000 however, the global toll was much higher (Island on Fire 2015).

Volcanic eruptions cause extreme weather events, often triggering other weather reactions. A series of extreme weather events, like the volcanic eruptions that occurred around the world during the Little Ice Age could have contributed to that climatic change. The individual events themselves did not account for global climate change, but together they created large-scale air pollution, which changed the planets temperature and weather patterns experienced during the Little Ice Age.

Studies investigating the ecological impacts of the Little Ice in North American (Figure 3.10) are generally focused on specific regions. Bradley and Jones (1993: 369) note:

> in the USA, tree-ring data from extensive sampling networks in the western USA provide regional paleotemperature reconstructions, whereas dendroclimatic studies in the eastern USA have generally focused on drought reconstructions. In the north central and northeastern USA, pollen extracted from laminated lake sediments has yielded an index of growing season temperatures resolved to 20-30 years over the last few centuries.

Evidence for temperature fluctuations has been documented historically, as well as is present in tree-ring data, ice-cores, and pollen in lake sediments. The onset of the Little Ice Age greatly impacted North American growing seasons, particularly, “in the early and late 1500’s, around AD 1700 ± 20, and AD 1840 ± 15” (Bradley and Jones 1993: 369). In contrast, the warmest periods of the Little Ice age occurred around, “AD 1650-1660, 1800, 1860, and 1930” (Bradley and Jones 1993: 370).

The colder and later half of the Little Ice Age impacted the Upper Great Lakes in intervals occurring roughly every 100 years from AD 1500 until 1800. While historic written accounts of bitterly cold winters support the chilly years shortly before and after the AD 1770-1850 cold interval, paleoclimatology provides our only means of assessing climatic variations before the beginning of instrumental records (Jones et al. 1998). Beginning with the cooling event associated with the Little Ice Age (AD 1350-1850), temperatures were significantly lower than the previous averages for an extended amount of time.

3.5 Cooling Trends and Colder Temperatures in North America

The two major cooling periods that will be addressed for North America are the Little Ice Age and the Forgotten Summer of 1816. Extreme cold temperatures in Michigan and the Upper

Great Lakes region were not uncommon historically, but have become increasingly unusual over the last fifty years (Table 3.3).

Date	Climatological Event Climatological Event or Climatic Change	Region
1816	Forgotten Summer	North America
1903 to 1904	Record Cold Temperatures	Michigan

Table 3.3 Some Major Cooling Events

Key questions in climatology today focus on the magnitude and pattern of warming trends in temperatures globally, and frequently utilize data from the past to formulate predictions about the future (Jones et al. 1998: 456). This section examines abnormal cold temperatures and cooling patterns in the past as a way of illustrating the climate changes occurring in North America.

3.5.1 The Forgotten Summer of 1816

One particularly cool summer during the Little Ice Age was documented across the Northern Hemisphere in 1816. Briffa et al. (1998: 451) investigated the correlation between volcanic eruptions and periods of cooling and found:

> a number of published regional dendroclimatic temperature reconstructions have made passing reference to the coincidence between certain localized cold summers and the dates of various volcanic eruptions, and the potential for identifying large volcanic signals in a combined set of North American and European chronologies.

Their data indicate that the Forgotten Summer of 1816 (Figure 3.7) was ranked as having the second lowest summer temperatures documented in the Northern Hemisphere. In this figure, the dates that reached the most extreme low temperatures are labeled (Briffa et al. 1998: 451).

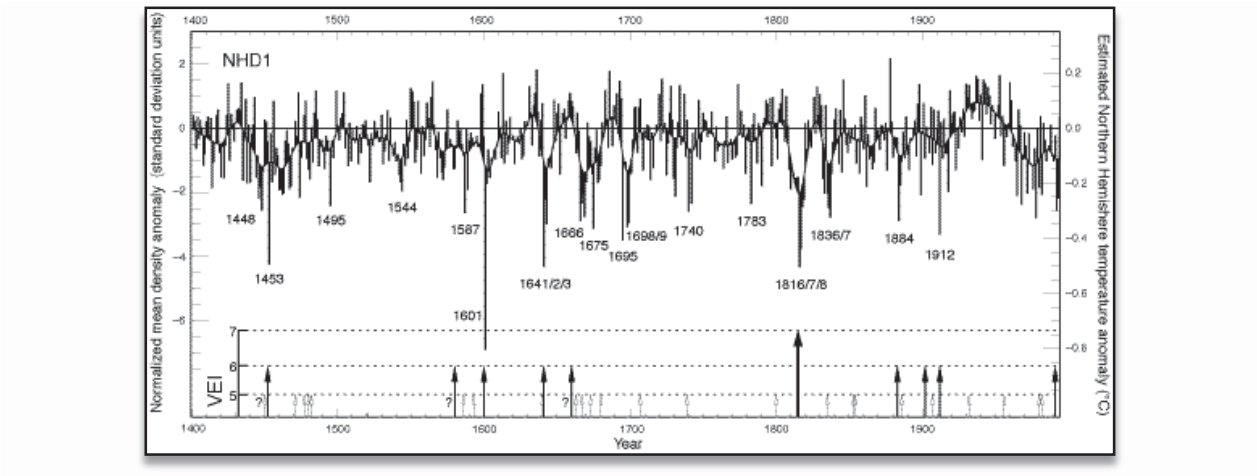


Figure 3.7 Recorded Temperatures during the Forgotten Summer of 1816 (Briffa et al 1998)

Briffa et al. (1998) claim that the extreme cooling effects experienced in the summer of 1816 were a reaction to a volcanic explosion a year earlier. This eruption occurred in April of

1815 in Tambora, Indonesia, and is "the largest historically documented eruption of the modern era" (Briffa et al. 1998: 452).

3.5.2 The Forgotten Summer of 1816 in Michigan

During this time, the Midwest had a sparse population. There are few reports and weather observations from Michigan regarding the effect of the volcanic eruption. In New England, however, widespread frosts were reported in every summer month, which destroyed crops. In addition, there were a number of heavy snowstorms in June, which killed hundreds. Nineteen states, including Michigan, reported accumulated snowfall during June of 1816. There was ice reported on southern Canadian lakes during the summer months, and presumably, the weather was very similar throughout the Midwest, including Michigan (NOAA 1816 Volcanic Eruption). Volcanic eruptions and cooling trends are usually synchronous, but the extent to which this volcanic eruption affected the world was substantial.

3.5.3 Record Cold Temperatures in Michigan, 1903-1904

The coldest recorded winter ever in Michigan history took place between December 1903 and February of 1904, with 18.7 degrees Fahrenheit as the average temperature for three months. Historical accounts describe the severity of the unwavering freeze, and illustrate just how unusual these excessively cold temperatures were for the time period (Riebeek 2010: 4). Volcanic events, like those discussed previously, have been linked as possible causes for the cold weather reaction in the Upper Great Lakes region of the United States.

3.6 Drought in North America

North America has experienced hundreds of multi-year droughts over time (Table 3.4). Drought is defined as an extended period when a region experiences a deficiency in its water supply, whether atmospheric, surface or ground water. The following section examines some of the historical examples of periods of drought in North America. The Medieval Warming Period lasted from AD 1000 to 2000, and resulted in regional droughts. The Southwestern drought between 1849 and 1905 and the Dust Bowl from 1930-1937 will be discussed in this section.

Date	Climatological Event or Climatic Change	Region
1899 to 1904	Drought in the Southwest	Southwest
1930 to 1937	The Dust Bowl	Central
1960 to 1967	Drought Episode	Great Lakes
2000	Wildfires	West/Plateau

Table 3.4 Key Drought Dates for North America and Michigan

Mild droughts are common in Michigan and the Great Lakes, but severe droughts are infrequent and generally of short duration (Nurnberger 1980). Two severe droughts occurred in Michigan during the 20th century and are discussed below. The first occurred between 1930 and 1937, and the second severe drought is documented as occurring between 1960 and 1967, with both droughts, coincidently, spanning seven year intervals.

3.6.1 Drought in the Southwest, 1889-1904

Between 1889 and 1904, the American southwest experienced a severe drought along with above-normal temperatures. This drought is considered to the worst of the century (Muhs and Been 2013). Figure 3.8 indicates the severity of this drought in comparison to rest of the 20th century.

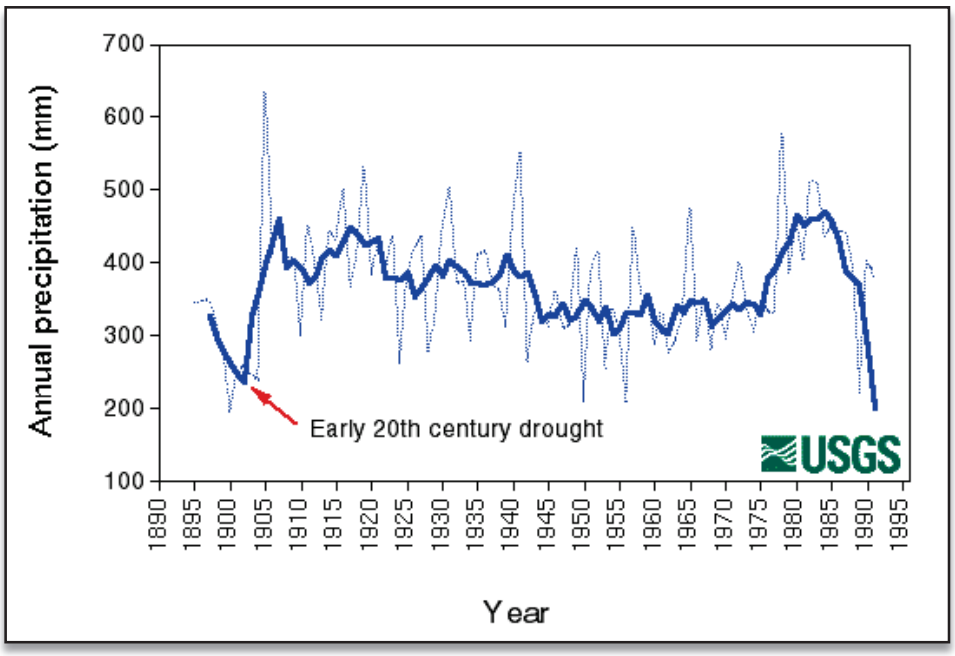


Figure 3.8 Early 20th Century Drought (Muhs and Been 2013)

Historical records of this event are limited. However, modern dating techniques, like dendrochronology, are beginning to reconstruct the drought and its impacts to human and plant populations. This event is marked as a particularly dry and hot time.

3.6.2 The Dust Bowl Drought Years, 1930-1937

During the 1930's, extreme dust storms frequented America's Great Plains. Though the individual severity and duration of these storms varied, the overall effects were debilitating. Over the decade, there were generally nine storms per month, with each storm lasting around ten hours.

These storms were the most extreme at the end of winter and beginning of spring. Airborne dust was only one part—certainly the most spectacular part—of an even greater problem. For the blowing dust once was topsoil, and topsoil was the most valuable resource of the area (Lockeretz 1978: 560).

The effects of soil erosion and drought had significant impacts on the environment, economy, and society. Populations in the Great Plains were greatly affected, but as Figure 3.9 shows the dust storms and subsequent effects impacted a majority of the United States.

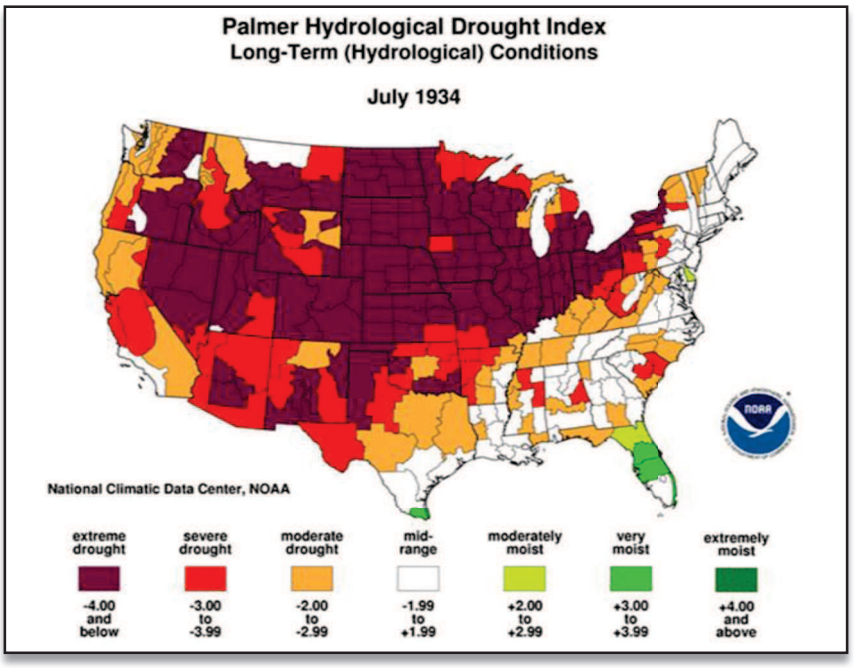


Figure 3.9 National Drought Impacts in July 1934 (North Dakota State University 2014)

According to Lockeretz (1978: 560), "the dust storms of the 1930's were the worst man-made environmental problem the United States has ever seen, whether measured in physical terms or by their human and economic impact". The affects the Dust Bowl had on human populations was devastating, and it has been documented that the "drought caused some 200,000 farm bankruptcies in the Dust Bowl; yields of wheat and corn were reduced by as much as 50%" (Rosenzweig et al. 2001: 90). During the Dust Bowl, extreme drought spread across the United States. Many people were impacted, and it took a long time to recover.

The Dust Bowl in Michigan, 1930-1937

Although conditions were much worse in the plains states, Michigan was not spared by this dry spell (Huizinga 2010). During the summer and fall of 1930, many locations received 30 percent less precipitation less than the normal amount statewide, which ranges from 23 to 30 inches annually according to the Michigan State Climatologist's Office (2009). In the summers of 1931 and 1932, crops were affected by the dry conditions, but not to the same extent as they were in 1931. Because of the severity of the 1930-1937 drought, 41 counties were recognized by the Federal Drought Relief Administration as needing assistance. Numerous deaths were attributed to extreme heat in July 1936 (Michigan Water Science Center 2013).

3.6.3 Drought Episode in Michigan, 1960-1967

The longest drought in Michigan since the 1930's occurred from 1960 to 1967 in the southern Lower Peninsula, northern Lower Peninsula and the Upper Peninsula. Many stream, lake, and ground-water levels were at record lows during this period of drought. Precipitation levels between 1962 and 1963 were at their lowest since 1931 (Michigan Water Science Center 2013).

3.6.4 Wildfires, 2000

There has been a noticeable increase in the frequency and severity of wildfires in the western United States over the last several decades. The two most relevant explanations for this increase include land management and climate change. The moisture levels of the soil, density of plants, and moisture content in those plants all influence the likelihood and severity of wildfires (NOAA 2000).

> Climatic explanations posit that increasing variability in moisture conditions (wet/dry oscillations promoting biomass growth, then burning), and/or a trend of increasing drought frequency, and/or warming temperatures have led to increased wildfire activity (Westerling et al. 2006).

According to both state and federal land management agencies, the severity and duration of wildfires that affected the western United States in 2000 was record breaking. Some of the impacts from these wildfires include:

> more than one million acres burned. The fire threat forced federal and state officials to close millions of acres of public land for extended periods. Interstate commerce was impacted and the interstate freeway was closed at times. Thick smoke filled valleys for extended periods, disrupting the lives of residents and visitors (NOAA 2000).

If the climate continues to dry; the frequency, severity, and duration of wildfires could increase.

3.7 El Niño and La Niña Years in North America

El Niño and La Niña can have a global effect, however, this section focuses on the impact of these climate cycles in North America. These years of weather related episodes result from interaction between the surface of the ocean and the atmosphere in the tropical Pacific (Table 3.5).

Date	Climatological Event or Climatic Change	Region
1957	El Niño	Worldwide
1965	El Niño	Worldwide
1972	El Niño	Worldwide
1973	La Niña	Worldwide
1975	La Niña	Worldwide
1982 to 1983	El Niño	Worldwide
1988	La Niña	Worldwide
1997	El Niño	Worldwide
1999	La Niña	Worldwide

Table 3.5 Some El Niño and La Niña Years Event

The impacts and effects of El Niño and La Niña are felt worldwide. The following sections examine these cooling and warming climate patterns in greater detail.

3.7.1 El Niño and La Niña in North America

Changes in the ocean impact the atmosphere and climate patterns around the globe. In turn, changes in the atmosphere impact the ocean temperatures and currents. The system oscillates between warm to neutral El Niño condition, or cold La Niña conditions with an on average every 3-4 years (NOAA 1998). The University Corporation for Atmospheric Research in partnership with NOAA (1994) noted:

> the impacts of El Niño upon climate in temperate latitudes show up most clearly during wintertime. For example, most El Niño winters are mild over western Canada and parts of the northern United States, and wet over the southern United States from Texas to Florida. El Niño affects temperate climates in other seasons as well. But even during wintertime, El Niño is only one of a number of factors that influence temperate climates. El Niño years, therefore, are not always marked by "typical" El Niño conditions the way they are in parts of the tropics.

La Niña is defined as cooler than normal sea-surface temperatures in the central and eastern tropical Pacific Ocean that impact global weather patterns (Figure 3.10). La Niña conditions recur every few years and can persist for as long as two years (NOAA 1998). The National Centers for Environmental Prediction (1997) notes that since 1975, La Niñas have been only half as frequent as El Niños.

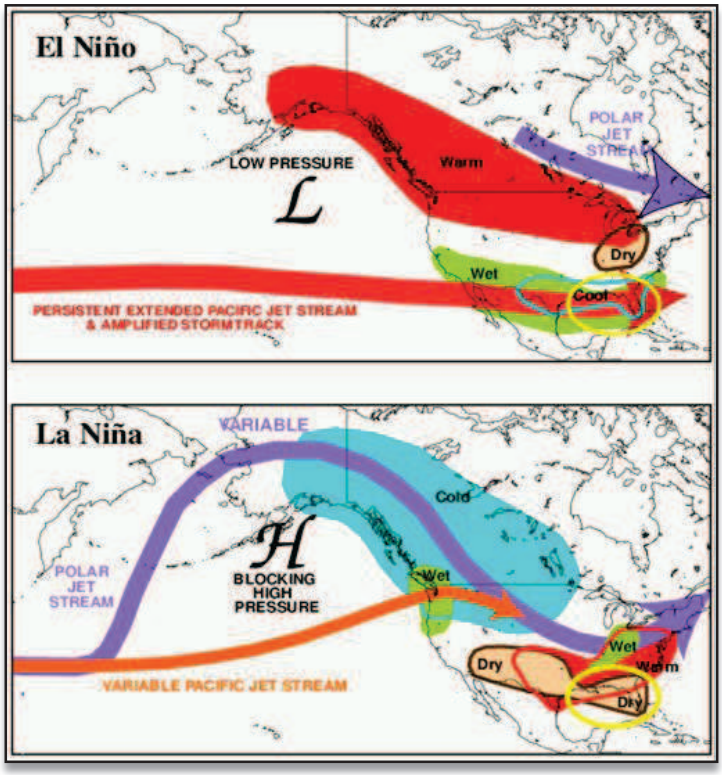


Figure 3.10 El Niño effects upon North American Weather and Atmospheric Circulation, December 19, 2005. (National Oceanic and Atmospheric Administration, American National Weather Service 2007)

Figure 3.10 illustrates the Pacific and Polar jet streams and subsequent Niño effects on North American weather and atmospheric circulation. The Pacific and Polar jet streams have substantial variability based on a number of conditions, but greatly impact the climate and weather patterns of areas like the Upper Great Lakes, land-locked states, and coastal regions. Shifts in the jet stream convergence create a variety of weather patterns, all of which affect the Upper Great Lakes region. Some of these affects are positive, while others can be negative.

3.7.2 El Niño and La Niña in Michigan

The Upper Great Lakes may not be the first region that comes to mind in discussion of the El Niño and La Niña Southern Oscillation, but the region is most definitely impacted during the Niño years (Null 2013). During an El Niño event, winters in the Great Lakes averaged warmer than the normal, and out of the eight El Niño events studied, the regional average cold season temperature was above normal five out of eight times with temperatures 0.45 degrees Fahrenheit above normal (Gabric, Keeney, Pytlak 2012). Winter precipitation showed a deficit in seven out of the eight El Niño events studied. The average precipitation deficit in the region studied was 1.82 inches (Null 2013). Changes in precipitation patterns greatly affect the seasonal availability and growth of many Native plants.

Some scientists believe that the increased intensity and frequency of El Niño and La Niña events, now every two to three years, is due to warmer ocean temperatures resulting from global warming (Beaudry 2014). A report from NOAA (1998) explained that higher global temperatures might be increasing evaporation from land and adding moisture to the air, thus intensifying the storms and floods associated with El Niño.

3.8 Flooding in North America

This section will focus on the effects of rain, snow melt, and dramatic heating and cooling events in the form of flooding in North America. The effects of such weather trends are visible through these major flooding events (Table 3.6).

Date	Climatological Event or Climatic Change	Region
AD 0	Post-Algoma Flood Phase	Michigan
1600 to 900	Historic Lake Level Reconstruction	Michigan
1904 and 1908	Precipitation and Resulting Flooding	Michigan
1947	Precipitation and Severe Flooding	Michigan
1986	Severe Flooding	Michigan
1993	Floods in Midwestern America	North America

Table 3.6 Several Extreme Flooding Events

The dates for these major flooding span many centuries, but are noted for their impacts on human life and resources. The following section outlines these flooding events, beginning with the Post-Algoma flood phase in Michigan at AD 0, continuing up to flooding relating to the Midwestern floods of 1993.

3.8.1 Post-Algoma Flood Phase, AD 0

Prior to AD 0, substantial flooding occurred for 500 years in the Upper Great Lakes region, leaving Lake Michigan at an all-time high water level (Lovis et al. 2012:19). The interval following this extremely wet period is referred to as the Post-Algoma Flood Phase. This is known from sediment analysis of areas that used to be underwater when they were part of the Great Lakes.

The climate of the Upper Great Lakes region was considerably drier during the Post-Algoma Flood Phase, but the climate did not alter drastically until about AD 500. High water levels of Great Lakes, referred to as the Pre-modern flood phase, occurred between AD 1300 and 1640 and is attributed as coinciding with the start of the Little Ice Age (Lovis et al. 2012:19).

3.8.2 Historic Lake Level Reconstruction in Michigan, 1600-1900

Quinn and Sellinger (2006) used a set of precipitation and temperature reconstructions based on tree ring data to reconstruct low water levels in Lake Michigan and Lake Huron between1600-1900. Their findings note that two very high precipitation periods occurred between 1610-1650 and between 1820-1840, with record high lake levels occurring in 1838 (Quinn and Sellinger 2006: 36).

3.8.3 Precipitation and Resulting Flooding in Michigan in the 20th Century

The most destructive flood in Grand Rapids history took place in 1904. Flooding in Michigan usually occurs in the spring months and is often a result of warming temperatures and rapidly melting snow. In Lansing, it was the worst flood in the previous 135 years of its history and many dams were either undermined or swept away (Mattox et al. 2004: 1).

Significant flooding occurred throughout the state, with the most significant impacts affecting the Grand, Saginaw, and Kalamazoo Rivers. Kalamazoo saw two square miles of flooding during this event Mattox et al. describe the flood in a centennial piece about the event (Figure 3.11):

> the Grand River went above bankfull on the night of March 24, 1904 rising slowly for the next four days. It broke the previous high-water mark by over 60 cm (2.0 ft), and was considered a once in 100 year flood. Over one-half of the population on the west side of the river was inundated. On the east bank of the river, numerous factories went underwater. There was one casualty (2004: 1).



Figure 3.11 Michigan Residents Paddling Down a Flooded Street (State Archives)

In March of 1908, serious flooding occurred in Albion, Michigan near Lansing. A story from the Albion Recorder remembers the epic flooding in an article (Passic 1997).

> The scenario began in February, 1908, when over 60 inches of snow fell, followed by a heat wave. In early March came heavy rains, and the waters of the Kalamazoo River rose to record levels. An all-night rain on Friday, March 6 raised the rushing waters to eight feet by Saturday noon. At 3:00 p.m. the Homer dam broke, sending an additional five foot wave of water and ice chunks headed towards downtown Albion. By midnight water over the Superior Street Bridge was a foot deep, and eighteen inches over the Cass Street Bridge. Dynamite was used to break up ice jams upstream and some water was diverted via the "black ditch" which flowed through the southwestern portion of town (Passic, Albion Recorder, March 17, 1997: 4).

Along with the dam and bridges, this flood caused several buildings to collapse (NOAA 2008). Water levels and subsequent damages from the floods of 1904 and 1908 were recorded breaking.

A similar flooding event occurred in April of 1947, following a month of heavy snowfall. The US Geological Survey notes that a pair of frontal zones brought heavy rains to the lower peninsula of Michigan, which then melted the existing snowpack and increased the runoff. Flooding took place from April 4 to April 11, and was considered the worst flood for the region since 1904. Flooding to this extent was generally considered a once-in-50-year event (USGS 2005).

Widespread heavy rains fell across the upper peninsula of Michigan in two time periods; the first being from April 24 to April 26, and the second period from May 7 until May 12. The two rain events led to 75–150mm (3.0–6.0in) of rain falling across northern Michigan over this three-week period. Residual snowpack in forested areas added to its effects. It was considered a

once in 25–50 year event for much of the area, although many of the records set during this event stand today. Damages from this extreme weather event totaled $575,000.00 (US Geological Survey 2005).

The flood that lasted from September 10 to September 15, 1986, resulted in unprecedented damage. Thirty counties within the State were declared Federal Disaster Areas (US Geological Survey 2005). Tragically, the flooding caused six deaths, injured 89, contributed to the failure of 14 dams, threatened 19 additional dams, and caused basement flooding or structural damage to about 30,000 homes (Miller and Blumer 1988).

3.8.6 The 1993 Floods in Midwestern America

Floods are another example of an extreme weather event. The Midwestern floods of 1993 are considered to be severe due to the duration and range (Figure 3.12).

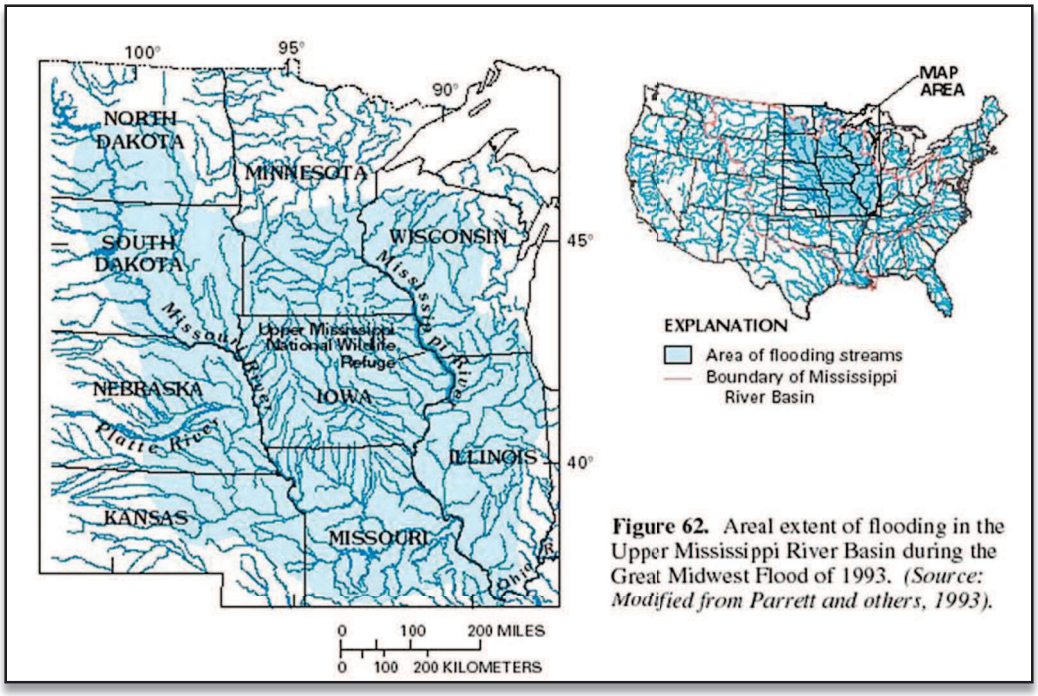


Figure 3.12 Flooding Along the Mississippi River in 1993 (USGS 2002)

Like other examples of severe weather, the affects can impact society in terms of agriculture, health, etc.

> Some locations on the Mississippi River were in flood for almost 200 days while locations on the Missouri neared 100 days of flooding. On the Mississippi, Grafton, Ill., recorded flooding for 195 days, Clarksville, Mo, for 187 days, Winfield, Mo., for 183 days, Hannibal, Mo., for 174 days, and Quincy, Ill., for 152 days. The Missouri River was above flood stage for 62 days in Jefferson City, Mo., 77 days at Hermann, Mo.; and for 94 days at St. Charles in the St. Louis metropolitan area.

> On October 7, 103 days after it began, the Mississippi River at St. Louis finally dropped below flood stage (NOAA 2008).

The impacts of these floods along the Mississippi River have been well documented, as well as the human adaptations, such as sand bagging or relocations, to this extreme weather event.

3.9 Contemporary Climatic Changes in Michigan and the Upper Great Lakes

This section specifically focuses on climate change in Michigan and the Upper Great Lakes region with attention directed toward the Sleeping Bear Dunes National Lakeshore (SLBE) area. The shift in precipitation and temperatures over the past few decades has begun to redefine the climate of the Upper Great Lakes region. Through the use of historic documents, past studies, recorded observations, and climatological data, the University of Arizona (UofA) research team was able to gather information that assisted in the evaluation of climate change on culturally significant plant species and the habitats in which they are found at SLBE.

Discussion of climate change are relevant within many disciplines today. As extreme weather events become more frequent and less predictable, the potential social, cultural, and economic impacts become as concerning as the physical impacts. Changes in weather patterns are predicted to impact crops, native plant life, and natural resources, and the general climate of the Upper Great Lakes region.

3.9.1 Climate Change and Weather Events: What does it all mean?

The weather events and climatic shifts occurring in Michigan and the Upper Great Lakes over the past 2,000 years have had a substantial impact on the region at various times throughout history. However, the changing climate over the past 300 years presents a key feature that links all of these events together. The trigger for the major climatic changes occurring today is frequently mentioned as beginning with the Industrial Revolution. Subsequently, the forecast for future temperature and climate shifts are directly affected by the current conditions.

Prior to the 19th century, climatic episodes were less documented. It appears that climatic shifts, or permanent changes occurring over a period of time were more common than the fluctuations and small scale climatic events know to occur in the 20th and 21st centuries. The climatic events of the 1930's were among the most severe recorded in Michigan and Upper Great Lakes history. Severe droughts, high temperatures, as well as destructive levels of precipitation related events have altered the landscape and forced humans to adapt. The planet has always experienced extreme weather events; however; it is the frequency, duration, severity, and unpredictability of modern storms that indicate a changing climate.

Extreme changing temperatures and increased precipitation levels cause a dramatic shift in the ability of plants and animals to survive in their currently occupied ecosystem. Apart from driving temperatures up, climate change is likely to cause bigger, more destructive storms, leading to an overall increase in precipitation (Riebeek 2010: 6). Both precipitation and temperature play major roles in the rising and falling of Great Lakes water levels, and precipitation plays an indirect role in the water balance, providing water for runoff, while air

temperature plays an indirect role by influencing runoff and water evaporation (Quinn and Sellinger 2006: 31).

3.9.2 The Current Status of Climate Change Research

Regarding the current status of climate change in Michigan, the Union of Concerned Scientists published the following statement:

> The latest, most reliable projections of future climate change combine 100 years of historical data for Michigan with the most up-to-date general circulation models of the Earth's climate system. In general, Michigan's climate will grow considerably warmer and probably drier during this century, especially in the summer. As a result of these changes, by 2030 summers in Michigan may feel more like current-day Ohio. By 2095, summers will resemble that of northern Arkansas with winters that feel like Ohio (Climate Change in Michigan 2009).

It is predicted that Michigan's climate will experience increased warming trends, and as a result, several negative effects may occur (Figure 3.14). Climate change has the potential to disrupt treaty harvests of natural resources by altering the environment across the ceded territories (GLIFWC 2010: Climate Change). Gross (2010: 57) notes that the lowering lake levels will drastically affect Michigan's coastal wetlands, and farther inland, smaller streams and tributaries could dry up if not replenished, thus negatively impacting associated wetlands and their habitat for wildlife and other species.

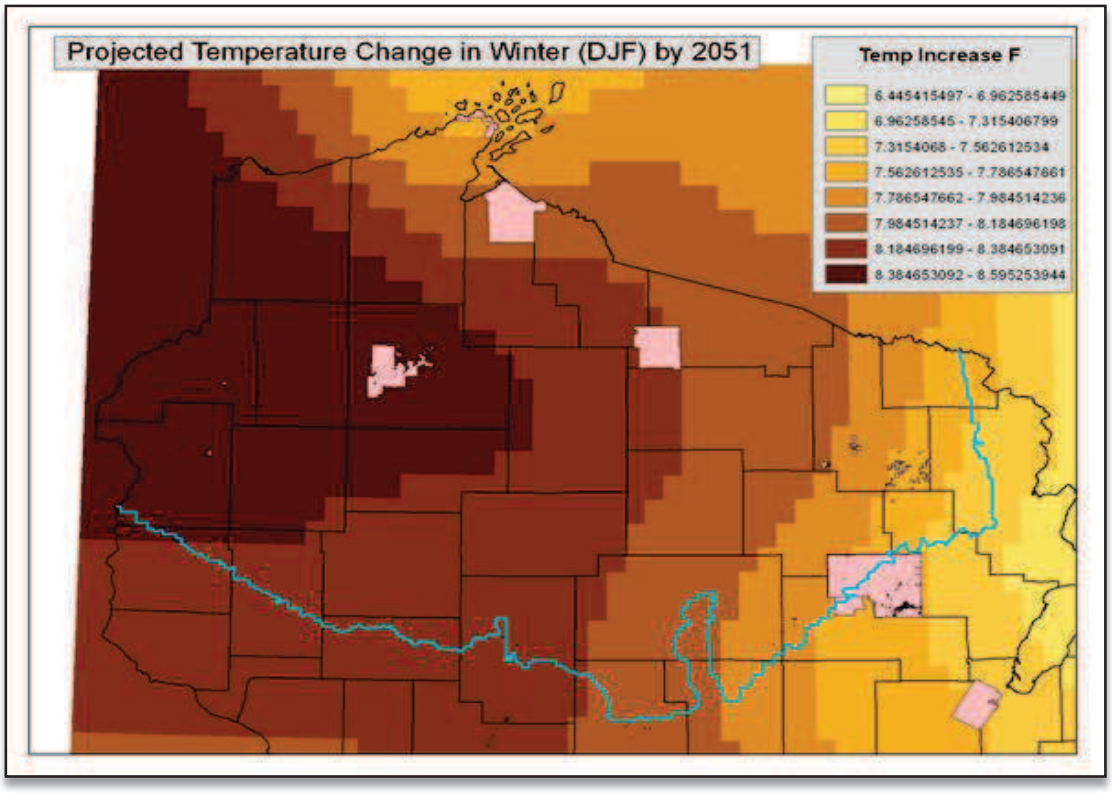


Figure 3.13 Projected Temperature Change in Winter by 2051 (GLIFWC 2010: Climate Change)

The Great Lakes Indians Fish and Wildlife Commission (GLIFWC) explained the range of some fish species is likely to decrease in the future as the water in some lakes and streams warms beyond the tolerances of cold and cool water fish. Similarly, wild rice stands may suffer due to increased intensity of spring storms which may uproot the plant during the vulnerable floating leaf stage (GLIFWC 2010: Climate Change).

Previous natural and cultural resources studies of this region have documented potential threats to plant life and the climate continues to shift. Some of the effects of air pollution have been noticed within the plant life in the Upper Great Lakes region (Stoffle et al. 2001). Anishinaabeg elders frequently labeled acid rain and other types of air pollution as serious threats to wild plants including stunted plant growth and reduced fruit production in a study done in 2002 (White and Danielsen 2002). Plants identified as being potentially affected include blackberry, blueberry, chokecherry, strawberry, raspberry, sumac, wild rice, wild plum, and cattail (White and Danielsen 2002).

CHAPTER FOUR
STUDY METHODOLOGY

This chapter provides a foundation for understanding the process by which the data for this report were collected, analyzed, and selected for presentation. The data collected reflects the resource use and management interests of the Sleeping Bear Dunes National Lakeshore (SLBE), the Midwest Regional Office of the National Park Service (MWRO), and three local Odawa tribes. This report is co-produced, with the knowledge, and observations of the participating Odawa tribes serving as the basis for the study. The research team from the Bureau of Applied Research, School of Anthropology, University of Arizona (UofA) has combined the goals of all involved parties to form a study design, and a report summarizing the findings (Figure 4.1). Plant use and management interests came together in a process where the four parties reached an agreement to which topics would be studied, where these studies should occur, how to develop protocols for dealing with public and confidential cultural data, and what was an appropriate report presentation format.



Figure 4.1 UofA Researchers and Odawa Representative at Otter Creek

Study results are designed to be directly connected to a proposed legislative change to National Park Service (NPS) 36 CFR 2.1, which will allow traditional plant collection on parklands. Plant collecting requests will come directly from culturally affiliated tribal councils, and will be negotiated with SLBE staff. Naturally, any plant collecting plans would be subject to the non-impairment clause of the NPS Organic Act. Thus, all plant collecting agreements must

consider how to assure that collecting is done in a sustainable fashion. It is assumed that adaptive management involving regular monitoring will be a part of any sustainable use plan.

The chapter includes the sections addressing: 1) the 2014 Ethnobotany and Climate Change Study, 2) tiering and iterative studies with a focus on UofA work conducted at SLBE during the 1998-2001 study (Zedeño et al. 2001), and 3) a summary of SLBE 1998-2001, 2011, and 2014 interviews. Each of these sections serves to further explain study goals, and how the study was accomplished.

4.1 The 2014 Ethnobotany and Climate Change Study

The current study was funded in 2013, with research and fieldwork conducted primarily in 2014, and data analysis and report writing taking place in 2015. Key areas of focus for the study were related to ethnobotany and climate change. Additionally, due to proposed changes in federal regulations regarding the collection of culturally significant plants growing in NPS units by American Indian tribes, it is vital that the NPS acquire baseline ethnobotanical information regarding contemporary Odawa plant use. These various kinds of data are needed to prepare this baseline which include issues such as:

1) Which species are both traditionally used and currently important,

2) How are the plants used,

3) Does gender influence who collects plants,

4) During what season are plants collected, and

5) What quantity of each plant is typically collected per gathering trip.

This baseline documentation allows the NPS to begin to estimate which plants may be desired, how much may be requested, and when gathering might occur. Naturally, these estimates are developed in consultation with any tribe proposing to use plant resources. In addition, the tribe and the park can use these understandings to assess any potential impacts of proposed plant collecting and develop sustainable collecting protocols. These discussions will occur within the context of the potential impact of climate change on these culturally significant ethnobotanical resources.

Currently, there are not any baseline climate change and ethnobotany data regarding which plants within the boundaries of SLBE are considered culturally significant to contemporary Anishinaabeg tribal members. Following the identification of culturally important plant species, the questions regarding the cultural adaptability, cultural vulnerability, and cultural resilience of these species in today's culture can be determined. Thus, the impact of climate change is considered and mitigated not just from a biological standpoint, but also from a cultural and trust responsibility position.

4.2 Tiering and Iterative Studies

The federal government recommends that new research should, whenever possible, not duplicate previous studies, but rather build upon earlier work and reference it. This process is called *tiering*, and involves building one study upon another to reach a conclusion. This 2014 SLBE report meets the Federal tiering requirement by (1) using background essays produced elsewhere, and (2) contextualizing some findings with reference to previous studies in the region.

In order to build an optimal ethnographic study given extant time and funding, it is important to design studies that repeat aspects and build one upon one another. These are called *iterative* studies. Lessons learned in one study can influence the kinds of questions asked in the next. The intellectual foundation of the work itself increases from study to study. Ideally, the findings of each study would be placed together for analysis.

This current study illustrates tiering and iteration. It is founded on research in SLBE previously conducted by members of the UofA research team in 1998-2001, 2011, and the present 2014 study adds to the previously gathered data. These UofA studies are discussed in more detail below.

4.2.1 The 1998-2001 SLBE Study (Zedeño et al. 2001)

American Indian cultural resource studies at SLBE began in 1996 (published in 2001) with an analysis of Anishinaabeg cultural connections and natural resource use in the western Great Lakes. The initial study, *Ojibway Traditional Resources Study in the Western Great Lakes* focused on natural and cultural resources of contemporary significance for Ojibwe and Odawa tribes located in the United States and Canadian Ojibwe First Nations. All participating tribes were once present in the immediate vicinity of the four NPS study units, which include (1) Sleeping Bear Dunes National Lakeshore; (2) Pictured Rocks National Lakeshore; (3) Apostle Islands National Lakeshore; and (4) Voyageurs National Park. The study sought to develop a foundational report regarding historic and current use of resources by culturally affiliated tribes, and assist in developing an understanding of Anishinaabeg cultural landscapes across the western Great Lakes. These data were to be used by NPS managers in the four parks to protect and preserve culturally significant places, resources, and landscapes.

The final report, which was published five years after the project began (Zedeño et al. 2001), was very lengthy due to the scope of the study, the large number of involved tribes, and the amount of data collected during the study. As a consequence of early 2001 report drafts being so long in length and complexity, the study findings needed to be summarized and few quotes were used to shorten the length. The 2014 study, however, being exclusively focused on SLBE provided the opportunity to return to the 1998-2001 interviews tapes and notes for a more detailed account of what Anishinaabeg people said about plants, animals, climate change, and places in the park. The original interviews conducted in SLBE during the 1998-2001 study have been transcribed and edited as appropriate to produce chapter five of this report.

4.2.2 The 2011 SLBE Study (Zedeño, Miller, and Hollenback 2011)

A second UofA study was conducted between 2009 and 2010. It was entitled *Sleeping Bear Dunes National Lakeshore and the Inland Consent- Decree of 2007: Ethnographic Resource Management and Tribal Access Considerations* (Zedeño, Miller, and Hollenback 2011). The study documented the cultural principles and practical implications of Odawa treaty rights. This project collected information with documents and interviews regarding tribal hunting, inland fishing, and gathering, as well as contemporary tribal research and development. The intended goal of the research was to aid in the evaluation of the impact that practicing treaty rights may have on the park's resources. The study was also designed to foster collaborative American Indian resource management within and beyond SBLE boundaries.

The 2011 SLBE study included field visits where tribal representatives discussed which plants were culturally important to contemporary tribal people. The majority of these 2011 ethnobotany findings have been incorporated into the 2014 SLBE study.

4.2.3 The 2014 SLBE Study

The 2014 SLBE project has been a collaborative effort between the three involved Odawa tribes (Grand Traverse Band of Ottawa and Chippewa Indians, Little Traverse Bay Bands of Odawa Indians, and Little River Band of Ottawa Indians) and the UofA research team. At the start of the project, UofA researchers met with officials from each of the three tribes to discuss the initial project study design, goals, and intended outcomes (Figure 4.2). During these meetings, the tribes assisted in the development of various aspects of the two data recording instruments that were used during the fieldwork portion of the study. Copies of the survey instruments are included in Appendices B and C.



Figure 4.2 UofA Researcher and Odawa Representatives Discussing 2014 SLBE Study

The current study is exclusively focused on plants, thus extensive plant data has been collected. The 2014 study also is uniquely concerned with climate change impacts on plants; however, it is interesting that climate issues did emerge in less structured interviews during the

2001 ethnographic study. To the extent possible, data from all three studies is used to help provide an Odawa perspective.

4.3 Summary of SLBE Interviews

The 2014 study is co-produced with the knowledge and assistance of the three Odawa tribes, with facilitation from the UofA researchers. The study focused on a total of seven sites. Figure 4.3 has the places visited marked with a red dot and their names highlighted in white. Participating tribal representatives were active in guiding UofA researchers to places within SLBE during May and September 2014 site visits within the park. These sites represent a range of ecosystems. The places with the names highlighted in light blue were noted places of interest add to the field activity plan by various the Odawa tribal representatives.

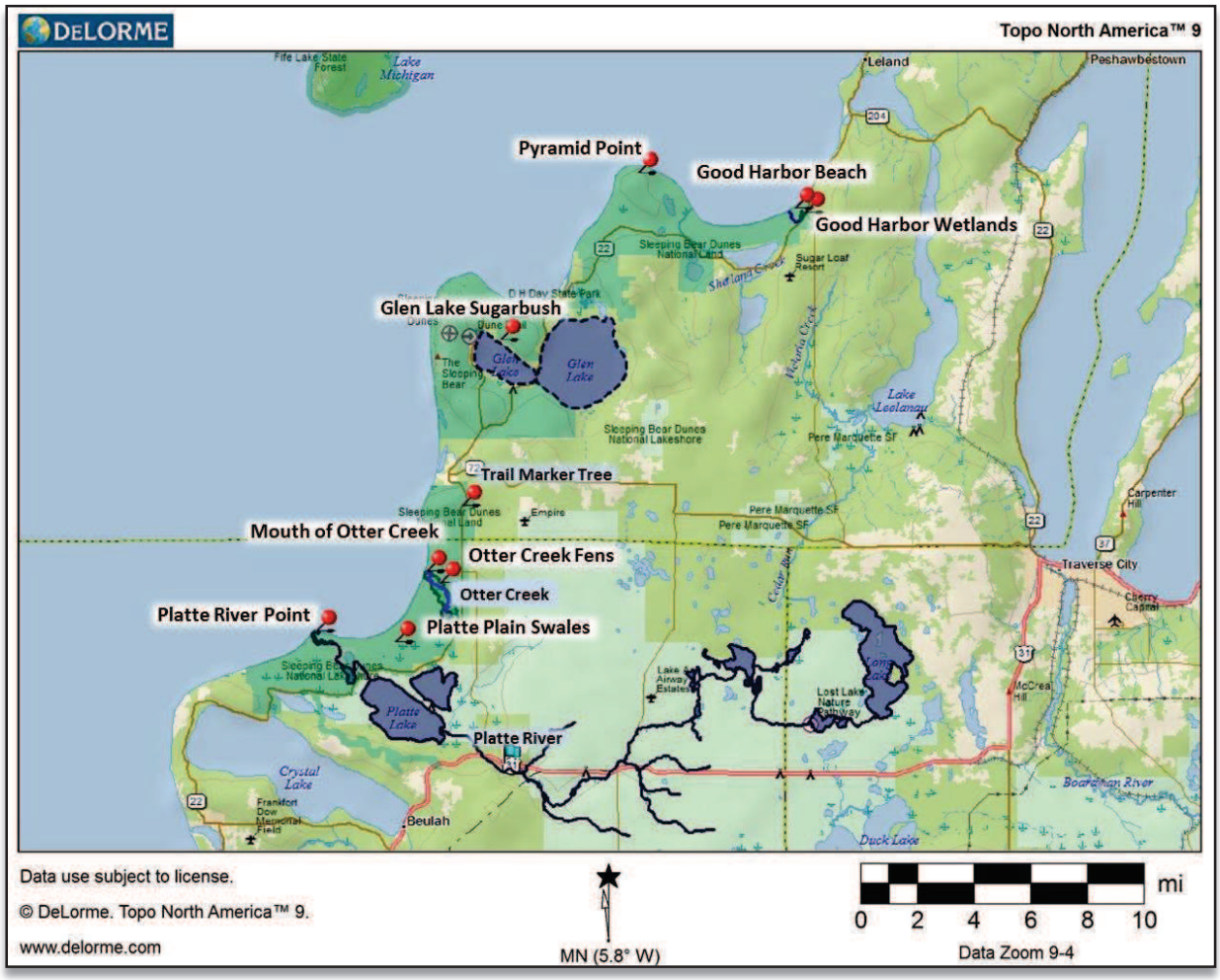


Figure 4.3 Overview of Sites Visited During the 2014 Study

During initial formal consultations with the participating Odawa tribes, discussion points were suggested regarding both the contemporary cultural meaning of traditional plants and Odawa perceptions of climate change occurring in the park. The discussion points were then

organized into a series of data recording instruments that would facilitate the thoughts of participating tribal representatives.

Two types of data recording instruments were developed (1) the Site Form, with discussion points regarding the ecological complexity of specific places in the park; and (2) the Plant List, where information about plants observed or known to occur at a specific location were quickly and accurately recorded (Table 4.1). These recording instruments were designed for writing down tribal representatives' thoughts and opinions while visiting study area places.

Copies of all data recording instruments were presented to tribal representatives at their field orientation. No questions were raised as to the appropriateness of these discussion points or how the study-specific conversations would be recorded. Tribal participants were assured that they could raise new discussion points during the field session.

Table 4.1presents the number of interviews conducted during the original 2001 study and the current 2014 study. The table presents the occurrence of interviews by study place and type of data collection form used by study. A total of 118 interviews were conducted; of which 103 were collected in 2014 (Table 4.1). The types of interviews are labeled across the top, while the interview locations are labeled on the left.

Location	Interview Type: 2001 Landscape Forms	2001 Site Forms	2014 Site Form	2014 Plant List	2014 Informal Int.	2001 Totals	2014 Totals	Grand Total
Platte River Point	0	4	3	4	5	4	12	16
Sylvan Sugarbush	0	0	2	2	0	0	4	4
Otter Creek Mouth	0	0	5	5	0	0	10	10
Otter Creek Fens	0	0	5	5	0	0	10	10
Glen Lake Sugarbush	0	0	4	4	1	0	9	9
Pyramid Point	4	0	2	4	4	4	10	14
Good Harbor	0	0	6	7	3	0	16	16
Bass Lake	0	4	0	0	0	4	0	4
North Manitou Island	0	3	0	0	0	3	0	3
Elsewhere	0	0	0	2	7	0	9	9
Totals	4	11	27	33	20	15	80	95

Table 4.1 Ethnographic Interviews from 1998-2001, 2014

A minimum of four interviews were conducted within any area visited as part of the 2014 study (Table 4.1). Interviews for each place exceeded this minimum expectation, suggesting high levels of biological and cultural understandings of each site visited within SLBE. The following text in chapter five, presents the ethnobotanical and ecological data from interviews conducted

during the 1998-2001 study at SLBE (Zedeño et al. 2001). While, chapter six provides a site-by-site analysis of the information collected at SLBE during the 2014 ethnobotany and climate change study. Both chapters work together to present a better understanding of Odawa plant resource uses and needs, as well as perceptions on the health and availability of plant resources within the park.

Additionally, some thoughts and observations were recorded as informal interviews as the tribal representatives and the UofA researchers traveled between sites (Table 4.1). Informal interviews or open-ended discussions were an important research tool used during this study. Open-ended discussions are defined as a conversation between an ethnographer and cultural representative, during which information specific to the project is shared and recorded. In most cases, the information is offered at a time when it is difficult to record on a data recording instrument, and so the ethnographer instead records the comments by digital tape recorder, or the tribal representative provides personal notes regarding their thoughts and concerns about a place or an important cultural resource.

The number of identified contemporary ethnobotanical resources was increased by approximately 15 percent by returning to the same sites from the May 2014 field session in September 2014, and with the addition of Platte Plain Swales as the new seventh site. This increase shifts from 183 to 210 contemporary use plants identified within the park (Table 4.2).

	Use Plants Identified by Previous UofA Studies*	2014 UofA Ethnobotany		
		Plants Identified in May 2014	Additional Plants Identified in September 2014	Total Plants Identified in 2014 UofA Study
Number of Plants Identified	97	183	27	210

*Previous Studies include Zedeño, Stoffle, Pittaluga, Dewey-Hefley, Basaldú, & Porter (2001) & Zedeño, Miller, & Hollenback (2011)

Table 4.2 Number of Plants Identified

A larger number of the Odawa identified plant resources at SLBE, provide evidence of the need for gathering agreements, the development of sustainable harvesting practices, and co-management of these vital ethnobotanical resources between the SLBE park staff and Odawa tribal communities. The findings from the 2014 field sessions serve to assist in these future negotiations, by presenting extensive information about Odawa ethnobotanical resource use, sustainable gathering practices, and management recommendations for sites within the park.

4.4 Climate Change Methodology

Climate change in relation to plants, as well as ecosystems, was a primary focus of this study. Beginning in the first quarter of the SLBE project in September of 2013, UofA researchers began to compile articles related to climate change in Northern Michigan. Branching out from the regionally specific articles, technical reports, and other publications, the UofA researchers then examined climate change data on a broader scale, moving from the Upper Great Lakes to weather events and climate change throughout North America.

After background research on climate change took place, the formulation of questions for use on the site form occurred. By designing several questions that prompted discussions of weather and climate change, Odawa representatives were able to describe the types of events and shifts occurring during their lifetime or their parent's lifetime. The recorded and written responses are included within chapter eight. These questions are presented below, and are included within the site form in Appendix C.

1) In your lifetime (or that of your parents) have you seen seasonal or annual weather changes? If yes, what changes have you (or your parents) observed?

2) Have these changes influenced the ecology of a place, such as where we are right now? If yes, then how has the ecology of this place changed?

3) Are the plants that have been traditionally gathered located in the same general places as they were in the past?

4) Do you see any, or can you think of, any traditional use plants that grow inside the park, that no longer grow outside of the park?

5) Do you think seasonal, annual, or climatic changes have affected the abundance of plants and where they are growing?

Many of the proposed climate change impacts in the state of Michigan, will most likely affect plants and ecosystems in negative ways. Potential climate change impacts, and those already affecting plant resources were discussed with Odawa representatives. They expressed a strong concern for the future of their traditional cultural use plants at SLBE and in Northern Michigan.



Figure 4.4 Odawa Representatives and UofA Researcher Discussing Climate Change

All tribal representatives participating in this study have firsthand experiences and observations relating to climate change. These experiences are not only personal, but often they are built on the experiences of earlier family members, including their parents and grandparents, who observed shifts in seasonal, annual, and long term weather and climate patterns. Detailed discussions about climate change impacts are included in chapters seven and eight of this report.

CHAPTER FIVE
ETHNOBOTANICAL INFORMATION FROM 1998-2001 INTERVIEWS

Interviews from 1998-2001 field sessions with community members from Sault Ste. Marie Tribe (Ojibwe), the Bay Mills Community (Ojibwe), and Grand Traverse Bay Band of Ottawa and Chippewa Indians (Odawa) were left out of a previous study that took place at Sleeping Bear Dunes National Lakeshore (SLBE) (Zedeño et al. 2001). This chapter presents the responses of five male participants with expert knowledge of cultural, animal, and ethnobotanical resources in the park and region surrounding SLBE (Figure 5.1).

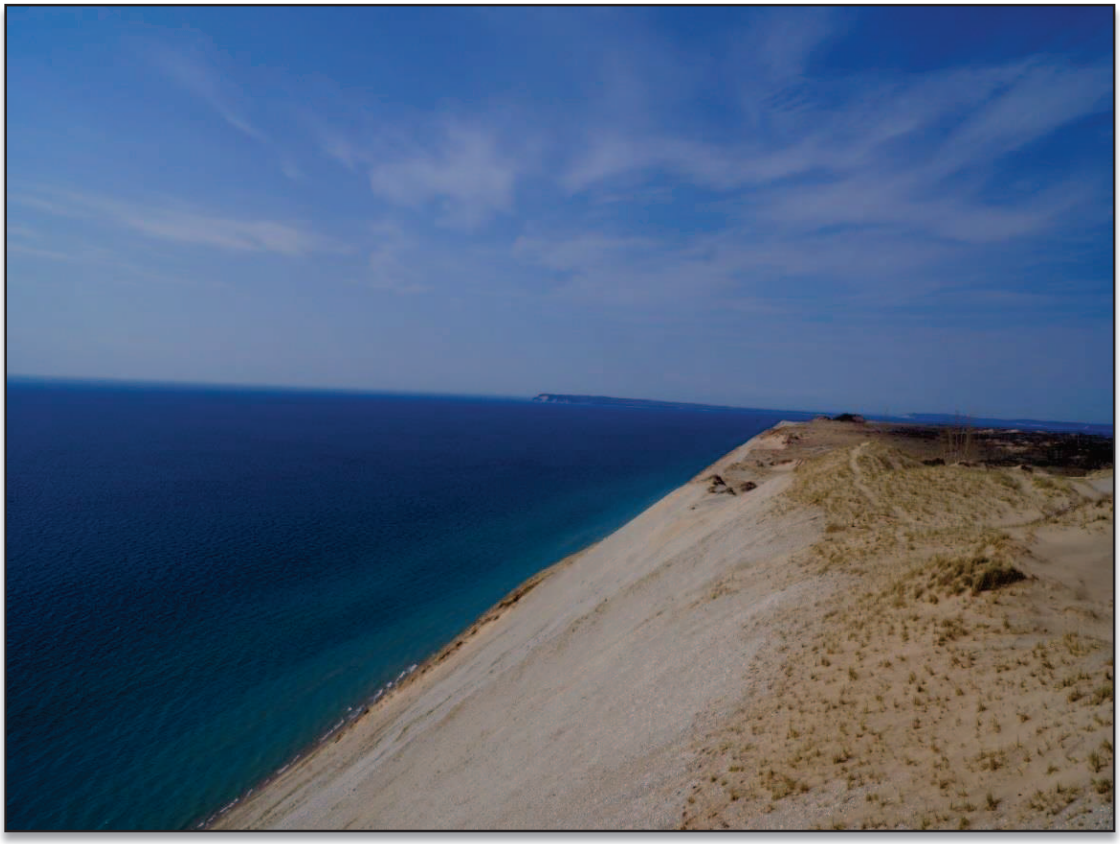


Figure 5.1: Empire Bluff at SLBE Facing North 2014

The interviews are presented here based on their relevance and detailed discussion of ethnobotanical resources at various locations throughout SLBE over 15 years ago. By reflecting on the climatic and environmental changes occurring in the same areas over several decades, concerns and trends become more visible, supporting our current study in several important ways.

5.1 Platte River Point

The section of the Platte River in the park extends from Platte Lake through Loon Lake and then to its mouth at the shore of Lake Michigan. This area of the Platte River basin is characterized primarily by coastal or pine forests and by swamp or bog niches. Flooded meadows covered with grasses and sedges occur along the Platte River floodplain (Hazlett 1991:148).

5.1.1 Interviews at the Platte River Point

Five interviews were conducted on the beach, at the mouth of the river. This is an important point because of the spiritual and physical connection between two different sources of water and its strategic location for traveling into the interior. The place is culturally significant for Ojibwe, Potawatomi, and Ottawa people who have used it on a continuous basis since their arrival into the area. The abundance of a variety of natural resources made this particular spot attractive for living, camping, and as a stopping place along travel and trading routes. Its significance also derives from its proximity to the spawning area in the Platte Bay, the view of the dunes it affords, and its use for ceremonial purposes.

The Platte River has been interpreted as being connected to all other places within the ancestral homeland, including the Manistique area, the Badinack River, and the Kaskanawa River. Tributaries to the Platte River also connected the river and other areas. The Platte River was an important trading route from the lakeshore to the interior. In addition, kinship relations and spiritual ties connect the different places and resources found therein. It is not surprising, therefore, to find abundant archaeological remains in the area given that people used it since prehistoric times.

5.1.2 Platte River Point Discussion

The following section includes a selection of responses given during the 1998-2001 SLBE study. Many of these are similar to responses given during the 2014 SLBE study.

Question 9 of the 2001 site form asked representatives to describe the geography of the area (Figure 5.2). Tribal members responded with the following comments:

- *All three groups* [Ojibwe, Ottawa, and Potawatomi] *have rights to this place. Ownership is determined by using it, taking care of it, and living in it. One positive aspect of the park is that the amount of chemicals used has been reduced. The earth is cleaner in the parks. It is a good place to harvest medicines* [not those along the road].

- *At the mouth of Platte River. The island to the north and the dunes to the northeast are the most prominent features. Trees and the homestead to the south. Lack of large stones on the beach. The river is similar to other ones in the Upper Peninsula.*

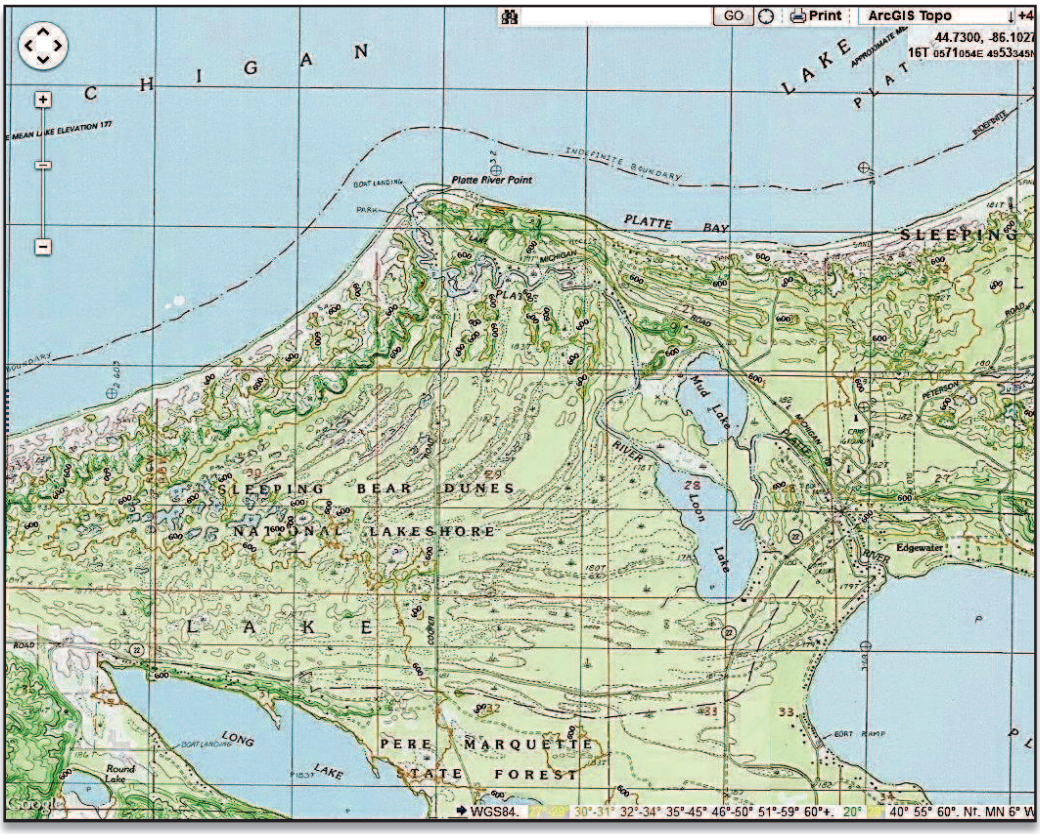


Figure 5.2 Topographic Overview of Platte River Point (Cal Topo 2014)

Question 10b of the 2001 site form asked, what makes this place suitable for the previously mentioned activities? In response, tribal members explained:

- *Ottawa, Ojibwe, and Potawatomi's used this place. Everything they needed was right here. This is ancestral homeland. It's a good place for fishing because bays are places where the currents are different from offshore. In addition, there were also medicines, berries, weeds used for food, plants increasing the amount of breast milk.*

- *Evidence for Maple sugaring, making syrup in this place. Bushes, several other types of berries, wintergreen, lots of berry picking in the area. Conducive to Native people using the area.*

Question 11bb of the 2001 site form asked, how the Platte River connected to other places. Tribal members commented:

- *People would gather at whatever river was closest to them. They would all come from great distances when the spawning runs happened. Then they would have a work bee - getting fish, cleaning them, preserve them by either drying, slating or smoking. They would have had ceremonies before, during and after food preparation. Especially in the spring, people were hungry after the winter. Trout*

species run in the spring as do suckers and walleyes. Other Great Lakes fish would come near the shore to reefs or shallow plant lakes. There were speared or netted. Fish weirs in the river were taken with nets like a funnel. People would obstruct the stream, narrow it with wood-rocks or dams and would catch a great volume.

Question 14a of the 2001 site form asked for representative's comments on water uses, to which one tribal member replied:

- *The river was used as a road for canoe travel. Water was also used for working purposes* [chipping arrows]. *Also for medicine, taking tree barks out and made medicine with heated small stones. It was also mixed with ashes to remove hair from hides. Water is the blood of the earth that gives us the life/blood; all things that give us life are medicine; water is one of the strongest medicine that we have; one of the four basic things in looking at the world: water, sky, fire, and earth. Water is one of the strongest things in creation. For sickness, water is mixed with bark, leaves, roots, or poured on stones for the sweat lodge. We heat the body up to help the body against things that bother it. Offerings are usually made to the water spirits for safe traveling.*

Question 18a of the 2001 site form asked for representative's comments on plant uses to which one tribal members replied:

- *Cattails, an abundance of poison ivy. We have four ceremonial plants: sage, tobacco, sweetgrass and cedar. Cedar is used primarily as a building material. All of these can be found in this area. Cedar was used as a ceremonial covering for the drummer, but also in the ceremonial lodge and in medicine. Cedar pillows warmed and used to heal backs but were also used in naming ceremonies. If you use fresh branches* [called a hand] *you can weave them together and overlap them.*

- *Oak is a protection medicine: our body is attuned to changes of seasons in plants. Pine needles were used against cold winters both as curative and preventive medicines. Different plants were used in different cycles. Equinacea was used for the immunization system before the cold season. In this place, there are plants for all these health problems: setting bones, throat, sinus, lungs, cancer medicine, liver medicine, blood medicine, arthritis, and emetics.*

- *Maple and other trees for syrup, nuts collected, also blueberries, huckleberries, and bushes used. White pine, oak, maple, beech: all used for medicine, food, fire, decoration, making things. Berries, blueberries, raspberries and oak nuts used for food. Bark from white pine cleans up the lungs, dry them out and recover from cold. Bitter roots* [for sore throat] *used for medicine. Birches used for ceremonial lodges. Mint was used in sweat lodge mixed with water. Also used in the Grand Medicine society: people would spend entire life for knowing specific plants. It was their life duty and they established a partnership with those plants. Specific societies had partnership with specific plants. For making things various plants were used: trees for boats, housing, clothing; reeds for mats,*

making fabrics, fish nets, fish lines; cat tails and hemp plants for ropes; basswood for ropes and fabrics; white cedar and white and yellow birch for making canoes. Barks used for baskets and bowls. Some logs were also chopped down for steamers. Food, medicine, clothing, shelter, transportation, plants were used form many things. White cedar for clothing, cattail and moss used for babies to keep clean in cradleboards or in their beds but also to soak up their waste material.

Question 22a of the 2001 site form asked Anishinaabeg representatives to comment on animal uses, to which tribal members replied:

- *Elk and deer horns were used on the sweat lodge and for tying and hanging things. Bears when they hibernate they have a strong spiritual power. When they sleep, they do spirit travel with doctors too. They know about plants, they teach people and talk to them about plants and give them the right to use the plants. Different parts of animals are medicine too.*

- *Otter, squirrel, mink, also used for bags, clothing, decoration on clothing. Horns used for tools. Tighten drums, chip flint using antlers or bone for these tasks. Animal use in ceremonies. The wing bones from the eagles were used to make whistles. Femur bones for pipes, and sinews in the back used for chords and bow strings. Deer tongue mixed with several pigments and used as paint. Also pigments from stones. It has an oil like a lacker mixed with coating of dried blueberries to make paint blue, red ochre or strawberries, but virtually all berries.*

Question 24a of the 2001 site form asked what is affecting the condition of the animals. Tribal members replied with a variety of responses.

- *Pollution. If plants are good, animals are ok as well.*

Question 28a of the 2001 site form asked what is affecting the condition of the fish, tribal members replied:

- *Loss of spawning grounds for development. Most people who float on the river are leaving the weeds on the bank alone. The fish need these weeds.*

Question 34a of the 2001 site form asked if tribal members had comments on the geology of the region, to which they replied:

- *Fasting is about teaching. Young women coming here during puberty… by fasting they make this sacrifice and seek knowledge and gifts. At times they receive the visions to be gifted with special name or stories but sometimes that fight was going back to the creator and die. Dunes were often used to fast. Fasting is a total commitment, an offering of your life so that the things around you can continue to survive and live. It's a commitment to dying, a confrontation with death. You sacrifice food, water, medicine, lodging so that your relations and the world as we know can continue to live. People still fast here and also at Pictured Rocks.*

Question 40 of the 2001 site form asked tribal members were asked for their recommendation for protecting the plants. One elder recommended:

- *Limit access by water traffic. The place is about to the limit of the people it can handle unspoiled; much else and it will be too many people. Allow fasting in the winter, limit tourist access at that time to allow Native people to come do fasting if they wish too. Inventorying plants which are endangered or difficult to find for Indian people. Make them available. Help preserve our culture and traditions.*

Question 45a of the 2001 site form asked why Anishinaabeg people would want access to this place. One tribal member explained:

- *Because of the uniqueness, specialness, and beauty of the place…the coming together of all these resources in one spot. There's a power here, part of the Creator is right here and Indian people like to be close to their creator.*

5.1.3 Platte River Point 1998-2001 Summary

The statements below are key summary points drawn from the 1998-2001 interviews at SLBE regarding plant resources.

- Because of the reduced amount of chemicals used within the park, this place is important for gathering medicines.
- Plants gathered in this area are used for food, medicine, for crafts, and ceremonies.

Anishinaabeg representatives considered the following factors to be affecting plants:

- People's actions.
- Pollution and the increasing size of the ozone whole.

Representatives made the following recommendations concerning the plants at this place:

- Improve people's education about the place.
- Inventory endangered plants or those plants that are difficult to find for Indian people.
- Have visitors remain on the trails.

These comments and recommendations are consistent with the additional data collected for this study.

5.2 Pyramid Point and Bass Lake

Bass Lake is located one mile south of Good Harbor Bay following Shalda Creek to the Little Traverse Lake. Bass Lake is a spring-fed lake in close proximity to School Lake; it contains a mixture of swamp forest ecology predominant south of the Pyramid Point area, and coastal forest ecology (Figure 5.3).

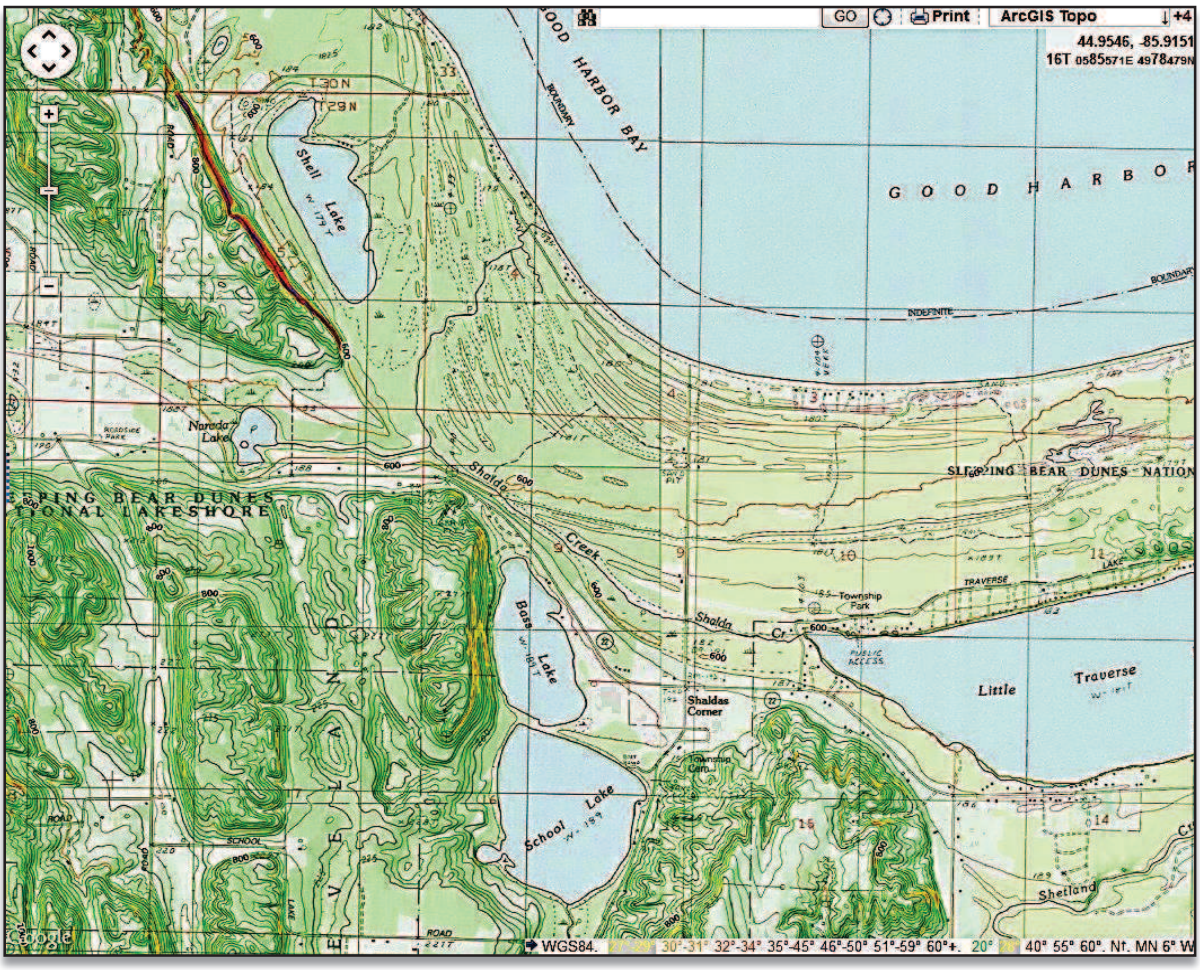


Figure 5.3 Map of Bass Lake and Surrounding Area near Pyramid Point

The wetlands surrounding the lake have tamarack, white cedar, white birch, beech, maple, and red pine. Animals and aquatic life were identified near Bass Lake and Shalda Creek. The area was noted as having bountiful resources and freshwater, all of which are important for a campsite or village.

5.2.1 Interviews at Bass Lake

A total of five interviews were conducted at this site with American Indian representatives from the Bay Mills Community (Ojibwe), the Sault St. Marie Tribe (Ojibwe), and Grand Traverse Bay Band (Odawa). The researchers and tribal representatives followed a short trail to the lake, and then stopped at various locations along the lakeshore to inspect the local flora and fauna.

Anishinaabeg representatives interpreted Bass Lake as primarily a place for winter hunting, trapping, and fishing activities and seasonal habitation, perhaps even year-round. They identified a variety of plants for medicinal and ceremonial purposes, including some species of mushrooms and berries. Figure 5.4 illustrates some of the ecological diversity surrounding the lake, including wetlands and northern hardwood forests.



Figure 5.4 Bass Lake at SLBE 2001

American Indian representatives consider Bass Lake to be part of a larger system of interconnected places. Particular connections have been identified with the Platte River and the Platte Lake, although one Ojibwe male expressed that the entire region is interconnected. Kinds of connections mentioned range from geographical affinities to intrinsic meanings of places, and from the potential location of old trails and trap lines to subsistence activities.

5.2.2 Bass Lake Discussion

The following section includes a selection of responses given during the 1998-2001 SLBE study. Many of these are similar to responses given during the 2014 SLBE study.

Question 9 of the 2001 site form asked representatives to describe the geography of the area. Tribal members responded with the following comments:

- *The inland lake appears to be spring-fed. There is a high concentration of algae. This means that aquatic life is dying.*

- *Marshy area; fishing, beaver, otter, medicines, mushrooms, snakes; the type of significance the marsh has are types of medicines in the marsh are unique. Some of the medicines, to get them, we have we go by snakes. If you're not thinking right you could get bit. Keep your mind right, and just take only the medicines you need. Our relatives in nature, they know that. That is what you call greed. That's trust, that's greed, that's trust. The bears, you heard about the bears being upset*

a few years back. Because they were killing them, just to make a certain part of the bear. They would poach them for certain parts, or sell them for medicine too.

- *Small lake, 200 yards across, near a beaver pond. To the south, a moderate rise of 50 feet. Small ridgeline, wetland type of environment with tamarack, white cedar, white birch, beech, maple, and red pine. On the ground, we have soft ground, a nice glacial lake, some bass and other fish. A king fisher, water lilies. Lake is not used very much.*

- *This pine/cedar grove area would make it ideal for habitation year round. Also a gathering area because of the presence of rich food sources. Marshes are good for medicine plants. There would be a village in the area in the flat where the parking lot is. Attractive because it is between two inland lakes and a small connecting stream.*

Question 10b of the 2001 site form asked, what makes this place suitable for the previously mentioned activities? In response, tribal members explained:

- *Kind of like how we have variety in our diet, so do animals. So what we would do, we would watch the animals and imitated their behavior, learned patterns. The bear was one of them. When a bear was wounded, they watched. The bear dug up root and ate it so they went and got that medicine and used it. So we went and got some of that medicine too. If you stayed here for a bit you could study their patterns. Any time of the year.*

- *They used the place here, although the Platte River was the main source for living. There is evidence of a deer line on the trees* [cedar]. *Thus, it was used in winter up on the north side of the area. There isn't much to gather here, but probably some medicine exists in the lake that is usable* [bitter root for instance].

- *The place might have been used for camping but not for long; probably part of a trap line or hunting trail.*

- *The site is especially good for a winter village. There is still beaver today and one could do ice fishing and spearing/netting in the winter. There is also a good fresh water supply.*

Question 16a of the 2001 site form asked for representative's comments on what is affecting the condition of the water. One tribal representative explained:

- *Some of the plants in the water seem very healthy. Bugs and other small fish are indicators of good conditions. However, airborne pollution affects its conditions, since there are no boats or motorized crafts here.*

Question 18a of the 2001 site form asked for representative's comments on plant uses, to which one tribal members replied:

- *Lettuce helps you relax, sleep.* [Nettles] *...kind of game, boys would slap each other with them, kind of stings, for fun, and, you know, you just make a tea out of it, for energy. Yeah, we have certain parts of the* [cedar] *trees around here that were used for starting fires.* [And what parts of the tree would you use] *Oh, I wouldn't want to say. Sacred parts, if it was raining you'd still get the fire going. Even if you use them like a flint stone, it would start up just like that.*

- *One medicine system includes 405 medicines but there are other medicine systems, one that include trees. One kind is bear medicine, another is elk medicine – Bear medicine is medicine that a bear taught you how to use. There are sweat lodge medicine, which could be bear medicine. Used to be you could tell seasons by plants but now they don't, plants and trees, won't grow together.*

- *White men did was they looked at the plants and they said, okay, studied it with science and said, this part of the plant is the important part, they call that the active ingredient, and they make a chemical version of it. Once they take a natural medicine and turn it into a drug. Once they do that, they no longer have a balanced medicine. Since they no longer have a balanced medicine, they'll have side effects. Suppose you stayed awake, and stayed awake, and stayed awake, but you're sleepy. You use the medicine in the leaves when the moon is big. We use roots when the moon is small. Moon affects potency of plants, like the tides, also works on humans.*

- *The basis of the medicine is the spirit. Plant has personality, characteristics, songs. So if you're going to use a certain part of a plant for a specific thing, in order for the way that that plant wants it to be used, you have to let that plant instruct you how to do it. You need to know what direction you must take to get to the plant so that the potency is there. Even if you don't do that you'll still get 10 percent of it. Plants know their purpose and their job. Humans should do their part too. Mixing appropriate, the right amount of each one. Every plant has their own song. The plants know it, and the people know it, they'll sing it while they're gathering. One more thing about the plants, the reason it works is because they're original medicines.*

- *Mushrooms* [especially morel] *are eaten in spring time. Some of the berries used for food and to make tee. Wintergreen also used to make tea. Birch bark and cedar for building canoes. Cattails for making mats or lodges. Birch bark for baskets.*

- *Tamarack was used for lung illnesses; bitter roots or sweet plague used for sore throats and to help in singing. Wintergreen, hemlock and tamarack used in ceremony. Maple syrup made in the spring, could have been a sugar camp here, collecting syrup making sugar.*

- *Trees provide shelter. Cedar is used for ceremonies. There are medicine plants like sweetgrass in the area. There are food plants like fiddle neck ferns which can be boiled before they unfurl.*

Question 20a of the 2001 site form asked, what is affecting the plants? To this question, tribal representatives explained:

- *Some folks have been here leaving rubbish around, and airborne pollution is a problem. Acid rain is affecting the plants.*

Question 22a of the 2001 site form asked Anishinaabeg representatives to comment on animal uses, to which tribal members replied:

- *Food, fur, medicine. Some bones are good for sewing. You can sharpen some bones and use them for hides, tools. We traded them too, and we used them for pouches, bags. Our sacred bundles. Deer hunting. Made a little fire, watch the fire for a while, and from watching the fire I could tell which direction the deer were in. The next day the deer came through. Grasshoppers would have a certain movement that would tell you about the herd and direction where they were. There's something you can do with deer tracks, it'd help you know where they're at. It works through the spirit, whatever spirit is helping the hunter; hunter spirit helper or sometimes you can work it out with the animals themselves. If you need food, they will come to you. Different kinds of lure medicine-plants. You put lure medicine on the track. Animal drawing - only if you have the right to do it. Just because you hear a song, that doesn't give you the right to sing it. You cannot steal the right to do it. If you try to steal a medicine, it won't work right. Individual name - spirit vision - he is turtle - good luck, long life, patience, endurance, strong heart if you cut his head off his heart will still be beating. Songs – they're owned by the people, but they can be owned by the animal too. Each animal has their own song, each hunter should have his own song.*

- *Whole lot of uses. Otter, deer, beaver and porcupine used for food. Beaver and all things are medicine. Food is medicine. From the beaver, we would take beaver caster mixed with juniper and juniper berries against the spirits causing headaches. From an Indians worldview, everything that is good for you is medicine. Even tobacco is a medicine. Some chewed tobacco used to cure uric acids. The same for the rest of the food. If eaten in good way and with moderation its medicine. If abused it becomes a bad medicine. Deer tongue used for making paints. Tanned skins used for clothing, quills of porcupine used for decorative purposes but also ceremonially. Deer used as ceremonial food at different kinds of feasts as offerings even though we are eating them for the ancestors' spirits. Bones and horns used to flaking flint.*

- *Porcupine are used for many purposes, decorative use of quills, a whole bunch of things.*

Question 24a of the 2001 site form asked what is affecting the condition of the animals. Tribal members replied with a variety of responses.

- *Good condition, beaver has his lodge. You can still see beaver lodges. Black cherry trees used as wintering spot by porcupines and evidence of otter eating fish. Lots of big fish based on scales in otter scat. Everybody here is doing pretty well.*

- *Some of the trees that are down, you know, had a purpose too. Like if you clean all the trees that are down, that's going to have and affect too. Some people use those trees. Small animals, insects.*

Question 44 of the 2001 site form asked, what are some recommendations for protecting the place, tribal representatives replied:

- *It is self-protected due to geographic location.*

- *No motorized vehicles.*

- *To preserve what we have here we should monitor the acidity of the lake, watch plants, not allow overhunting and keep good common sense of the area and maintain it as it is. I would also limit motorized vehicles and restrict the number and purposes of use for the area.*

Question 45a of the 2001 site form asked why Anishinaabeg people would want access to this place. One tribal members explained:

- *It's their land, part of their ancestors, for different uses, different purposes. Whites are apart from nature but Anishinaabeg are a part of it.*

- *Possible educational purposes for children.*

- *They are already here - to fish, camp, powwow, gather plants.*

5.2.3 Pyramid Point and Bass Lake 1998-2001 Summary

The statements below are summary points drawn from the 1998-2001 interviews at SLBE regarding plant resources. Plant and animal availability, health, and environmental changes are all topics covered with these summary points.

- Plants found at Bass Lake are used for medicinal purposes, ceremonies, and construction
- Plants have personalities and songs
- Medicine plants are brought to the person by a given animal
- Plants at this location were used year-round

American Indian representatives considered the following factors to be affecting the plants:

- Global warming
- Litter left behind by visitors

Representatives made the following recommendations concerning the plants at this place:

- Non-Native people need to understand the value of plants
- Avoid motorized traffic
- Monitor plant populations

5.3 North Manitou Island

North Manitou Island is the larger of two islands located off the eastern coast of Lake Michigan, about eight miles west of the town of Leland. The island encompasses an inland fresh-water lake or Lake Manitou that makes this place particularly important to Indian people because of its "lake-within-lake" geography (Figure 5.5).

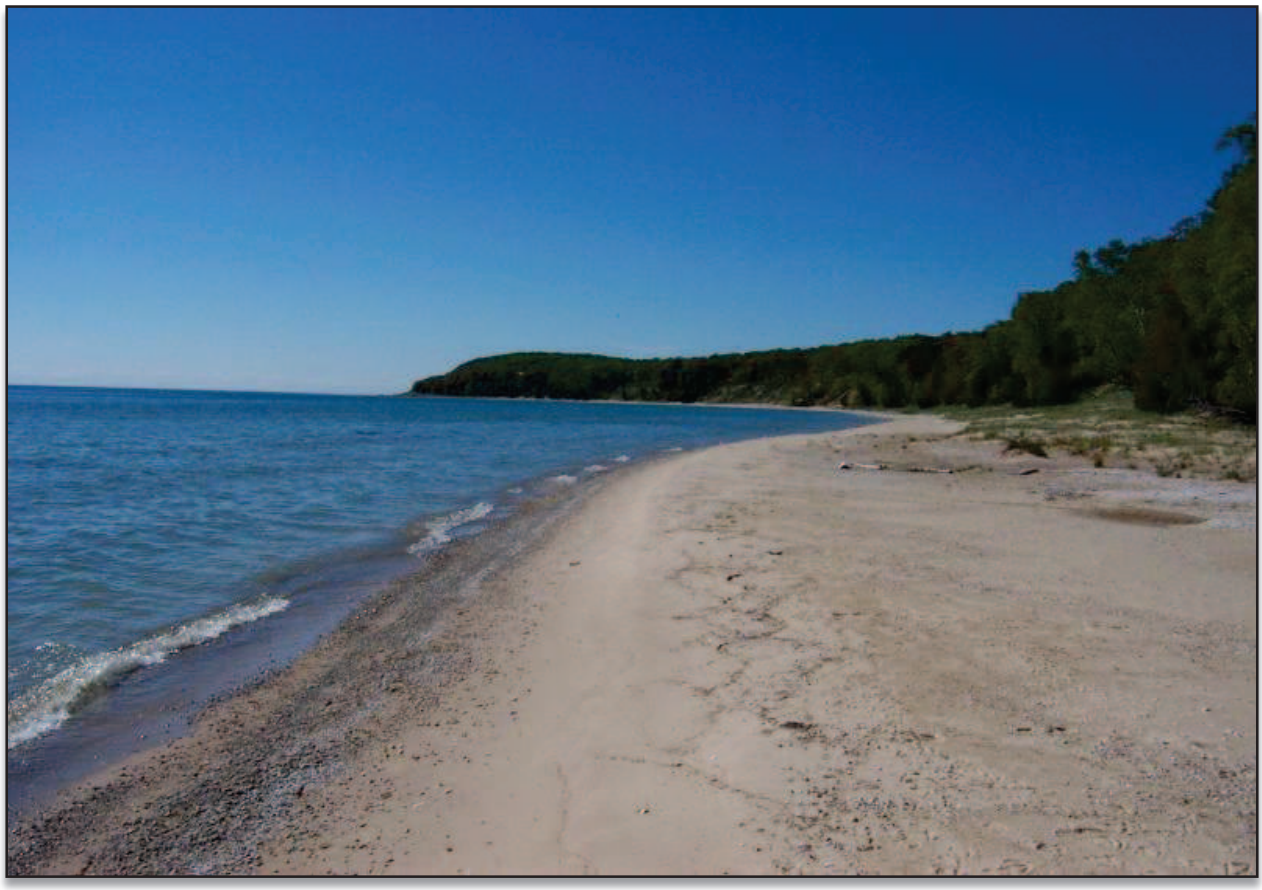


Figure 5.5 North Manitou Island Beach Facing South 2001

The predominant vegetation in North Manitou Island includes sugar maple, beech, white ash, basswood, and hemlock. A cedar grove grows by the lake. Because of the high moraine on

South Manitou Island shielding North Manitou Island from strong northward winds, the latter has only developed minimal dunes, and only in areas where the wind is not blocked (Hazlett and Vande Kopple 1983).

5.3.1 Interviews at North Manitou Island

Five interviews were conducted on the shore of Lake Manitou with representatives from the Sault Ste. Marie Tribe (Ojibwe), the Bay Mills Community (Ojibwe), and Grand Traverse Bay Band (Odawa). A sixth interview took place at the Frank's Farm area. Figure 5.6 presents a topographic overview of North Manitou Island.

For the American Indian representatives, North Manitou Island is part of a larger regional landscape that connects the islands to other features on the mainland and to other lakes. The island once contained a large deer and moose population to allow a few families to continuously live there. The clearings at Frank's Farm with scattered evidence of lithic industries, the large birch trees on the trail to Lake Manitou, and the cedar grove on the lakeshore were of particular interest to the people interviewed. A ring-shaped sequence of ironwoods delimitates an area that might have been used for ceremonial uses at Frank Farm. In addition to this clearing, the representatives were able to see some old birches that had evidence of bark use.

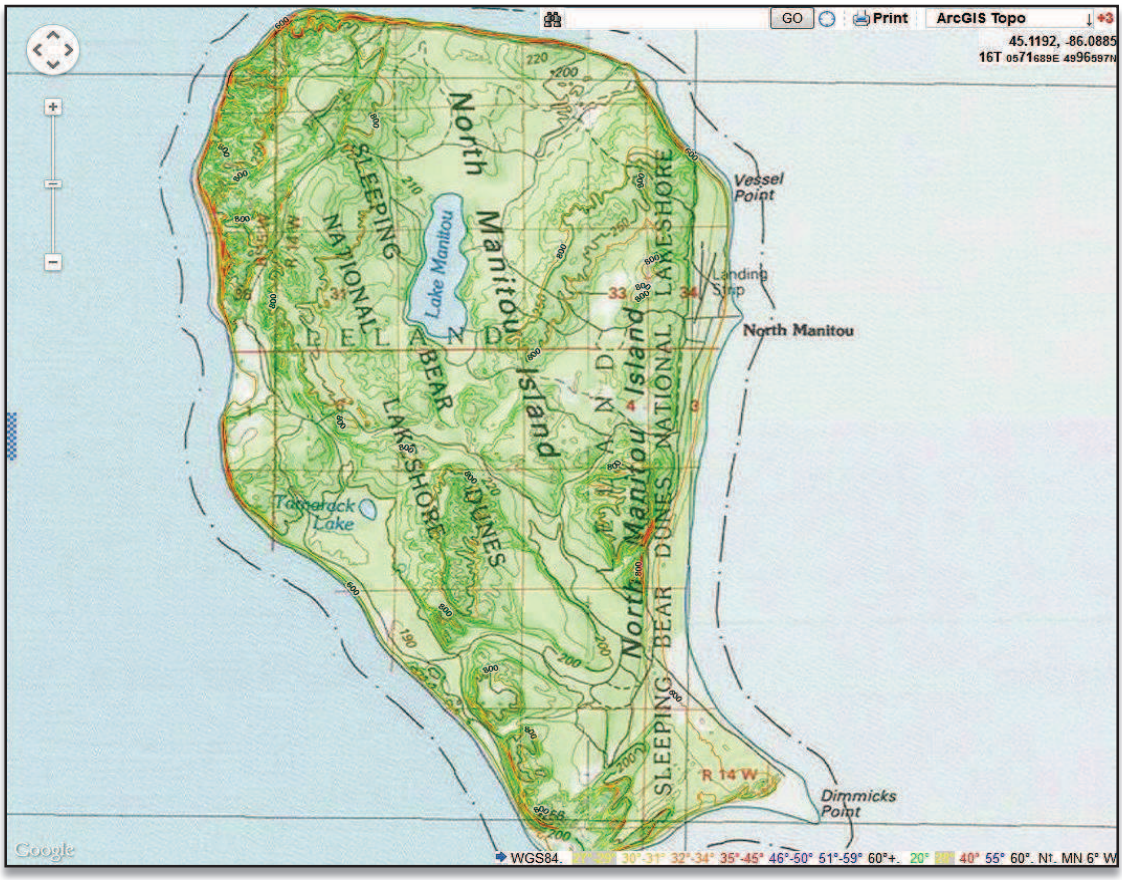


Figure 5.6 Map of North Manitou Island

The island contained resources for year-round occupation--deer, moose, fish, and various plants. However, people who used this area were primarily living in St. Ignace on the Mackinac Strait, *L'Abre Croche*, or Grand Traverse Bay. American Indian representatives have interpreted the place as a travel stop on the way to Manistique. One representative believes that only one extended family could have been resident here. When people camped here, they would divide the space on the island by clan.

The island is connected to the regional landscape including places such as South Manitou Island, Suttons Bay, Grand Island, and Grand Traverse Bay. Places are connected through family ties, geographic similarities, similar ceremonial lore, and patterns of seasonal use. In addition, this island is on a route for copper exchange that went from south of Lake Michigan to the Lake of the Woods.

5.3.2 North Manitou Island Discussion

The following section includes a selection of responses given during the 1998-2001 SLBE study. Although the 2014 SLBE study was unable to visit North Manitou Island, it was visible at Good Harbor Beach and Pyramid Point, allowing for some discussion of its significance.

Question 9 of the 2001 site form asked representatives to describe the geography of the area. Tribal members responded with the following comments:

- *It is an ideal summer spot; it has everything that we need - cedars, cattails, big trees, berries and spearmints. Sugar was extracted from maple trees and carried out with birch bark containers. It is a tradition that the tribes carry on these days and we still have sugar bushes. Around the edge of a cedar and cattail area. Mats made from reeds. Teas made from spearmint and berries, of course, you would eat the ripe soft ones but the mushy ones went in the pot for tea.*

- *It seems like a perfect summer place. Open areas with wild fruit trees black cherry, pin cherry, raspberry, blueberry. Also it would have maple trees for the sugaring a key element for why the people would hang around here* [N. Manitou Island]. *Sugaring in the spring. Had to be carried out with birch bark baskets in the early days. Sugaring is a tradition that the tribe still carries out today.*

- *The area around the lake has Beech, Tamarack, White Cedar, Yellow Cedar Black cherry foodstuffs, several hardwood varieties, pines white pine spruce. Among those that I saw coming in, are the maple trees, evidence of tapping beech nut trees, several other plants including leeks, mushrooms. I saw different fruit trees.*

Question 10b of the 2001 site form asked, what makes this place suitable for the previously mentioned activities? In response, tribal members explained:

- *Probably not more than an extended family was resident here. It's a secluded place, though, protected by a water barrier from the peninsula. This makes it good for holding ceremonies. Along the beaches, they put up lodges for ceremonies to give thanks in the spring and fall and also naming ceremonies. Collecting nuts, making maple sugar in the spring. Sufficient amount of resources here.*

- *Clans would get together in a central location so this lake* [Manitou] *would be the central place. There would have been a clan at each end of the island and maybe Frank's Farm. Maybe people could have lived here. There was deer and moose. The summer was lean for fishing - full spawning runs gave them access. They would have definitely camped here and if that occurred during a ceremonial season, they would have held ceremonies too.*

- *During certain seasons, they would hold ceremonies* [spring, summer, and fall]. *Fall is the biggest ceremony. It is possible that some people lived here at all times. They would have deer and moose to hunt. They would also spear fish in the spring and netting in summer and fall.*

- *Mainly ceremonial site, although few might have decided to stay. There are lake trout here.*

- *This was a ceremonial gathering place; this area is famous for its lake trout population, which would be right off the coastal waters. And that was a sacred tradition for the Ojibwe.*

- *Cedar, maple, and the trout population make it a suitable ceremonial area.*

Question 18a of the 2001 site form asked for representative's comments on plant uses, to which one tribal members replied:

- *Wood was also traded with the steamers on the lake. All medicine were used in a ceremonial setting. For us only 10 percent of the curing process is physical, whereas the 90 percent is spiritual. Some plants don't seem to have properties to cure a specific disease, but that's what the spirit instructed the doctor to use for curing. The curing spirit could be different things: bear, turtle, wolf, or an ancestor. Maple trees here have evidence of sap drainage, beech nuts were eaten as well as leaks, various fruits from trees, and mushrooms. The plants were also used in various medicines: striped maple for phlegm and lung disease; cedar for cleansing; raspberry for pregnant women; different types of mints; barks of pine boiled for colds and pneumonia; reeds for sore throats; Indian pipe and fungus on trees also used for different illnesses but not sure what. Plants also used to make various things: spoons, bowls, bark of sugar maple for sap-collecting*

buckets, saplings used to make wigwams, ceremonial buildings, and different lodgings. Cedar to make canoes, birch trees for covers of canoes, paddles, bows, and arrows.

- *We saw a big paper birch tree on the walk to Lake Manitou. It had places where the bark had been removed. The Indians probably did this a long time ago. These big trees are important to us today because they can still be a source of birch bark and they mark where our people lived. Very traditional ecosystem here, everything needed to survive. There's probably sweetgrass on the island too, I haven't smelled it but if it is in season right now.*

Question 20a of the 2001 site form asked, what is affecting the plants? To this question, tribal representatives explained:

- *Airborne pollution and some evidence of usages by humans* [tea bag, rock stuck in trees, spring from an old car] *but things go away with time. Trees are doing better than in many other places. There are some tremendously old ones in a virgin forest condition. We don't see those so often anymore.*

- *The plants are hearty and healthy. I like the wilderness designation. It protects the plants. The clearing we made at Frank's Farm is growing in. It needs to be burned so it does not close up and disappear.*

- *Nothing other than the drought.*

Question 30a of the 2001 site form asked if tribal members had comments on artifact use at the site, to which one tribal representative mentioned:

- *There is evidence that sap was taken from the maple trees. People might have come here to get a particular stone, flint or other. The field at Frank Farm seemed to have been used for agriculture: potatoes or corn, crops that need little attention or maintenance, but it was also used as ceremonial place after harvesting the crops.*

Question 34a of the 2001 site form asked if tribal members had comments on the geology of the region, to which they replied:

- *The open clearings like at Frank's Farm were made by Ojibwe and kept open so we could have our villages here and so the animals will have grass and to make big areas of berries at the edge of the woods.*

Question 40 of the 2001 site form asked tribal members were asked for their recommendation for protecting the plants. One elder recommended:

- *Further education of visitors on what sacred plants mean, and what fish we eat. Also educate people on the meaning of cedar for Natives.*

Question 45a of the 2001 site form asked why Anishinaabeg people would want access to this place. One tribal member explained (Figure 5.7):

- *Tribes in the fall and early spring would want to come here to fast. Maybe we could have a week or two for us available for coming and fasting. Also to experience the beauty of the place and give thanks to the creator for it still being here the way it is. As spiritual people we like to go to unspoiled places to experience the way it was for our ancestors. Experience the magnitude of 600 or 800 years old trees and get attuned with nature. Today it is difficult to find high points for fasting and ceremonies. It would be good to set up a lodge.*

5.3.3 North Manitou Island 1998-2001 Summary

The statements below are key summary points drawn from the 1998-2001 interviews at SLBE regarding plant resources. Plant and animal availability, health, and environmental changes are all topics covered with these summary points.

- Plants collected on this island were used for ceremonial and medicinal purposes.
- A maple sugar camp was present on this island.
- Various plants found on this island were used to make a large number of tools and objects.
- The ring of ironwood trees at Frank's Farm constitutes a circle used for political meetings and ceremonies.
- The variety of berries and plant resources that grow in the summer make it an ideal spot for that season.

American Indian representatives considered the following factors to be affecting plants:

- Airborne pollution and littering by visitors.
- Drought

Representatives made the following recommendations concerning the plants at this place:

- Clearing at Frank's Farm needs to be burned to prevent its disappearance.
- Improve interpretation programs on meaning of sacred plants.

The responses from Anishinaabeg representatives who participated in the 1998-2001 study maintain many similarities with management recommendations and concerns voiced by 2014 Odawa participants. The following chapter presents the 2014 Odawa representatives responses to ethnobotanical resource, landscape, and management recommendations at several of the same sites visited during the 1998-2001 study.

CHAPTER SIX
DESCRIPTION OF SITES VISITED WITHIN SLEEPING BEAR DUNES NATIONAL LAKESHORE

The selection of seven sites within the park occurred as a way to assist University of Arizona researchers (UofA) and Odawa representatives in documenting variation in ethnobotanical resources throughout Sleeping Bear Dunes National Lakeshore (SLBE). Each site represents diversity in availability of plant resources and different types of ecosystems, with the majority of selected sites also noted as holding cultural significance for Odawa people. Moving from the southern portion to the northern portion of SLBE, seven sites were visited. The sites visited include: 1) Platte River Point; 2) Platte Plain Swales; 3) the Mouth of Otter Creek; 4) the Otter Creek Fens; 5) Glen Lake Sugarbush; 6) Pyramid Point; and 7) Good Harbor Beach and Wetlands. Figure 6.1 illustrates the location and distribution of selected sites throughout SLBE.

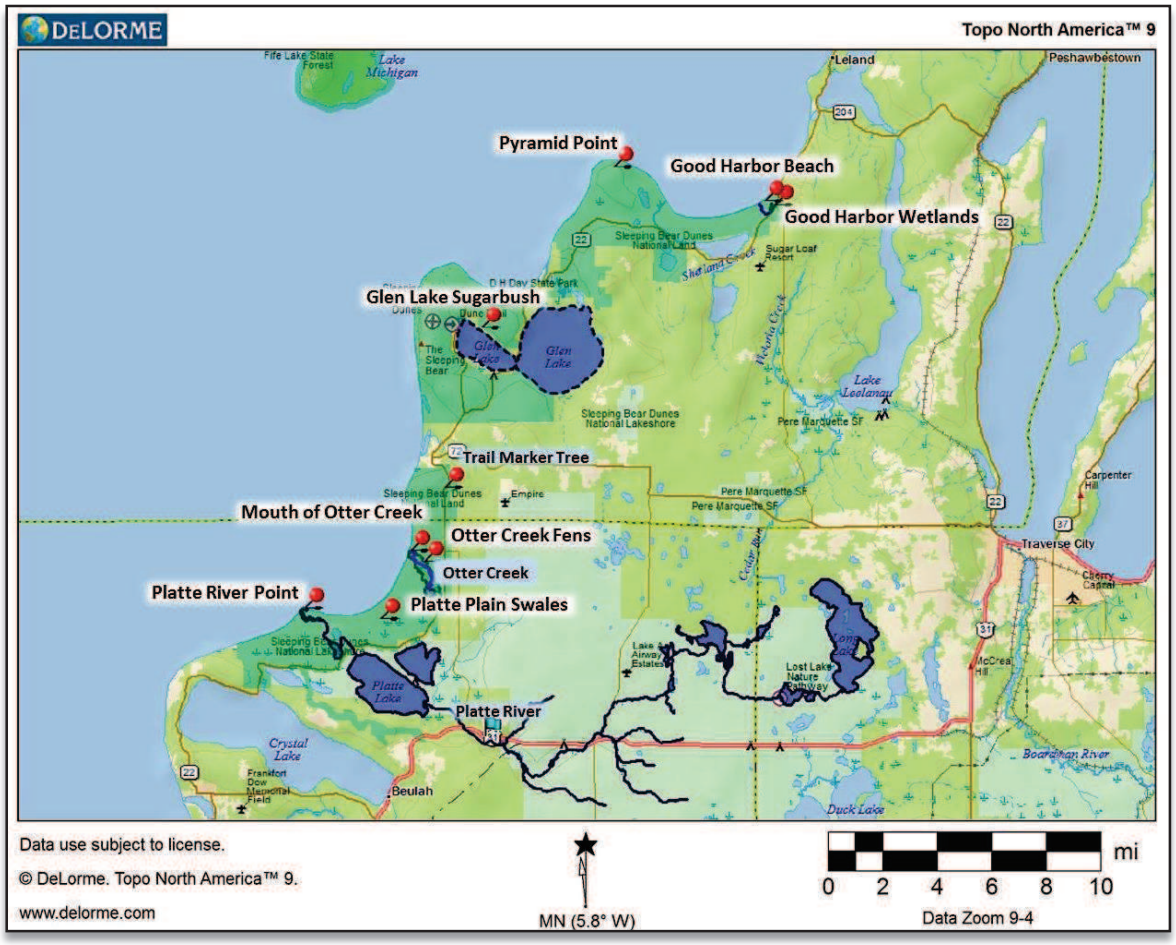


Figure 6.1 Map of Seven Sites Visited within SLBE During the 2014 Study

The first site visited during the 2014 study was Platte River Point. This site represents riverine, coastal dune, wetland, and northern hardwood forest ecosystems. Additionally, the convergence point of the Platte River and Lake Michigan located at this site demonstrates a culturally significant feature from an Odawa perspective. The diversity of plant resources available at this site is immense, with a total of 119 different ethnobotanical resources identified here by Odawa representatives. Ethnobotanical resources found at Platte River Point serve a variety of medicinal, cultural, and utilitarian purposes. Nearby cultural landscape features, such as the dune bluffs add additional significance to the site. Table 6.3 presents a list of 119 Odawa identified plants documented at Platte River Point during the 2014 site visits.



Figure 6.2 Odawa Representatives and UofA Researchers at Platte River Point

The second site visited as part of the 2014 study is referred to as Platte Plain Swales. Tribal representatives suggested visiting the Platte Plain Swales because it is unique ecologically and has diverse and abundant plant resources. Interviews at this site were integral in increasing the total number of documented contemporary use plants and expanding the understanding of plants that had already been recorded. The geological formation of the swales was caused by glacial movement; glaciers made a series of cuts in the earth that lie parallel to the shoreline of Lake Michigan in the Platte Bay. The swales contribute to this study because of their unique and vulnerable ecology. They are especially sensitive to climate change due to the fragile ecosystem they represent. Inconsistent or decreased rainfall caused by climate change will affect the natural balance of the swale ecology. Because there are numerous culturally central Odawa medicinal

plants growing in the area, the physical, social, and spiritual impacts of any ecological shifts at this site will be devastating. Additionally, a human-modified tree is an indication that this place was significant in the past and continues to be significant contemporarily for the Odawa tribes.

A third site visited during the 2014 study was referred to as Otter Creek Mouth, described as the convergence point of Otter Creek and Lake Michigan in Platte Bay. Giant dune bluffs that serve as vision questing sites for Odawa people surround Otter Creek, much like Platte River Point. Historically, the logging village of Aral occupied the area surrounding Otter Creek mouth, contributing to the ethnohistory of the region. Unique dune, beach, and riparian habitats host a variety of ethnobotanical resources at Otter Creek Mouth.

The Otter Creek Fens are the fourth site visited during the 2014 study of ethnobotanical resources and climate change at SLBE. The fens are a series of marl springs, located less than a mile from the mouth of Otter Creek and provide a variety of resources and ecological diversity, as well as a culturally significant spot where Odawa representatives could hold ceremonies. Although, the Otter Creek Fens are not a place for gathering resources, the site serves as a model for identifying the effects of climate change on fragile wetland ecosystems.

The fifth site visited during the 2014 study is the Glen Lake Sugarbush, a historic maple sugaring camp used for several hundred years by Odawa families (Figure 6.3). By visiting the Glen Lake Sugarbush, site discussions with Odawa representatives about seasonal variation in maple sugaring, and other climate change issues took place with strong visual components noted around the site. The Glen Lake Sugarbush is important for measuring these noticeable climate changes occurring. It also offers the potential for a place within the park that Odawa people could continue to hold their traditional sugar camps and educate tribal youths about the process.



Figure 6.3 Odawa Representatives and UofA Researchers Visit the Glen Lake Sugarbush 2014

The sixth site visited during the course of the 2014 study was Pyramid Point, a dune bluff overlooking Lake Michigan. Pyramid Point has a long history of Odawa occupation and use. It is located on an overland Odawa trail historically used for seasonal migration, and served as a camp for those Anishinaabeg people making use of water travel routes across Lake Michigan. Euro-American's settling the area in the mid-1800s dramatically altered the landscape through logging activity, but a substantial portion of the northern hardwood forest ecology has been restored in the area. Many birch trees grow at the site, and it would be a good spot for birch bark harvesting. Odawa representatives visiting the site in 2014 commented on the contemporary use of the area for vision questing and teaching youths about the land and Odawa culture (Figure 6.4).



Figure 6.4 Odawa Representative and UofA Researchers Identifying Plants at Good Harbor 2014

Good Harbor Beach and Wetlands comprises the seventh site visited during the 2014 study. Despite the separation of the two areas by about 0.75 mile, they are connected by the Good Harbor hydrological system. The sand beach and freshwater dunes on Good Harbor Bay make it a popular location for park visitors. The large Empire Bluffs nearby appeal to the Odawa people as ceremonial sites. Ethnobotanical resources along the beach are unique, and found in few other places except freshwater dunes. Further inland, the Good Harbor wetlands also are home to an extensive variety of ethnobotanical resources, totaling to nearly 100 different contemporary use plants. A site-by-site analysis of the 2014 SLBE study is presented by the following sections.

6.1 Platte River Point

Platte River Point is located 13 miles south of Empire, Michigan, near the southern boundary of SLBE (Figure 6.5). Platte River Point marks the convergence of the Platte River and Lake Michigan at Platte Bay. This site is important to the study based on its ecological diversity, geographic location, and previous visits to Platte River Point during fieldwork in 2001 (Zedeño et al. 2001). Additionally, Platte River Point holds cultural significance from an Odawa perspective, based on the spiritual power associated with the convergence of two sources of water. The Platte River connects two lakes, and spans an ecologically diverse area, with hardwoods, swamp forests, coastal dunes, and pine forests (Hazzlett 1991).

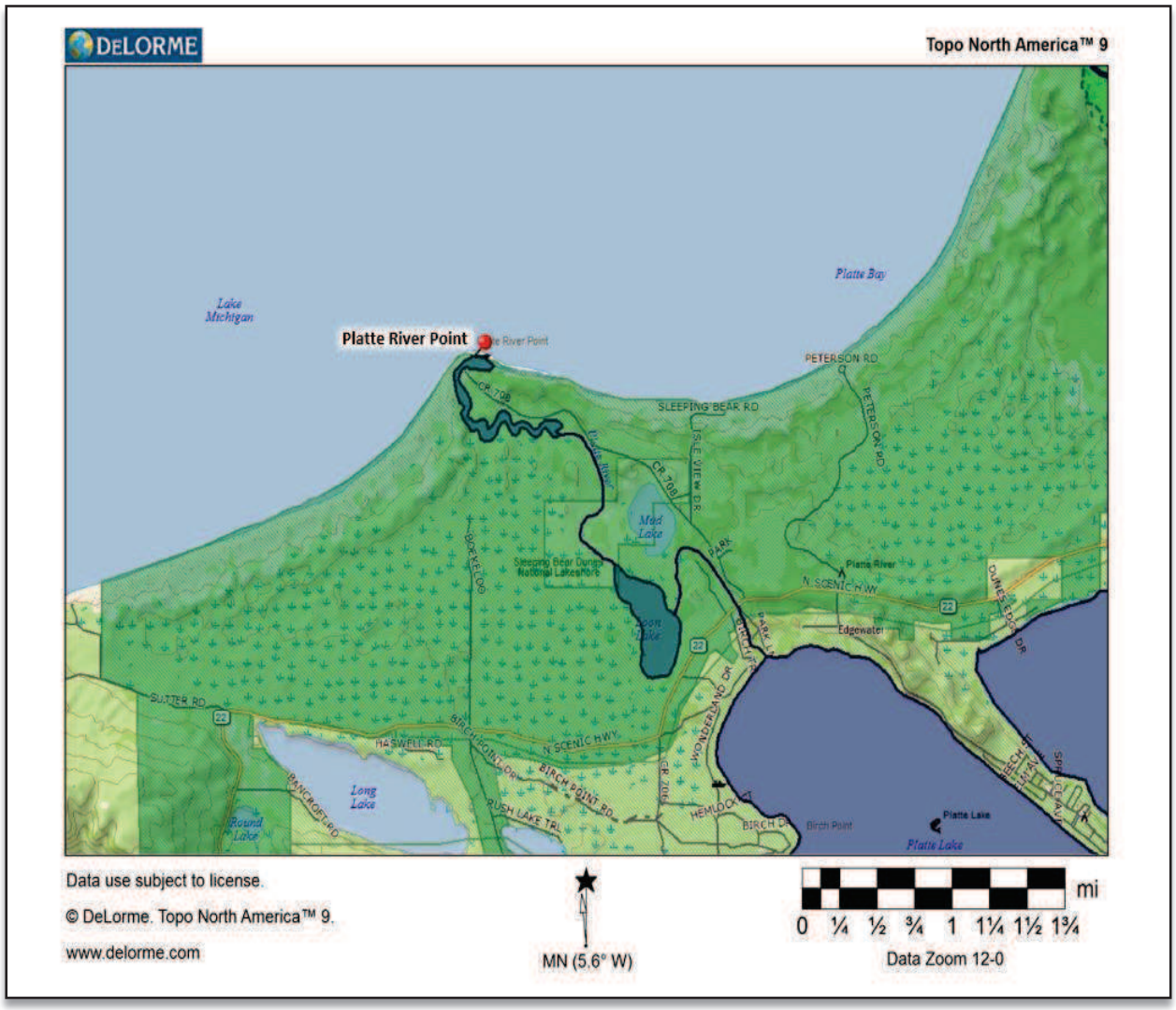


Figure 6.5 Map of Platte River Point

As a riverine ecosystem with over two hundred different plant species, Platte River Point provides a key example of a type-site for assessing the effects that changing climate and other factors that play in the health and availability of ethnobotanical resources within SLBE. Aspects of the ecology, geology, and the cultural landscape of Platte River Point are addressed in the

following section, with comments and recommendations for the continued use and preservation of the site presented by Odawa representatives.

6.1.1 Geology

Platte River is an alluvial river, which means that sediment is picked up and re-deposited elsewhere as the channel erodes, floods, and changes its own course. Platte River Point marks a large silt deposit at the delta. The Platte River is a major hydrological system in northern Michigan, which originates from the southern edge of Long Lake. It flows in a westward direction through Platte Lake and converges with Lake Michigan at Platte River Point. The river channel ranges from 45 feet to 100 feet in width as it nears the delta. Figure 6.6 illustrates the extensive Platte River hydrology.

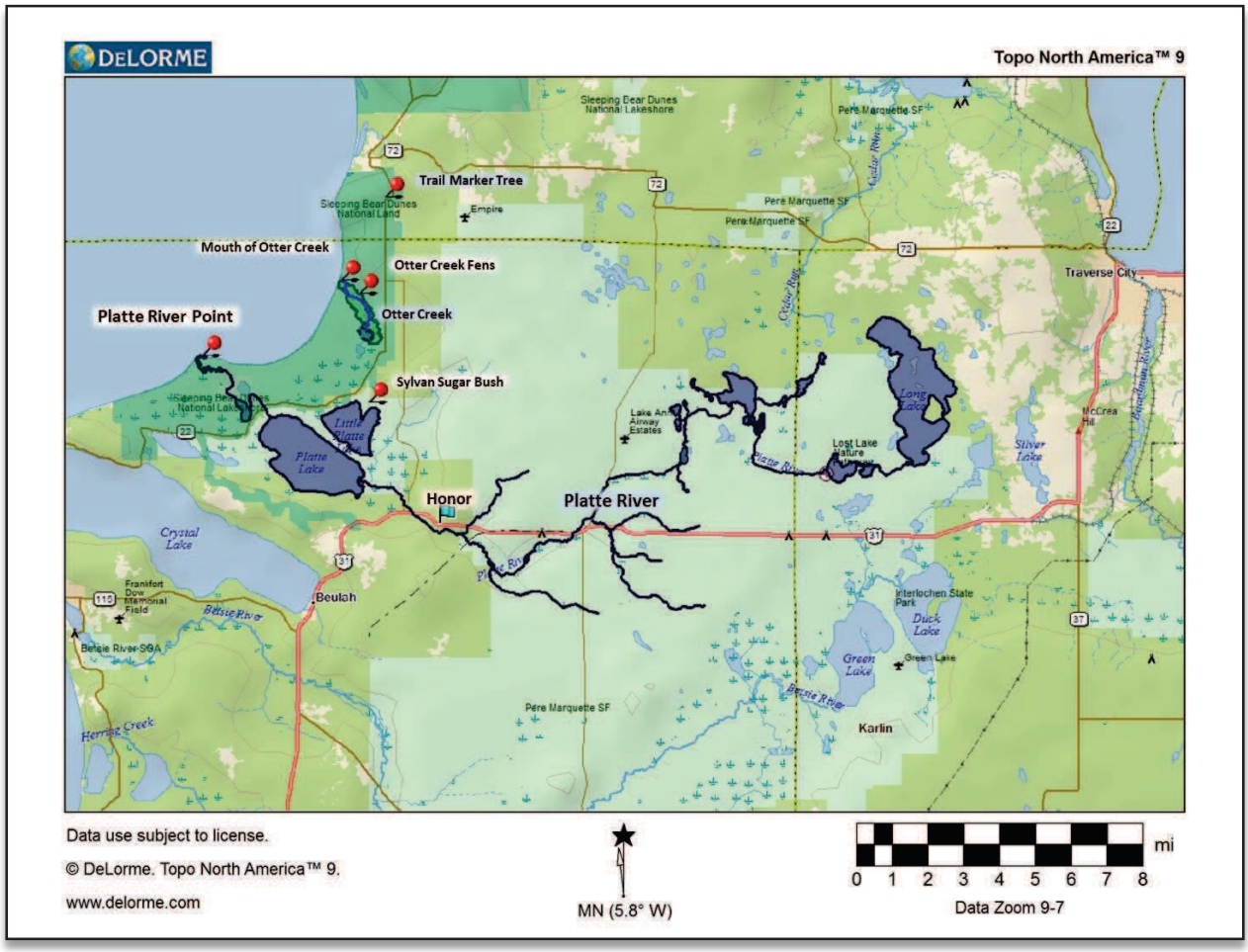


Figure 6.6 Overview of Platte River Hydrology

As the Platte River converges with Lake Michigan, the west bank of the river is flanked by coastal dunes. The eastern bank of the Platte River is significantly different in its soil composition and ecological diversity. The geology of the east bank includes a combination of sandy soil and large hills covered by hardwood and cedar forests. Sand, water, wind, snow, and human visitors contribute the ever-changing landscape at SLBE.

The Platte River is surrounded by several large moraines, which are defined as glacially formed accumulations of unconsolidated glacial debris, like rock or soil. The northern ridge of the Point Betsie moraine forms the southwestern boundary of a large depression, now known as Platte Lake, with the Empire moraine serving as the eastern boundary (Calver 1947: 6). The lake, fed by the Platte River, rests between these two moraines. A morainic ridge extends southeast from the mouth of the Platte River, all the way to the southern end of Little Platte Lake, a distance of approximately five miles (Calver 1947: 6). Figure 6.7 illustrates the topography of the Platte River Point area, with the morainic ridge outlined in red.

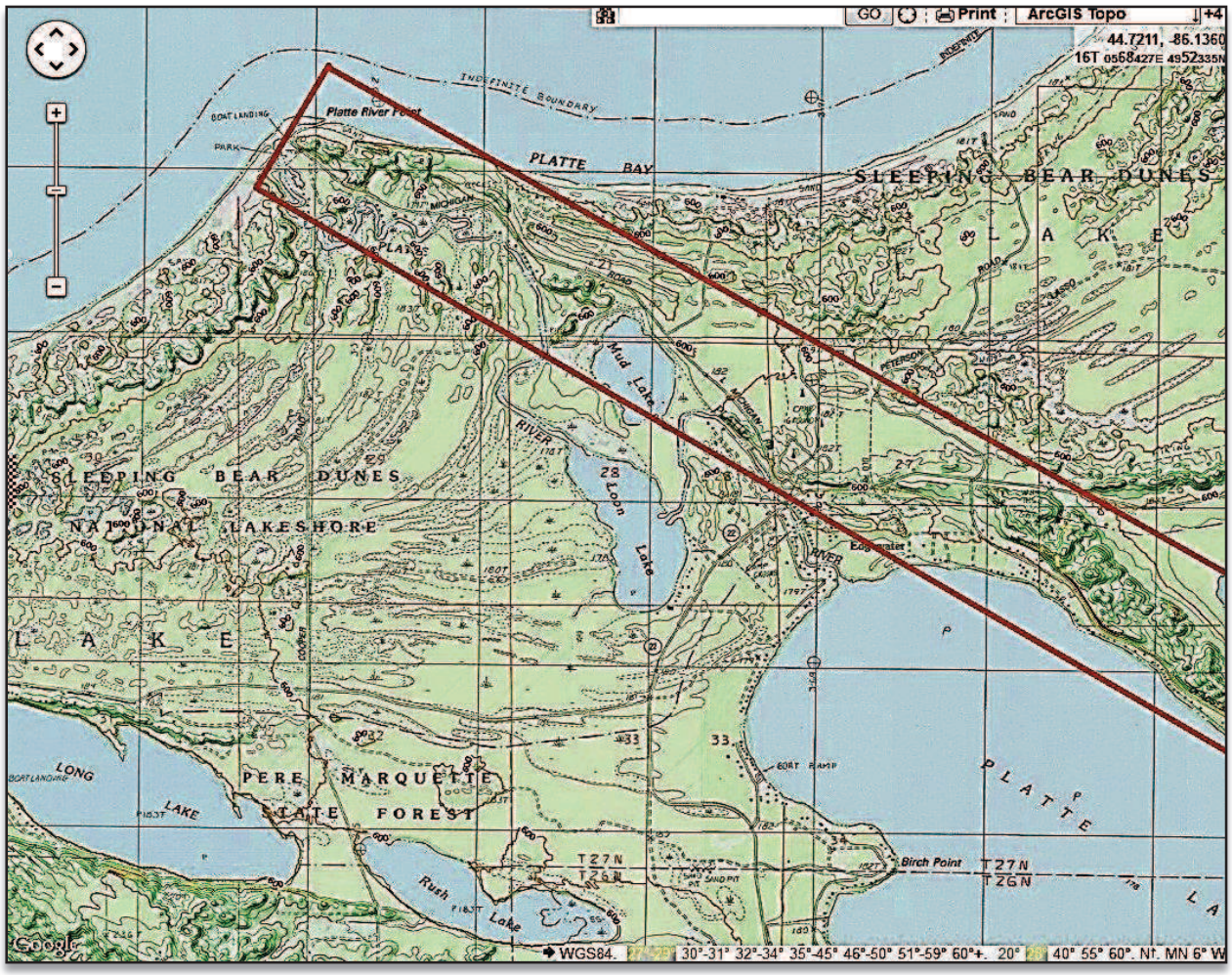


Figure 6.7 Topographic Overview of Platte River Point Geology

Geologic features within SLBE are the result of glacial ice sheets forming and thawing, suggesting that the formation of the large aeolian sand dunes occurred around 12,000 years ago (Lovis, Arbogast, and Monaghan 2012: 7). Looking north from Platte River Point, the Empire Bluffs and Sleeping Bear Bluffs are visible. The 400 foot high sand dunes are remnants of debris deposited by melting glacial ice thousands of years ago. The formation of the dunes occurred as the ice melted, with the runoff waters carrying sand and rock from the ice, depositing the debris and forming the giant dunes. The pattern of the Platte River convergence with Platte Bay and

nearby bluffs is repeated along the park's entire shoreline, reflecting the earlier array of ice lobes and interlobate glacial deposits (Sleeping Bear Dunes National Lakeshore 2014: Geology Tour).

6.1.2 Ecology

Platte River and the Platte River Point delta contain over two hundred different plant species representing several unique kinds of ecosystems. Platte River is predominantly a riverine ecosystem, defined as a flowing or lotic river that exhibits a longitudinal gradation in temperature, concentration of dissolved materials, turbidity, and atmospheric gases, from the source to the mouth (Thorp, Thoms, and Long 2008: 28). Support for a variety of aquatic plant species is provided by wetland habitats in pools and slow moving parts of the Platte River, contributing to the diversity of ethnobotanical resources present.

The area surrounding Platte River Point also represents a unique coastal dune ecosystem. Freshwater coastal dunes contain unique flora and fauna, and are a highly dynamic landscape (Lovis, Arbogast, and Monaghan 2012: 1). Lichens, fungi, mosses, grasses, wildflowers, shrubs and trees are able to grow within a dune ecosystem; however, drying winds, low soil moisture and fertility, and intense sunlight along with blowing sand are conditions that affect the growth of dune vegetation (Michigan Department of Natural Resources 2014: Coastal Dune Vegetation and Ecology). The wetland and coastal dune ecosystems at Platte River Point are visible in Figure 6.8.



Figure 6.8 Wetland and Coastal Dune Ecological Diversity at Platte River Point, Facing South

Moving inland from the river and coastal dune areas, a dramatic transition to a northern hardwood ecosystem occurs. In Michigan, the northern hardwood ecosystem is the most common forest ecology unit. The main species in this forest ecosystem is the sugar maple. The soil transitions from mainly sand to a darker and richer mix as you move away from the shoreline (Michigan Environmental Education Curriculum 2005: Northern Hardwood Forest). Swamp forests are also common in the Round Lake area and around ponds in the Platte Bay and Platte River regions. These forests include alder, Michigan holly, and white cedar in the areas farthest from Lake Michigan (Hazlett 1991: 144-148).

These four types of ecosystems, located within close proximity to one another, are home to a range of plant species. From an Odawa perspective, many of the plants are considered both traditional and contemporary use plants, serving a wide variety of purposes.

6.1.3 Special Features

Platte River Point is important for Odawa representatives based on the diversity of plant resources and a wide variety of river, dune, and marsh habitats. Additionally, the cultural significance of the site stems from the Odawa ontological and epistemological perspectives about hydrological convergence points. The view of the dunes contributes to the spiritual power that Platte River Point holds.

The convergence point of Lake Michigan and the river delta is considered to be a special feature associated with Platte River Point (Figure 6.9). Anishinaabeg water taxonomy is based on both the physiographic diversity and the peculiarities of water and water bodies, its complexity derives not only from the physical, but also from the historical and spiritual realms (Zedeño, Miller, and Hollenback 2011: 50).

Odawa representatives in 2014 explained that high places, such as the dune bluffs, serve as vision questing and fasting sites for Odawa people. The proximity of both the Sleeping Bear and Empire Bluffs to the water increases the power associated with the sites. Viewscapes and waterways connect Platte River Point and dune bluffs, increasing the spiritual power of these places.

Archaeological remnants of Odawa camp and village sites add to the importance of Platte River Point. Odawa representatives felt a strong connection with their past, knowing that they had the same desire as their ancestors for the use of this special place. A variety of natural resources made this particular spot attractive for living or camping, and as a stopping place along travel and trading routes.



Figure 6.9 Convergence Point at the Delta of Platte River with Lake Michigan

Other special features include the availability of medicinal plants. Many of these plants are rarely found elsewhere and are reliant on a healthy riverine ecosystem. Access to plant resources combined with spiritual and cultural connections contribute to the importance of Platte River Point.

6.1.4 Native American Comments

Platte River Point has a history of Anishinaabeg use spanning thousands of years, from pre-contact times to today. Odawa representatives spoke with UofA researchers about the use, meaning, and significance of Platte River Point, and identified contemporary ethnobotanical resources. Comments from Odawa representatives are included here as a way to explain the significance of the area. These comments also assist in providing a better understanding of the impact that climate change is having on use plants and other culturally significant resources in the park.

Discussions with Odawa representatives regarding ethnobotany at Platte River Point occurred in 2001 as part of a previous NPS study that was facilitated by the UofA. The details of these 2001 discussions and site visits can be found in Chapter five of this report. In the recent 2014 study, Odawa representatives also visited Platte River Point, discussing ethnobotany and climate change with UofA researchers. Table 6.1 illustrates the types of discussions held with Odawa representatives that visited Platte River Point.

	2001 Landscape Forms	2001 Site Forms	2014 Site Form	2014 Plant List	2014 Informal Int.	2001 Totals	2014 Totals	Grand Total
Platte River Point	0	4	4	5	5	4	14	28

Table 6.1 Discussions with Odawa Representatives that Visited Platte River Point in 2001 and 2014

Table 6.1 provides a summary of the types of interviews and topics that were discussed with Odawa representatives in 2001 and 2014. Four site forms with interview questions about the use, significance, and types of resources available at each site occurred in 2001, while three interviews took place in 2014. Four plant lists, detailing types of plants known to be growing in the park, were filled out in 2014 while visiting the area with Odawa representatives. Five informal interviews or discussions about Platte River Point were held while driving to and from the site.

Odawa Ethnobotany and Site Use

Ethnobotanical resources found at Platte River Point serve a variety of medicinal, cultural, and utilitarian purposes. Nearby cultural landscape features, such as the dune bluffs, add additional significance to the site. Table 6.2 on the following page, presents a list of 119 Odawa identified plants documented at Platte River Point during the 2014 study.



Figure 6.10 Odawa Representative and UofA Researcher Discussing Climate Change at Platte River Point

Box Elder	*Acer negundo*
Striped Maple	*Acer pensylvanicum*
Red Maple	*Acer rubrum*
Silver Maple	*Acer saccharinum*
Sugar Maple	*Acer saccharum*
Mountain Maple	*Acer spicatum*
Wooly Yarrow	*Achillea fanutosa*
Yarrow	*Achillea millefolium*
Sweet Flag	*Acorus calamus*
Nodding Wild Onion	*Allium cernuum*
Wild Onion	*Allium stellatum*
Wild Leek	*Allium tricoccum*
Beachgrass	*Ammophila*
Bog Rosemary	*Andromeda glaucophylla*
Dogbane	*Apocynum sp.*
Spreading Dogbane	*Apocynum androsaemifollia*
Indian Hemp	*Apocynum cannabinum*
Wild Sasparilla	*Aralia nudicaulis*
Common Burdock	*Arctium minus*
Alpine Bearberry	*Arctostaphylos alpina*
Bearberry	*Arctostaphylos uva-ursi*
Jack in the Pulpit	*Arisaema triphyllum*
Field Sagewort	*Artemisia campestris*
Swamp Milkweed	*Ascelpias incarnata*
Common Milkweed	*Ascelpias syriaca*
Yellow Birch	*Betula alleghaniensis*
Black Birch	*Betula nigra*
White/Paper Birch	*Betula papyrifera*
Low Birch	*Betula pumila*
Virginia Grape Fern	*Botrychium virginianum*
Marsh Marigold	*Caltha palustris*
Giant Puffball	*Calvatia craniformis*
Blue Cohosh	*Caulophyllum thalictroides*
American Bittersweet	*Celastrus scandens*
Atlantic White Cedar	*Chamaecyparis thyoides*
Prince's Pine	*Chimaphila umbellata*
Common Thistle	*Cirsium vulgare*
Goldthread	*Coptis aspleniifolia*
Gray Dogwood	*Cornus racemosa*
Great Willow Herb	*Epilobium angustifolium*

Field Horsetail	*Equisetum arvense*
Scouring Rush	*Equisetum hymale*
Boneset	*Eupatorium perfoliatum*
Beech	*Fagus grandifolia*
Beefsteak Mushroom	*Fistulina hepatica*
Woodland Strawberry	*Fragaria vesca*
Wild Strawberry	*Fragaria virginiana*
Reeds	*Fragmites sp.*
White Ash	*Fraxinus americana*
Black Ash	*Fraxinus nigra*
Red/Green Ash	*Fraxinus pennsylvanica*
Wintergreen	*Gaultheria procumbens*
Huckleberry	*Gaylussacia baccata*
Witch Hazel	*Hamamelis virginiana*
Oxeye Daisy	*Heliopsis hellanthoides*
Sweetgrass	*Hierochloe odorata*
Jewelweed	*Impatiens sp.*
Black Walnut	*Juglans nigra*
Cedar	*Juniperus sp.*
Shrub Juniper	*Juniperus communis*
Red Cedar	*Juniperus virginiana*
Labrador Tea	*Ledum groenlandicum*
Ground Cedar	*Lycopodium complanatum*
Ground Pine	*Lycopodium obscurum*
White Sweet Clover	*Melilotus alba*
Wild Mint	*Mentha arvensis*
Horse Mint	*Monarda Punctata*
Morel Mushroom	*Morchella esculenta*
Catnip	*Nepeta cataria*
Tobacco	*Nicotiana sp.*
Ginseng	*Panax quinquefollum*
Dwarf Ginseng	*Panax trifollum*
White Spruce	*Picea glauca*
Black Spruce	*Picea mariana*
Jack Pine	*Pinus banksiana*
Red Pine	*Pinus resinosa*
White Pine	*Pinus strombus*
Balsam Poplar	*Populus balsamifera*
Large Tooth Aspen	*Populus grandidentata*
Quaking Aspen	*Populus tremuloides*

Wild Cherry	*Prunus emarginata*
Fire Cherry	*Prunus pensylvanica*
Chokecherry	*Prunus virginiana*
Wild Crab Apple	*Pyrus coronaria*
White Oak	*Quercus alba*
Burr Oak	*Quercus macrocarpa*
Black Oak	*Quercus velutina*
Red Oak	*Quercus rubra*
Sumac	*Rhus sp.*
Prickly Wild Rose	*Rosa acicularis*
Wild Rose	*Rose virginiana*
Red Raspberry	*Rubus idaeus*
Blackberry	*Rubus pennsylvanicus*
Willow	*Salix sp.*
Pussy Willow	*Salix discolor*
Red Willow	*Salix laevigata*
Common Elderberry	*Sambucus canadensis*
Red Elderberry	*Sambucus racemosa*
Black Snakeroot	*Sanicula marilandica*
Bulrush	*Scirpus americanus*
Fragrant Goldenrod	*Solidago graminifolia*
American Mountain Ash	*Sorbus americana*
Dandelion	*Taraxacum officinate*
Ground Hemlock	*Taxus canadensis*
White Cedar	*Thuja occidentalis*
Basswood	*Tililia americana*
Eastern Hemlock	*Tsuga canadensis*
Cattail	*Typha latifolia*
American Elm	*Ulmus americana*
Slippery Elm	*Ulmus rubra*
Stinging Nettle	*Urtica dioica*
Blueberry	*Vaccinium angustifolium*
Cranberry	*Vaccinium oxycoccos*
Small Cranberry	*Vaccinium thapsus*
Mullein	*Verbascum thapsus*
Highbush Cranberry	*Viburnum opulus*
Wild Grape	*Vitis labrusca*
River Bank Grape	*Vitis riparia*
Wild Rice	*Zizania aquatica*

Table 6.2 Plants Identified at Platte River Point by Odawa Representatives during the 2014 Study

The location of the Platte River Point in proximity to Lake Michigan and the Platte River made the site a logical choice for Odawa people to use for camping, hunting, fishing, gardening, harvesting wild resources, holding ceremonies, and establishing permanent villages. When asked about the use of Platte River Point in prehistoric, historic, and contemporary times, Odawa representatives provided many details.

- *We would have used that entire* [Platte] *river, from the mouth up and down the entire river, for hunting, fishing, trapping, gathering, camping, ceremonial use. I can imagine villages and everything. We would have used it like a roadway, like a highway, or travel route. Lake Michigan to inland.*

- *At all of the river mouths around the Great Lakes, we* [Odawa people] *would have been camping at times, and if these sites were a good source of fish and things like that, we would have bigger villages or camps at times. All of this area* [near Platte River Point] *includes archeological sites.*

- *For us medicine is stronger when we're able to pick it in this type of environment, as opposed to picking the same medicine beside the road. Right beside the road it is not the same, there is just a different spiritual aspect to it when we are able to pick plants that are pristine, untouched, well as pristine as we can find. So, this place* [Platte River Point] *would be great if we were able to come and harvest for medicinal purposes.*

6.1.5 Ethnographic Comments

Ethnographic and ethnohistorical accounts serve to support contemporary Odawa knowledge about natural and cultural resources, and to demonstrate longstanding ties with this site and the greater Sleeping Bear Dunes area. The Great Lakes region has long been the home of the Odawa people, its forests and waters providing ample resources. Odawa survival depends on precise knowledge of the ways of animals, the cycle of the seasons, and the properties and uses of plants (Clifton, Cornell, and McClurken 1986: 14). The Platte River is one of the hydrological systems used by the Odawa people for trade and travel, connecting it to many other places within the Anishinaabeg homeland, including the Manistique area, the Badinack River, and the Kaskanawa River (Zedeño et al. 2001). With the main channel of the Platte River extending 30 miles inland, it served as a route to other creeks, streams, and rivers; providing an expansive network of waterways used for transportation throughout the Upper Great Lakes region.

The Platte River was an important trading route from the lakeshore into the interior regions, with kinship relations and spiritual ties connecting the different places and resources found therein (Zedeño et al. 2001). Odawa people utilized the complex series of lakes and hydrological systems throughout Northern Michigan as travel and trade routes, modifying trees as markers of their seasonal cycles of movement between resources (Cardinal and Cobb 2012). Steelhead trout and salmon spawning areas currently exist in Platte Bay, adding another dimension of cultural significance to the Platte River Point area. The abundance of resources, access to freshwater, and ease of mobility made Platte River Point an excellent site for seasonal camping and year-round habitation.

The Odawa people used Platte River Point from the pre-contact period into the 19th century. They had a series of large village sites, seasonal camps and gardens located near the Platte River delta at Lake Michigan, with archaeological evidence of these features documented by Weir (1986) and Richner (1991) who refer to the site as the Platte River Campground (20BZ16). Richner excavated the site in 1987 and identified 25,898 artifacts representing long-term occupation of the area from AD 130 into the 20th century, further noting that Platte River Campground is a multicomponent site with specialized activity areas, such as a fish cleaning station (1991: 45). Moving southeast, up the Platte River toward the current town of Honor, Michigan, a series of Native American archaeological sites including campsites, villages, and burial mounds are noted by Hinsdale (1931: Map 11) (Figure 6.11). The entire length of the Platte River from its delta through Honor, Michigan can be considered a continuous occupation area.

Many of the same aspects that made Platte River Point an attractive site for habitation among the Odawa communities were also appealing to Euro-American's, who were officially granted permission to settle the region in 1836 (McClurken 1991: 88). The old growth pine, maple, oak, and other hardwoods represented a small fortune for timber barons entering the region.



Figure 6.11 Map of Indian Archaeological Sites in Benzie County, Michigan (Hinsdale 1931: Map 11)

The logging industry quickly took over the Platte River, drastically altering the landscape, and in turn affecting the flow of the river with the arrival of the Guelph Patent Cask Company in 1895, the first timbering company in the area (Richner 1991; Yock 2011). The nearby town of Honor, Michigan experienced population growth so spectacular that the county seat was moved there in 1908. By 1915, the forests around the Platte River were littered with stumps and felled trees forcing the lumber company to move to Beulah (Richner 1991: 65). Although devastated by logging activity in the early 20th century, today the Platte River Point area presents a series of healthy, flourishing ecosystems and a variety of resources.

6.1.6 Site Recommendations

Odawa representatives provided recommendations for the use, management, and possible interpretation of the Platte River Point area (Figure 6.12). They determined Platte River Point to be in excellent condition, with a healthy river and wetland ecosystem, and undisturbed qualities necessary for the collection of medicinal plants. Plants required for other traditional practices were identified as growing in this area, and access to these resources is of great interest to Odawa people.



Figure 6.12 Odawa Representatives Giving Site Recommendations at Platte River Point 2014

These recommendations explain some of the reasons that access to Platte River Point is of importance to Odawa people. The direct responses from the Odawa representatives are presented here.

- *Odawa camps and village sites can be found up and down the shores of the Platte River, but nothing in the park tells our history on this land. It is of importance to the Odawa people that our story, our history be presented to visitors here* [SLBE]. *Maybe we could put up some interpretive signs by the campground, or by the other areas around the Platte.*

- *There are several areas* [in SLBE] *I've looked at and would love to have a* [ceremonial] *lodge here. I'm a Wabano person and I'd love to go over there and build a Wabenogan lodge for one of our spring or summer or fall ceremonies. I wouldn't want to do a winter one here, we've already got those grounds picked out. But I'd love to be able to come over to the park and do a Wabano ceremony.*

- *We try to get into areas* [to gather plants] *that don't have a lot of foot traffic. You don't want people to have been trampling around on it. Or places near parking lots where chemicals leak or spill. When you find these areas that are removed from foot traffic, auto traffic, it's much better harvesting*.

Platte River Point represents an area of significance for Odawa people based on the presence of natural and cultural resources, illustrating their extended occupation in the area. The convergence point of the Platte River and Lake Michigan adds ceremonial importance to the site. The presence of medicinal plants identified in the Platte River Point area contributes to the documentation of the extensive Odawa traditional ecological knowledge base applicable within SLBE.

6.2 Platte Plain Swales

The Platte Plain Swales are located seven miles south of Empire, Michigan. They are found about 0.84 miles southeast of Platte Bay, and less than a mile north of the Platte River (Figure 6.13). The Platte Plain Swales are visible on both sides of Peterson Road, ranging from 200 to 500 feet from the roadway on either side. Additionally, swales are found on the west side of the Platte River. The term swale describes a long, narrow, usually shallow trough between ridges or sandbars on a beach that run parallel to the shoreline. Platte Plain Swales represent a unique ecological and geological feature that provides a habitat for a diverse assortment of flora and fauna.

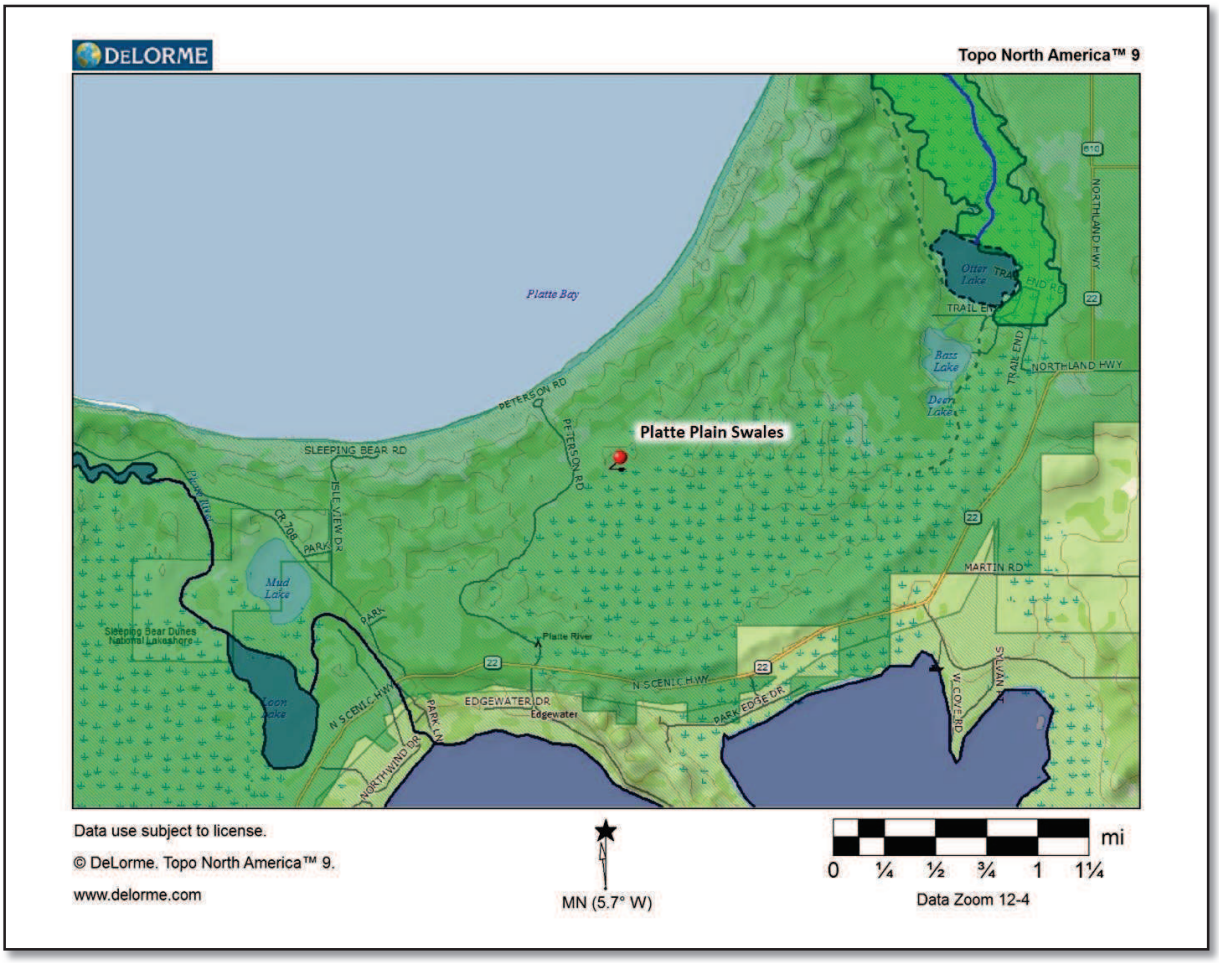


Figure 6.13 Map of Platte Plain Swales

The elevation of the swales gradually increases from 592 feet to 604 feet at the last of the parallel ridges. Odawa representatives visiting the swales noted the cultural significance of the area as a place to collect important medicinal plants, found in few other areas. The area has been used by Odawa communities since time immemorial, with camps located near the Platte River making use of trails leading to the swales. Plant resources at the swales include blueberries, huckleberries, oak trees, and medicinal plants like jewelweed and sweetflag. The water level of

the swales is dependent on rainfall and therefore, is highly susceptible to climate change and drought.

6.2.1 Geology

The geology of the Platte Bay shoreline and the formation of the nearby swales are a direct result of glacial recession that took place 12,000 years ago (Figure 6.14). Receding glaciers during the Ice Age helped create many of the dune and swale complex systems in Michigan, visible throughout SLBE. While swales closer to the shoreline become flooded as water from Lake Michigan rises, inland swales flood more often because of groundwater flowing down from hills and other drainage (The Nature Conservancy 2014: Southern Lake Michigan Rim, Dunes and Swales). Wind and weather also play integral roles in the formation of the dunes and swales.

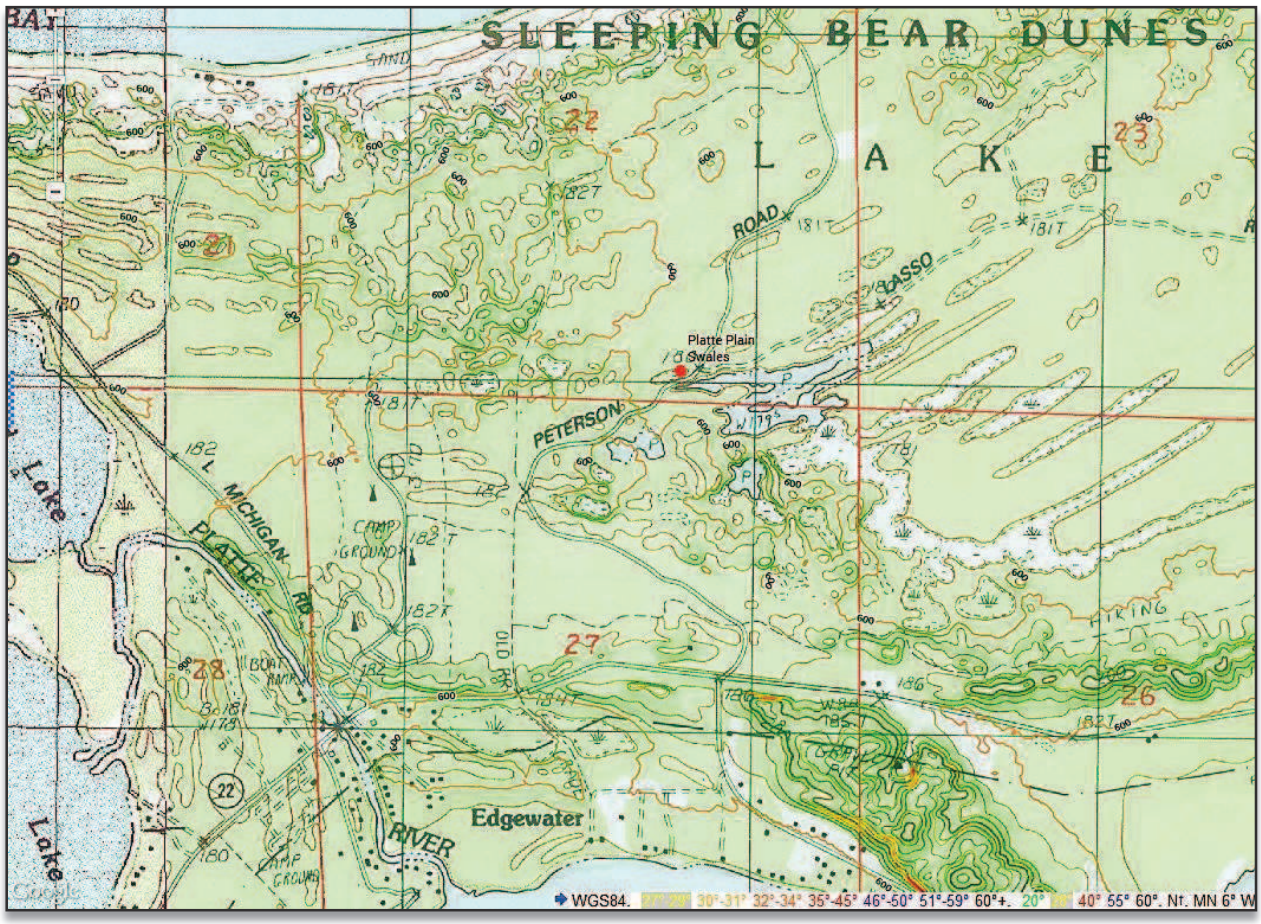


Figure 6.14 Topographic Map of the Platte Plain Swales

Swales are scars left by moving glaciers. An aerial view shows a series of arcs fanning out over two miles, generally following the contours of the existing shoreline (Figure 6.15). These swales exist all along the Platte Bay on either side of the Platte River. For the purposes of

this study, the area for the documentation of ethnobotanical resources was restricted to the swales located at the junction of Peterson Road and Lasso Road.

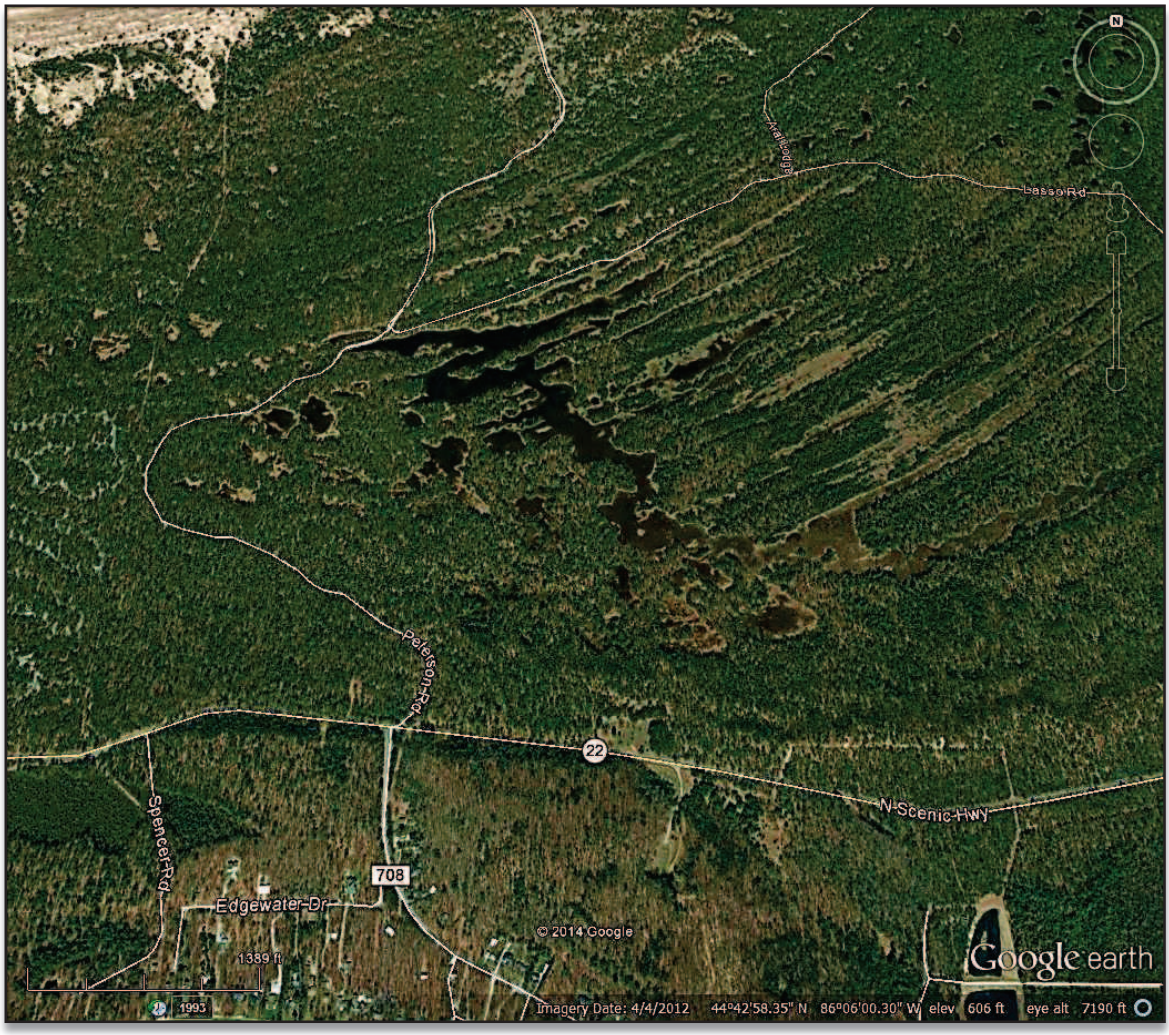


Figure 6.15 Aerial View of the Platte Plain Swales

The movement of large ice sheets shifted the earth in such a way that exposed bedrock was surrounded by dirt ridges, allowing for rainwater and snowmelt to collect. These small, narrow, lake-like water catchments are unique geologically, and as a result, a sophisticated ecology has developed.

6.2.2 Ecology

The Platte Plain Swales contain a unique assemblage of physiographic, soil, and vegetative components, and provide a high quality habitat for numerous shoreline animal species. The wooded dune and swale complex is considered a distinct natural community in Michigan (Michigan State University 2004: 1). SLBE encompasses a 2,600-acre wooded dune and swale complex near Platte Bay (Figure 6.16). The swales are dominated by open marsh, with

grasses, sedge, and ferns with the dune and swale wetlands sustaining at least one bald eagle nest, and supporting four plant species that are on the state and federal "threatened" lists (Voss 1997: Great Lakes Bulletin News Service).



Figure 6.16 Platte Plain Swales Facing Northeast

The dune and swale complexes contain several types of plant communities. These include Great Lakes marsh, emergent marsh, intermittent wetlands, northern wet meadow, southern wet meadow, northern fen, poor fen, interdunal wetland, rich conifer swamp, poor conifer swamp, bog, dry northern forest, and open dune (Michigan State University 2004: 5)

6.2.3 Special Features

Odawa representatives that the Platte Plain Swales should be visited as part of this study, due to the presence of culturally and ecologically unique features. The special features of the Platte Plain Swales include (1) a crooked tree and (2) a high concentration of medicinal plants. Together, these facilitate strong cultural connections to this place.

The crooked tree at the Platte Plain Swales is a visual indication of the place's importance. Traditionally, Odawa people migrated seasonally for resources and trade. Young trees were intentionally modified as a means of marking a place. Figure 6.17 provides a detailed view of the twisted trunk of the crooked tree at the Platte Plain Swales. This torsion does not occur naturally, but is deliberately instigated and maintained until it is a permanent characteristic of the tree.



Figure 6.17 Crooked Tree at Platte Plain Swales

Odawa representatives observed a fungus observed growing on the crooked tree that was used traditionally, and continues to be used contemporarily (Figure 6.18). The presence of this fungus added to the significance of the crooked tree as a cultural and natural resource.



Figure 6.18 Fungus Growing on Crooked Tree

There is a unique relationship between the geological formation of the place and ecology, particularly the plants that grow there, including a high concentration of medicinal plants (Figure 6.19). Odawa representatives shared with the UofA researches that the types of plants growing in an area can indicate the meaning of that place. Therefore, because there are an abundance of medicinal plants growing at the Platte Plain Swales, it is viewed as a sacred area.



Figure 6.19 Rare Medicinal Plants Identified at the Platte Plain Swales

The Platte Plain Swales have unique cultural and ecological features that contribute to the meaning and interpretation of the place. Rare and culturally significant plants grow in abundance at the swales. The crooked tree may serve as a place marker to signal available resources at the swales. Features observed at this place contribute to the cultural significance of the area, and documented knowledge of contemporary Odawa use plants.

6.2.4 Native American Comments

Odawa representatives visited the Platte Plain Swales for the purpose of identifying ethnobotanical resources and discussing the impact that climate change may potentially have on plants and trees present within the unique swales ecozone. The comments from these discussions are presented here.

Discussions with Odawa representatives regarding ethnobotany and site use at the Platte Plain Swales occurred only in 2014. No data or site visits to this particular area occurred in conjunction with the previous NPS sponsored study in 2001. Table 6.3 illustrates the types of discussions held with Odawa representatives that visited the Platte Plain Swales in 2014.

	2001 Landscape Forms	2001 Site Forms	2014 Site Form	2014 Plant List	2014 Informal Int.	2001 Totals	2014 Totals	Grand Total
Platte Plain Swales	0	0	3	4	0	0	7	7

Table 6.3 Discussions with Odawa Representatives who Visited Platte Plain Swales in 2014

Site forms and plant lists were utilized to collect information on contemporary ethnobotanical resources at the Platte Plain Swales. The combination of these methods enabled discussions on the land, plants, and special features that are key elements of this area for Odawa people.

Ethnobotany and Site Use

A variety of ethnobotanical resources were identified by Odawa representatives while visiting the area. In total, 33 contemporary use plants were documented. Each plant identified had documented medicinal uses. Comments from Odawa representatives present meaning and cultural connection to the place. Table 6.4 lists each plant identified in the area.

Sweet Flag	*Acorus calamus*
Bog Rosemary	*Andromeda glaucophylla*
Bearberry	*Arctostaphylos uva-ursi*
Moss	*Bryophyta*
Heather	*Calluna vulgaris*
Hummock Sedge	*Carex stricta*
Prince's Pine	*Chimaphila umbellata*
Sweet Fern	*Comptonia peregrina*
Yellow Nutsedge	*Cyperus esculentus*
Huckleberry	*Gaylussacia baccata*
Oxeye Daisy	*Heliopsis hellanthoides*
Jewelweed	*Impatiens sp.*
Wild Iris	*Iris sp.*
Labrador Tea	*Ledum groenlandicum*
Woodlily	*Lilium philadelphiam*
Wild Mint	*Mentha arvensis*
Forget-me-not	*Myosotis Sp.*
Interrupted Fern	*Osmunda claytoniana*
Red Top Panicgrass	*Panicum rigidulum*
Spruce	*Picea sp.*
Pine	*Pinus sp.*
Jack Pine	*Pinus banksiana*
Red Pine	*Pinus resinosa*
White Pine	*Pinus strombus*
Pondweed	*Potamogeton Sp.*
Brackenfern/Fiddlehead	*Pteridium*
Oak	*Quercus sp.*
Pin Oak	*Quercus palustris*
Hardstem Bulrush	*Schoenoplectus acutus*
Cattail	*Typha latifolia*
Blueberry	*Vaccinium angustifolium*
Mullein	*Verbascum thapsus*
Arrowwood	*Viburnum acerifolium*

Table 6.4 Plants Identified at Platte plain Swales by Odawa Representatives during the 2014 Study

The following comments were provided by Odawa representatives regarding the plants at Platte Plain Swales.

- *I have noticed that there are other swales just like this on the other side of the Platte River, right down through there on the west side. It kind of splits up an area of those. I had mentioned that the Platte River area was heavily used by our people before contact, so that whole area around there shows the evidence of our use going way back. So, you can imagine if people were down around the river using it for fish, game, travel, whatever, they would also need medicines so they would head into the swales to find more or better medicines back in there.*

- *You have all kinds of important plant life in there, plus you've got rainfall, you've got a system that brings in a lot more variety of animals, birds, but especially plant life because you have the aquatic plants there that are so important to us, like the jewelweed.*

6.2.5 Ethnographic Comments

For Odawa people, crooked trees once served a utilitarian purpose. These intentionally modified trees were used to indicate different messages. The meanings of specific torsion patterns have been lost, but the importance of the trees as markers has not been forgotten. Most crooked trees are now interpreted as the marker of a sacred or resource-rich area. However, a few famous crooked trees continue to signal a specific meaning. Stoffle et al. (2001: 73) states,

> Ojibways could recognize individual trees by their unique growth marks, shape, and association with other features. This is the reason for including shoreline trees

> as landscape features, because they were frequently used as landmarks. Such is the case, for example, of the *Arbre Croche*, French words meaning "crooked tree." Blackbird (1887: 10) tells that, when the Ottawa Indians first came to the northeast shore of Lake Michigan, a great pine with a very crooked top stood by the shore where the first village in Little Traverse Bay was built. The party called the tree *Waw-gaw-naw-ke-zee* or crooked top of the tree. The tree eventually became a shoreline landmark for Ottawa and Ojibway canoe parties and its name the name of a stretch of shore, from Middle Village to Cross Village. The "Witch Tree" at the Grand Portage Reservation is an old cedar and a centuries -old Ojibway shrine, where they left offerings to appease the storm spirits of Lake Superior (Danzinger 1979: 45). Trail- marker trees, such as that found at the head of a trail in Stockton Island (APIS), Wisconsin, were intentionally modified to acquire a specific angular shape. A sapling would be bent and tied to a stake buried in the ground; alternatively, the sapling would be broken. The tree would then grow with a horizontal angular bent in its trunk, the angle pointing in one direction or another (Ritzenthaler 1965: 183).

Because crooked trees were used to navigate seasonal migration trails, they were placed all throughout Odawa traditional lands (Figure 6.20). Many crooked trees were destroyed during the logging era. Today, crooked trees serve to reconnect Odawa people with significant places from their cultural past.



Figure 6.20 Trail Marker Tree along Modern Pathway, Pictured Rocks National Lakeshore Park (Ruuska et al. 2011)

The geology and ecology of the Platte Plain Swales is rare. The meaning of the place is derived from the unique landscape and plant resources. Medicinal plants are sacred to Odawa people, and therefore, the places that they grow abundantly, like the Platte Plain Swales, hold cultural value. This place is sacred to the Odawa representatives because of the rare ethnobotanical resources it supports.

6.2.6 Site Recommendations

The Platte Plain Swales represent a unique ecological feature within SLBE. Many species of plants and ethnobotanical resources found at few other locations grow within the shallow waters of the swales. After visiting the Platte Plain Swales, Odawa representatives provided recommendations and suggestions for the use and management of the area (Figure 6.21). These recommendations are presented below.

- *This is an important resource for future use; most folks don't even know they're there because there hidden from the road. A lot of our tribe isn't even familiar with them now.*

- *Prior to contact when the forests were huge and untouched there were lots of resources everywhere, but now inside the park is a good place to find resources and gather them, because there are no negative impacts like we see outside the park.*



Figure 6.21 Odawa Representative and UofA Researcher Discussing Site Recommendations

The Platte Plain Swales are physically and culturally unique, and therefore, are highly vulnerable to climate change. The resources at this place hold great significance to the Odawa representatives that visited the swales. One interpretation is that the crooked tree marked this as a place to collect medicinal plants. Because of its sacredness, Odawa representatives hope that this place can be protected within SLBE.

6.3 Otter Creek Mouth

Otter Creek Mouth is located five miles south of Empire, Michigan and five miles northeast of Platte River Point (Figure 6.22). Esch Road provides access to Otter Creek and a public beach along the shore of Lake Michigan, which extends several miles north. The mouth of Otter Creek converges with Lake Michigan within Platte Bay, in the southern quadrant of SLBE. Much like Platte River Point, Otter Creek Mouth contains ecological diversity pertinent to this study and offers a chance to observe several unique ecosystems. The spiritual power associated with the convergence of two sources of water and the nearby Empire Dune Bluffs presents a series of culturally significant landscape features for the Odawa people, contributing the importance that the ethnobotanical resources at Otter Creek Mouth hold.

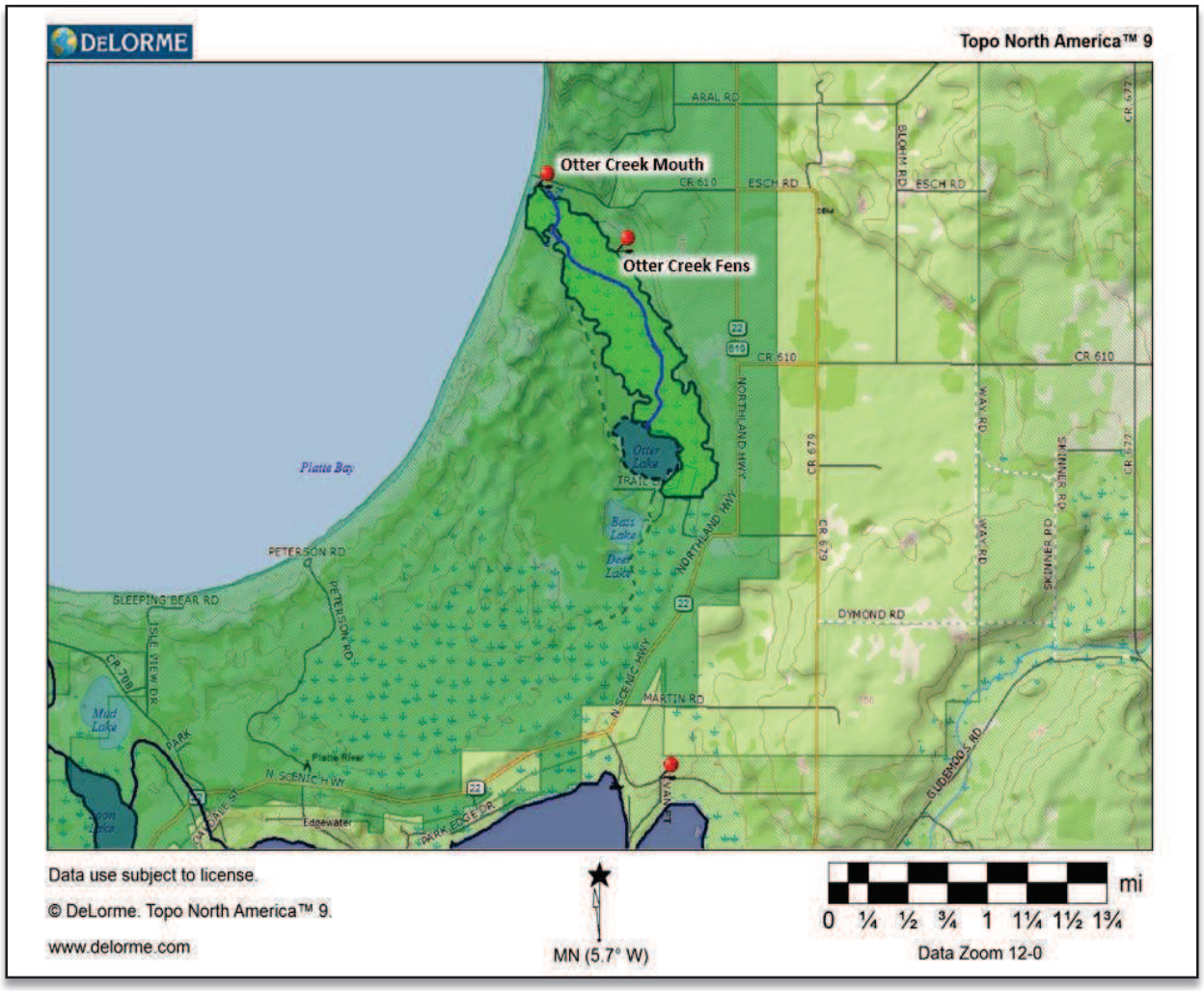


Figure 6.22 Map of Otter Creek

The Otter Creek Mouth ecosystem has a vast assortment of plant species, representing coastal forest, wetland, and dune ecosystems (Figure 6.23). Odawa representatives noted that 104 of those plants and trees were traditional and contemporary ethnobotanical resources. The

wetlands of Otter Creek Mouth offer insight into the effects of climate change, human impacts, and other factors that contribute to the health of ethnobotanical resources within the park.



Figure 6.23 Photograph of Otter Creek Mouth and Lake Michigan

The use of Otter Creek for logging activities in the early 20th century brought about the deforestation of the area, which has now been reseeded. The following sections address the ecology, geology, ethnohistory, and cultural landscape of Otter Creek Mouth. Comments and recommendations from Odawa consultants regarding the use and preservation of the area are also provided.

6.3.1 Geology

Otter Creek Mouth is a part of a 1.5 mile hydrological system fed by Otter Lake and a series of marl springs that flow northwest toward Lake Michigan (Keller Lynn 2010). It is located west of a lateral moraine, and was formed as the result of erosion caused by melting glacial ice sheets. Otter Creek converges with Lake Michigan at the Esch Road Beach where a delta deposit of silt and sand from Otter Creek has built up so that it constricts the stream, causing the channel to narrow as it empties into Platte Bay. Figure 6.24 presents a topographic map of the geological features in the Otter Creek mouth area, highlighting the close proximity of the creek and beach to the giant dune bluffs on the northeastern side of the creek.

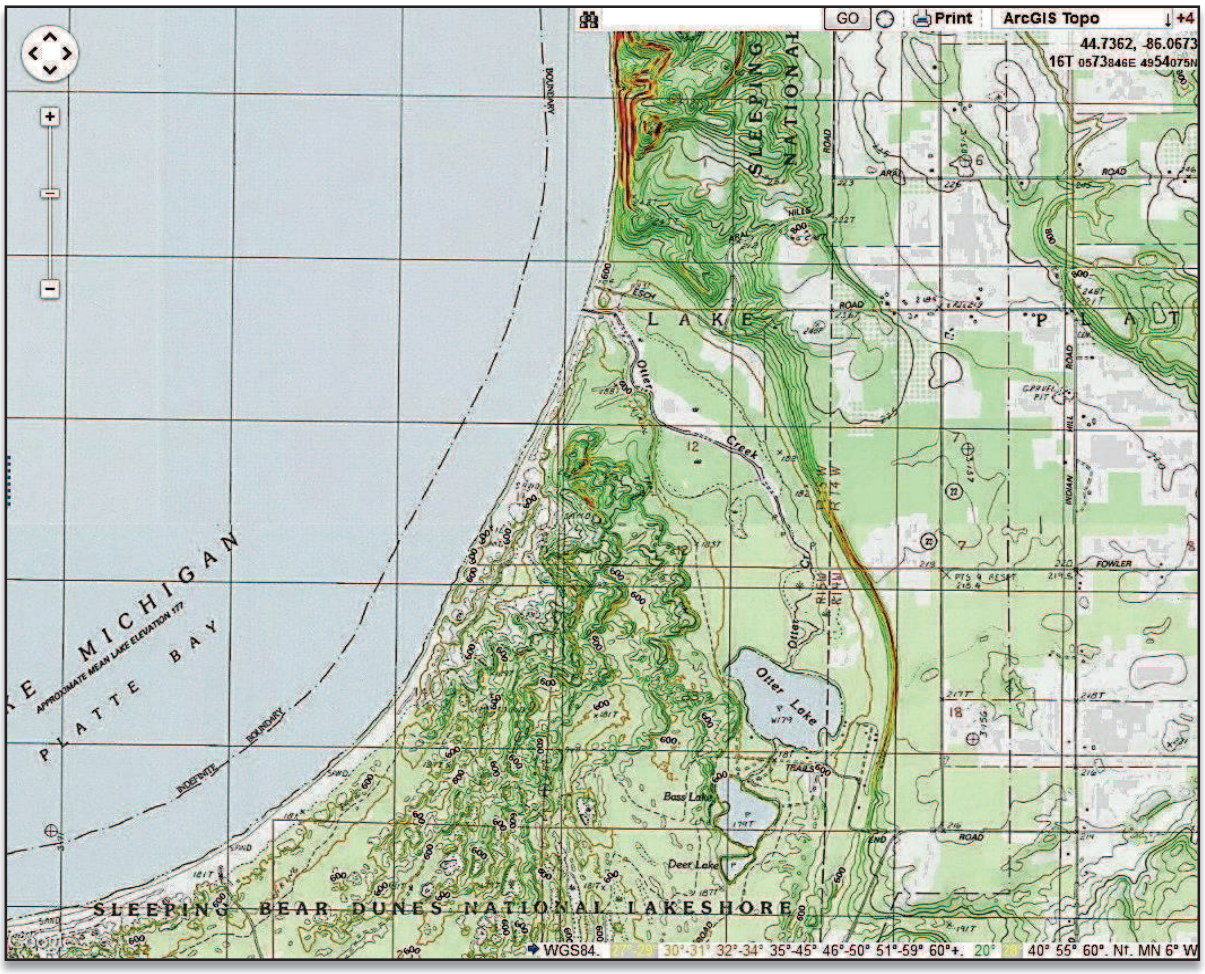


Figure 6.24 Topographic Overview of the Geology Surrounding the Otter Creek Hydrological System

The terrain near Otter Creek Mouth differs drastically from the surrounding area. Moving south from the sandy beach along the Lake Michigan shoreline, a steep incline marks the transition between sparsely vegetated coastal freshwater dunes to a hardwood and conifer forest area. Keller Lynn (2010) notes the transition from sandy soil into a dark rich earth where the cedar forest cuts off near the shore.

6.3.2 Ecology

The ecology of Otter Creek Mouth characterizes both coastal and northern hardwood forest ecosystems. Coastal forests, or pine forests, occur in dry, sandy soils around dune fields and sand ridges (GLIFWC 1993: 5). These forests are dominated by a pine-oak association, with red maple occurring rarely (Waterman 1926: 357). Pine and oak forests are very well developed in the Aral Dunes, with occasional cedar in the upper story in moist and dense stands (Hazlett 1991: 149).

Moving south from the sandy beach along the Lake Michigan shoreline, a steep incline marks the transition between sparsely vegetated coastal dunes, into a hardwood and conifer forest area. Moving south from the mouth of Otter Creek, red willow, sumac, and a variety of rushes densely populate the banks of the stream (Figure 6.25).



Figure 6.25 Otter Creek Plant Resources

Further south past the bridge over Otter Creek on Aral Road, a thick cedar forest begins on the east bank of the creek, providing another dramatic shift in plant species. Flanking Otter Creek on the west bank the terrain shifts to a steep bluff with a densely thicketed area of red willow and sumac extending from the creek to the base of the incline. Birch, maple, oak and other hardwoods comprise the majority of trees growing on the bluff overlooking Otter Creek. The understory growth consists of small thickets of shrubs, creeping juniper, chokecherry, witch hazel, several berries, and herbs (Zedeño et al. 2001: 87). During a late spring visit to the Otter Creek Mouth area, the understory was densely populated with trillium. Common juniper, sand cherry, red osier, buffalo berry, grape, and cottonwood are the established woody species on the Sleeping Bear Plateau forests (Hazlett 1991: 153).

6.3.3 Special Features

Otter Creek Mouth contains features that are important within Odawa epistemological and ontological perspectives, due to the significance of convergence points, like the convergence visible at Otter Creek Mouth and Lake Michigan. Places where two elements come together are

believed to be most powerful (Zedeño, Miller, and Hollenback 2011: 50). Different bodies of water hold different powers and have various purposes in healing and ceremony; Otter Creek Mouth marks the connection of three water sources being Otter Creek, Lake Michigan, and Marl Springs that flow into the creek from the southeast.

In addition to the convergence of waterways and ecosystems at Otter Creek Mouth, other special features include the viewscapes that contribute to the spiritual power of the area. Looking to the north from the shoreline provides a clear view of the Empire Dune Bluffs (Figure 6.26).

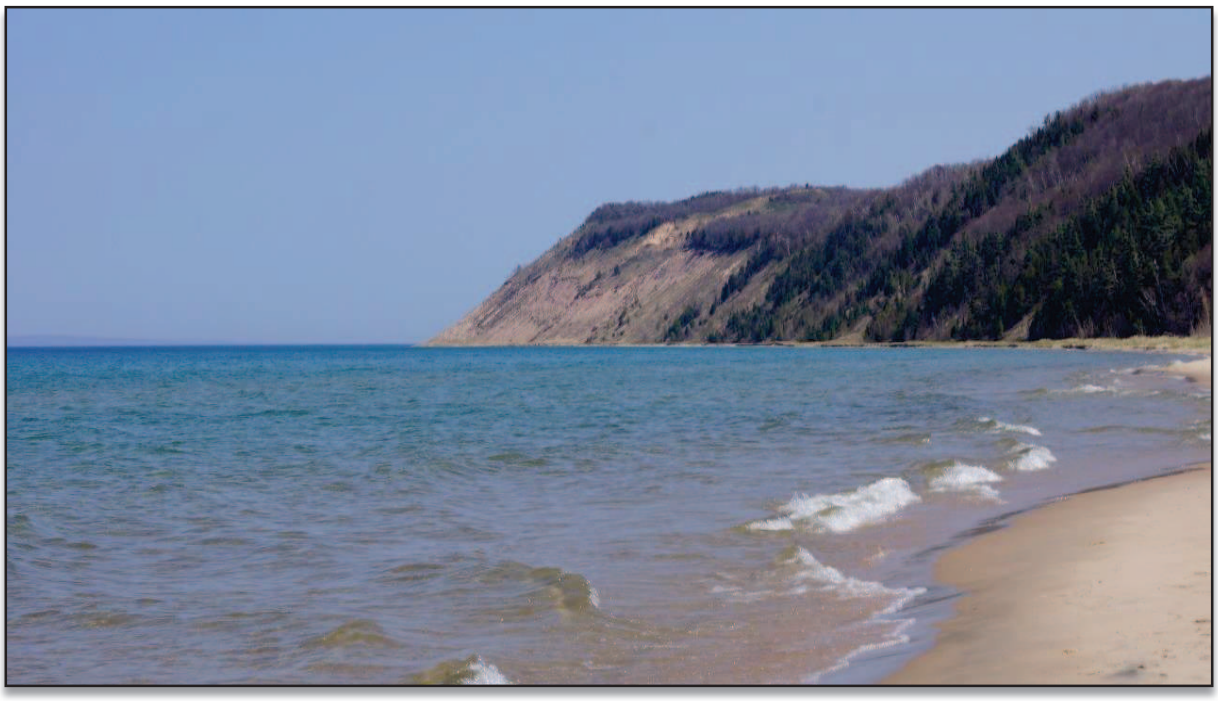


Figure 6.26 View of Empire Bluffs from Otter Creek Mouth

Otter Creek Mouth offers a unique diversity of ethnobotanical resources and ecosystems. The shore's sands converge with the rich dark soil of the cedar forest as the land follows the creek inland towards springs and swamps. Each of these four habitats contains a variety of plants. The plants are not only assorted, but Odawa people distinguish great differences between the same plants growing in different environments. The powers provided by the land and the water can alter the plant's use and potency, making Otter Creek a highly desirable location for gathering and ceremony.

6.3.4 Native American Comments

Comments from Odawa representatives help illustrate the uses and significance of this area. Additionally, these comments provide a better understanding of how climate change has impacted traditional use plants and other culturally significant resources. Discussions with Odawa representatives during the 2014 field season regarded the uses, meaning, significance,

and history of Otter Creek Mouth along with ethnobotanical resources present at the site. Table 6.4 illustrates the type of discussions held with Odawa representatives during the visit at Otter Creek Mouth. Ethnobotanical resources, cultural landscape features, and the extended use of Otter Creek Mouth by Odawa people has contributed to the importance of this site today. Several sites visited as part of the 2014 study were previously visited in 2001, but the Otter Creek Mouth was not included in earlier park visits.

	2001 Landscape Forms	2001 Site Forms	2014 Site Form	2014 Plant List	2014 Informal Int.	2001 Totals	2014 Totals	Grand Total
Otter Creek Mouth	0	0	7	8	0	0	15	15

Table 6.4 Discussions with Odawa Representatives that visited Otter Creek Mouth

Site forms and plant lists were used to gather information on ethnobotanical resources present in the area, and informal conversations were held at the Otter Creek Mouth area in 2014. The combination of these various methods for having discussions about the land, plants, and uses assisted the UofA research team in identifying key resources and areas that Odawa people wish to have access to.

Ethnobotany and Site Use

Odawa representatives identified 104 traditional and contemporary use plants growing at the mouth of Otter Creek. Table 6.5 presents a list of the Odawa identified ethnobotanical resources. The quantity and quality of ethnobotanical features at Otter Creek Mouth are important for Odawa people in the 21st century who are having a difficult time finding healthy plants for use in medicines and ceremonies, due to habitat loss, human disturbance and vehicle emissions. This sections outlines the significance that Otter Creek Mouth holds for Odawa people.

Balsam Fir Tree	*Abies balsamea*
Box Elder	*Acer negundo*
Striped Maple	*Acer pensylvanicum*
Red Maple	*Acer rubrum*
Silver Maple	*Acer saccharinum*
Sugar Maple	*Acer saccharum*
Mountain Maple	*Acer spicatum*
Wooly Yarrow	*Achillea fanutosa*
Yarrow	*Achillea millefolium*
Sweet Flag	*Acorus calamus*
Wild Leek	*Allium tricoccum*

Speckled Alder	*Alnus rugosa*
Tag Alder	*Alnus serrulata*
Beachgrass	*Ammophila*
Big Bluestem	*Andropogon gerardii*
Burdock	*Arctium L*
Alpine Bearberry	*Arctostaphylos alpina*
Bearberry	*Arctostaphylos uva-ursi*
Common Milkweed	*Ascelpias syriaca*
Yellow Birch	*Betula alleghaniensis*
Black Birch	*Betula nigra*
White/Paper Birch	*Betula papyrifera*

Low Birch	*Betula pumila*
Buffalo Grass	*Bouteloua dactyloides*
Smooth Brome	*Bromus inermis*
Moss	*Bryophyta*
Marsh Marigold	*Caltha palustris*
Pennsylvania Sedge	*Carex prensylvanica*
Pitcher's Thistle	*Cirsium pitcheri*
Goldthread	*Coptis aspleniifolia*
Gray Dogwood	*Cornus racemosa*
Red Osier Dogwood	*Cornus sericea*
Queen Anne's Lace	*Daucus carota*
Purple Coneflower	*Echinacea purpurea*
Spikerush Sedge	*Eleocharis palustris*
Field Horsetail	*Equisetum arvense*
Scouring Rush	*Equisetum hymale*
Boneset	*Eupatorium perfoliatum*
Joe Rye Weed	*Eupatorium purpureum*
Beech	*Fagus grandifolia*
Woodland Strawberry	*Fragaria vesca*
Wild Strawberry	*Fragaria virginiana*
Reeds	*Fragmites sp.*
Black Ash	*Fraxinus nigra*
Wintergreen	*Gaultheria procumbens*
Cow Parsnip	*Heracleum lanatum*
Sweetgrass	*Hierochloe odorata*
Cedar	*Juniperus sp.*
Shrub Juniper	*Juniperus communis*
Red Cedar	*Juniperus virginiana*
Tamarack	*Larix laricina*
Beah Pea	*Lathyrus japonicas*
Woodlily	*Lilium philadelphiam*
Honeysuckle	*Lonicera Sp.*
Punk	*Melaleuca quinquenervia*
White Sweet Clover	*Melilotus alba*
Wild Mint	*Mentha arvensis*
Morel Mushroom	*Morchella esculenta*
White Waterlily	*Nymphaea odorata*
Ironwood	*Ostrya virginiana*
Switchgrass	*Panicum virgatum*
Spruce	*Picea sp.*
White Spruce	*Picea glauca*

Pine	*Pinus sp.*
Jack Pine	*Pinus banksiana*
Red Pine	*Pinus resinosa*
White Pine	*Pinus strombus*
Poplar	*Populus sp.*
Balsam Poplar	*Populus balsamifera*
Balm of Gilead	*Populus gileadensis*
Large Tooth Aspen	*Populus grandidentata*
Quaking Aspen	*Populus tremuloides*
Sand Cherry	*Prunus pumila*
Black Cherry	*Prunus serotina*
Brackenfern/Fiddlehead	*Pteridium*
White Oak	*Quercus alba*
Burr Oak	*Quercus macrocarpa*
Black Oak	*Quercus velutina*
Red Oak	*Quercus rubra*
Sumac	*Rhus sp.*
Prickly Wild Rose	*Rosa acicularis*
Wild Rose	*Rose virginiana*
Red Raspberry	*Rubus idaeus*
Blackberry	*Rubus pennsylvanicus*
Willow	*Salix sp.*
Red Willow	*Salix laevigata*
Sandbar Willow	*Salix interior*
Bloodroot	*Sanguinaria canadensis*
Little Bluestem	*Schizachyrium scoparium*
Bulrush	*Scirpus americanus*
Goldenrod	*Solidago Sp.*
Dandelion	*Taraxacum officinate*
Ground Hemlock	*Taxus canadensis*
White Cedar	*Thuja occidentalis*
Basswood	*Tililia americana*
Poison Ivy	*Toxicodendron radicans*
Wake-Robin	*Trillium grandiflorum*
American Elm	*Ulmus americana*
Blueberry	*Vaccinium angustifolium*
Mullein	*Verbascum thapsus*
Highbush Cranberry	*Viburnum opulus*
Violet	*Viola sp.*
Wild Grape	*Vitis labrusca*
Common Prickly-Ash	*Zanthoxylum americanum*

Table 6.5 Plants Identified by Odawa Representatives at Otter Creek Mouth During the 2014 Study

Odawa people have made use of the area around Otter Creek Mouth for camping, hunting, fishing, gardening, harvesting, and holding ceremonies since time immemorial. When asked about the historic and prehistoric use of Otter Creek Mouth, Odawa representatives provided many details. Their comments on the ethnobotanical resources and use of the site are presented here.

- *We think that there would be a fasting site on that hill over their* [gestures toward Empire Bluffs]. *The higher the spot, the more powerful, especially near the water.*

- *Those big hills, those big dunes that's what is significant to me. I'm sure they were land markers when they* [Odawa people] *were coming back in the spring.*

- *There are so many medicines that I see driving, but won't pick along the road because of all the pollution, you have to go in* [the woods] *back as far as you can get to pick things, because I try to gather them clean. It almost has to be state land or federal land to gather on, you know?*

Climate Change

Climate change was a main point in many conversations with tribal representatives during the assessment of the availability of Odawa traditional and contemporary use plants within SLBE. Figure 6.27 illustrates Odawa representatives and UofA researchers holding discussions about climate change at Otter Creek. Some of the comments presented by Odawa representatives at the mouth of Otter Creek are included here.

- *There is drought. We have had some drought years were the plants weren't there, some of the medicines, there wasn't any, they weren't out, you know, they went dormant. The weather is really crucial to what we do, picking medicine.*

- *We used to be able to tell the natural weather signs, you know like predict the weather, like the winter, if there's a lot of acorns it's going to be a hard winter, if there's a lot of berries be a long winter, and some years it is, some years it isn't but it never used to be that way, it was pretty much a given.*

- *It's getting harder and harder to find plants, and some plant we can only pick right when we need them, you can't pick them ahead of time and if they aren't there right when we need them, then that's really a crisis.*

6.3.5 Ethnographic Comments

The resources around Otter Creek Mouth give light to previous uses of this site (Figure 6.27). One Odawa representative described this area as a launching point for a massive trade route that extended beyond the shores of Sleeping Bear Dunes to Montreal, Saskatchewan, and

Manitoba, where trades between the Odawa, Ojibwe, and Cree would take place. Otter Creek Mouth contains the ethnobotanical resources necessary for constructing traditional canoes, including birch, cedar, spruce, and tar. Other resources include an abundance of medicinal plants and food sources, such as berries, fish, and small mammals. The site would have been used for fasting and ceremony. Otter Creek Mouth offered resources to endure the winter and collect fur until the spring hit and the canoes set off for various trade routes.



Figure 6.27 Odawa Representatives and UofA Researchers Discussing Old Dock at Otter Creek Mouth

This area also has a vast history of settlers working with the Odawa people. From 1880 to 1911, the area surrounding Otter Creek Mouth was the thriving town of Aral (Figure 6.28). Aral contained the Robert Bancroft Farm, two stores, a bakery, a fish market, several boarding houses, and a steam-powered sawmill. Another group of boarding houses and cabins called Frenchtown were located across from Otter Creek. Among the laborers in Aral, approximately fifty Odawa people and their families occupied the town from a nearby reservation (Beck 1987: MS).

The sawmill was a two story wood construction consisting of boilers and the steam engine on the first floor and the saw on the second floor. Timber was rolled into Otter Creek where sand and mud was washed off, then floated to the mill pond where a conveyor belt, powered by the steam engine, lifted the logs to the second floor. An eight-foot-tall elevated roadway, called a timber tramway, carried the limber from the sawmill to the dock, where it was loaded onto ships and carried off to various cities located along Lake Michigan. Right in front of

the sawmill Otter Creek was dammed to create a mill pond (W. Anderson 1890 NPS Sleeping Bear Dunes, History and Culture).

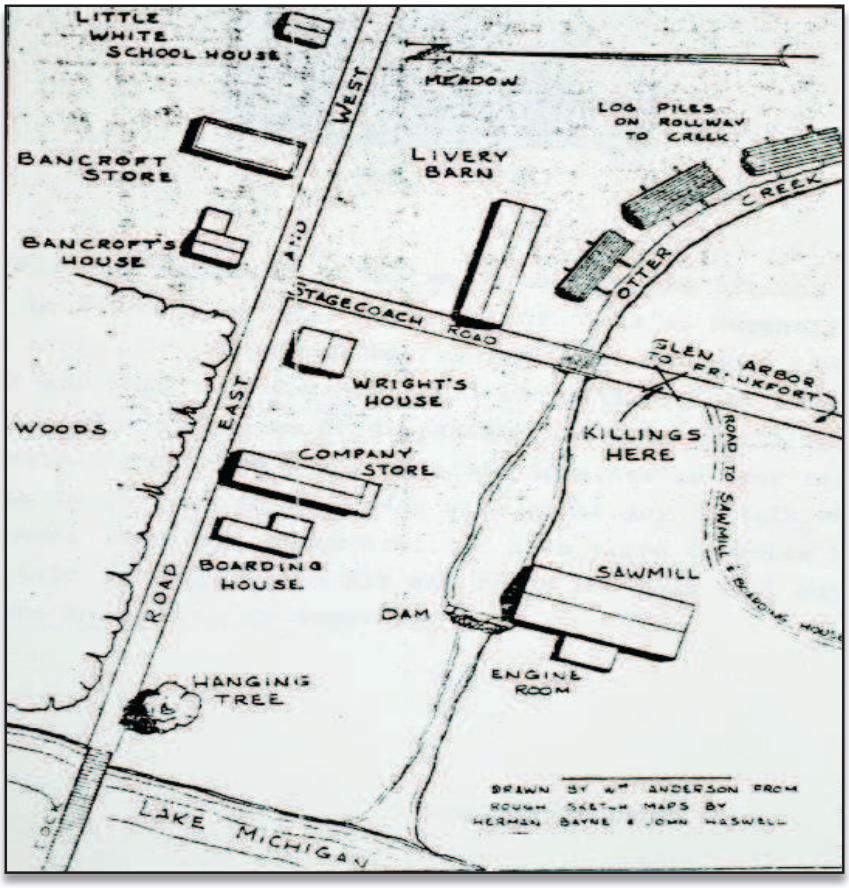


Figure 6.28 Map of Aral and Otter Creek as it was in 1890 (W. Anderson, NPS Sleeping Bear Dunes, History and Culture, Aral).

By 1911, the forest was depleted and the sawmill was forced to shut (Sleeping Bear Dunes National Lakeshore 2014: Aral). The forest took back the land and flourishes today, leaving little to no trace of the historic logging town (Sleeping Bear Dunes National Lakeshore 2014: Aral).

6.3.6 Site Recommendations

While visiting the mouth of Otter Creek and the surrounding area, Odawa representatives identified numerous ethnobotanical resources and cultural landscape features. Otter Creek Mouth is of value to Odawa people for contemporary use due to the location of the nearby giant sand dune bluffs, proximity to water for ceremonial purposes, and the vast array of ethnobotanical resources. Odawa representatives talked with the UofA research team about the future use and gathering activity of plants at Otter Creek Mouth (Figure 6.29). Odawa recommendations for the use, management and preservation of these resources are presented here.

- *This would be a good place to come and pick medicine.*

- *Most of the time it is hard to find the medicines, the plants, that we need, you know? So, I'm always looking wherever I go to see what's growing there. To have a new place to come, a big area like this would be great.*

- *There's lots of White Oak here. We like to use the bark, it's really a good one, but because there is none up north, we have to buy it from a health food place. We would like to gather that here for sure, that would be awesome.*

- *Water is really significant for ceremony, it's really important to have access to water, and we don't really have access to water. We tried do a ceremony in another park and they have all kinds of rules, we couldn't have a fire, couldn't do this, you know it was really restricted, and we just needed to be by the water. We kind of had to sneak around which isn't good, you want to be free to pursue your religious beliefs. And then we had a bunch of hikers, and campers coming up on us which isn't good, but if you could have a park, like if we wanted to do fasting up on those hills, we could restrict it to just us when we were up there. They wouldn't let us close the area off, but that was a few years ago.*



Figure 6.29 Odawa Representative and UofA Researchers Discussing Site Recommendations

Otter Creek Mouth offers easy access to an assortment of cultural and natural resources. The Odawa representatives that visited this location noted their desire to make future use of the beach and creek for ceremonial activities.

6.4 Otter Creek Fens

The Otter Creek Fens are located within the boundaries of SLBE, about 0.8 miles southeast from the mouth of Otter Creek and 3.46 miles south from Empire, Michigan (Figure 6.30). The Otter Creek Fens, or groundwater springs, are accessible from Esch Road via the Marl Springs Trail in Benzie County. The fens are part of cedar swamp forest, as is most of Otter Creek. The Otter Creek vegetation is among the most diverse in the park (Hazlett 1988). This area was selected due to the diversity of plants in swamp forests, and the cultural significance of springs. Inland lakes and spring-fed waterholes are known as the abodes of good and evil *manitous* or spirits (Kane 1986 [1897]).

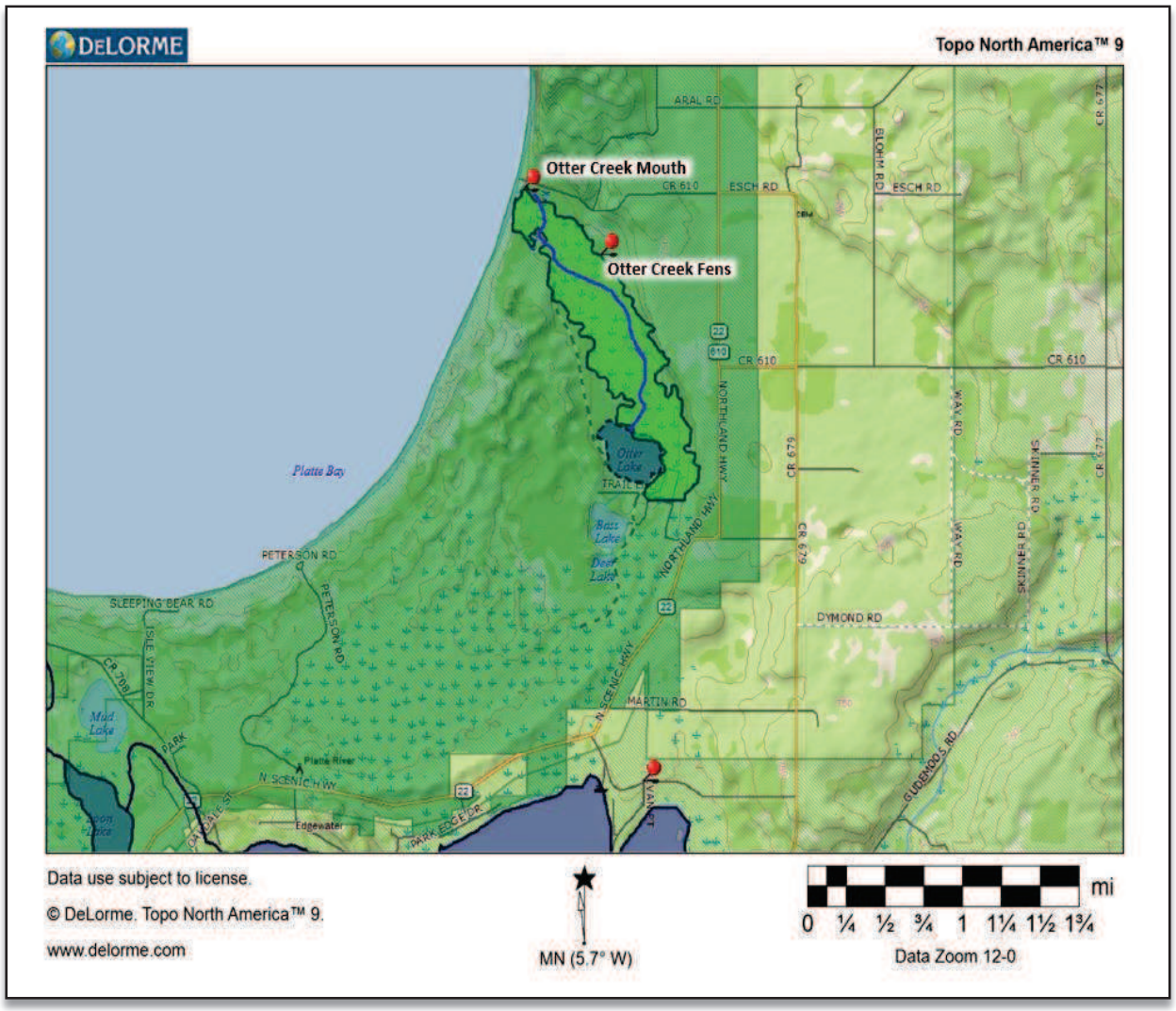


Figure 6.30 Map of Otter Creek Fens

This site provides significant information that is necessary in the assessment of the health and availability of ethnobotanical resources within SLBE, regarding the effects of changing climate. Aspects of the ecology, geology, and the cultural landscape of Otter Creek Fens are addressed in the following

sections, with comments and recommendations for the continued use and preservation of the site presented by Odawa representatives.

6.4.1 Geology

The Otter Creek Fens, as well as the surrounding marl springs, moraines, and drumlins, are geologically unique. Figure 6.31 illustrates the diverse topography of the region surrounding the Otter Creek Fens, highlighting the curvature of the moraines and hilly terrain. The hydrology of Otter Creek, Otter Creek Lake, and the fens are the result of glacial activity in the area that took place thousands of years ago.

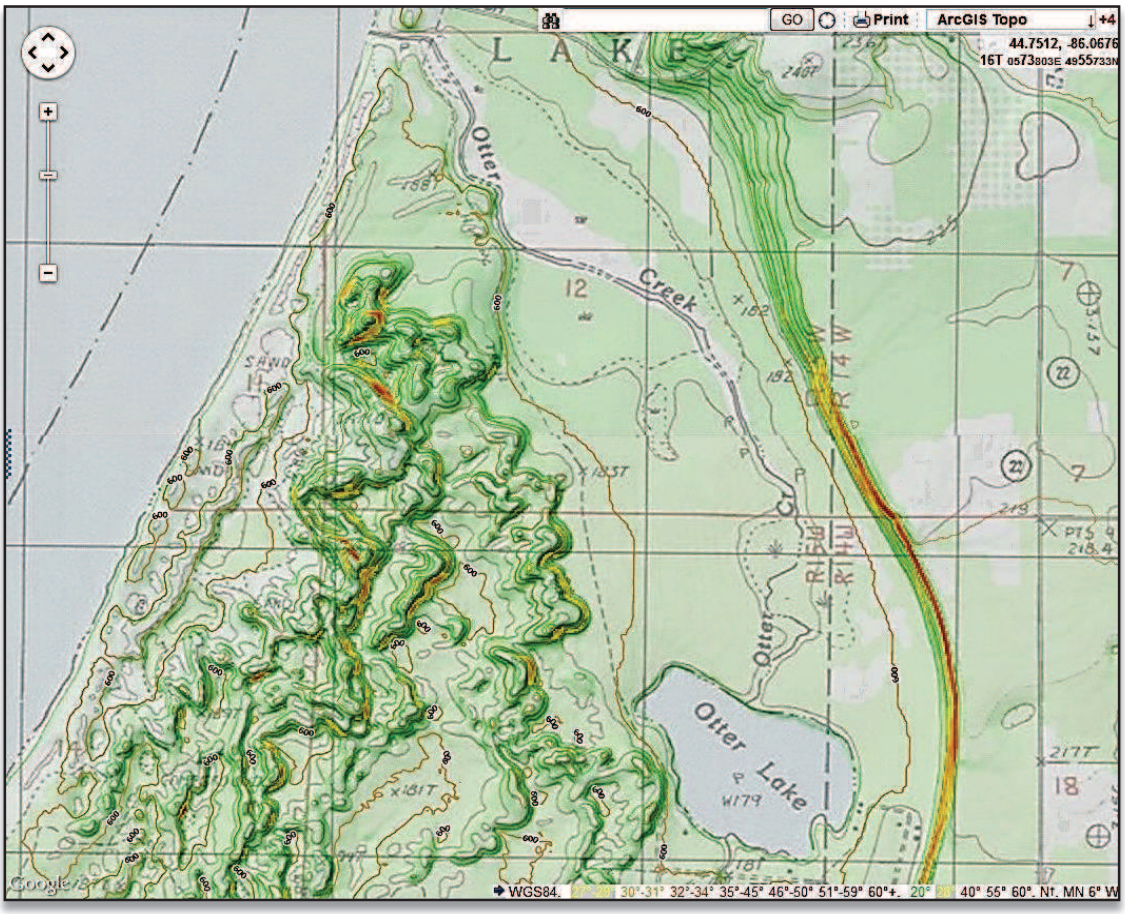


Figure 6.31 Topographic Map of the Otter Creek Fens Area

The fens at Otter Creek are part of the Manistee Moraine system in SLBE. The SLBE NPS explains the geology (SLBE N.D: Park Geology):

> The land-sculpting effect of continental glaciation in northwest Michigan is clearly illustrated in the geologic features of the Sleeping Bear Dunes region (National Park Service 1961; Drexler 1974). The evidence indicates that Wisconsin ice lasted from approximately 50,000 to 10,000 years before present,

with the ice having disappeared from the Sleeping Bear region about 11,800 years ago. During and following glacial retreat, the water levels of the Great Lakes fluctuated as they sought the lowest outlets, with the final adjustment as we know them today taking place about 3,000 years ago (Drexler 1974).

Immense headlands, characteristic of the Lake Michigan shoreline in the vicinity of Sleeping Bear Dunes, for the most part, resisted the force of the advancing ice and steered the ice lobes into the valleys. The ice lobes gouged debris from the valley floors and deposited it along the sides of the valleys when the ice finally melted, creating prominent moraines. Generally, these moraines and the valleys between them are oriented in a north-south direction (National Park Service 1961).

Figure 6.32 provides an illustration of the types of geology and land forms that are left behind as part of the retreating glacier process, including morraines, drumlins, and kettle lakes. The bedrock beneath the terminal moraine deposits at Otter Creek consist of layered sedimentary units, primarily sandstone, shale, and limestone (Handy and Stark 1984).

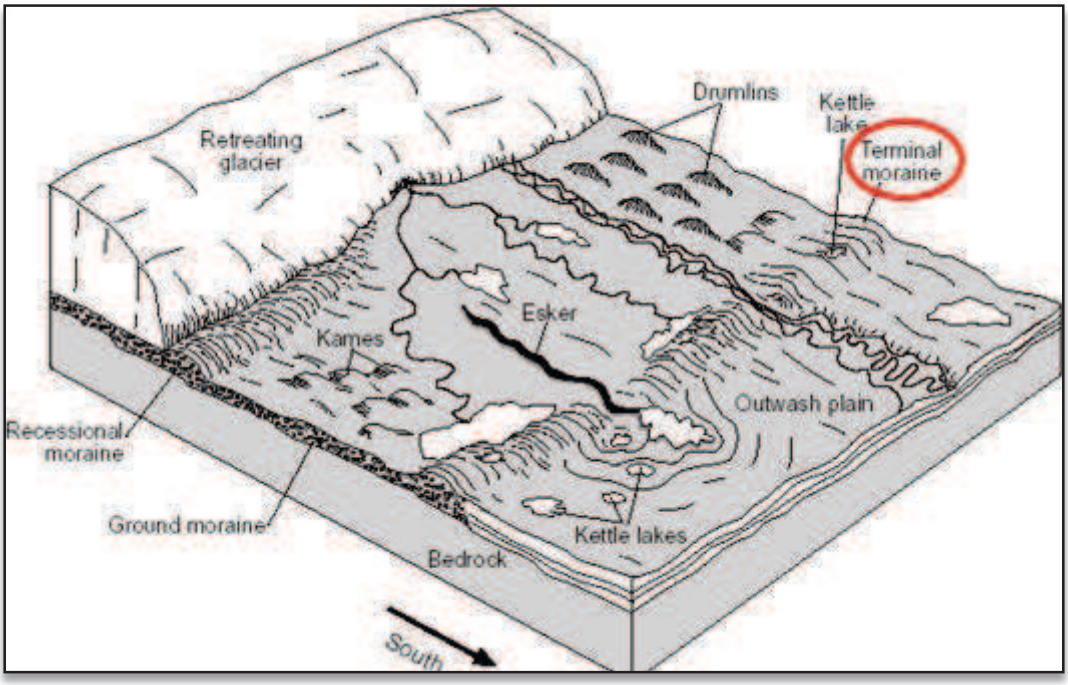


Figure 6.32 Diagram of Moraine Formation (Education Solution 2002: Continental Glacier)

The orientation of the moraines slopes from north to south. This geological structuring allows water to seep down to the bedrock, move south along the slope, and remerge near the Lake Michigan shore at the Otter Creek Fens. The geology of the Otter Creek Fens is highly demonstrative of previous glacial activity, from the marl clay and springs, to the formation of nearby moraines.

6.4.2 Ecology

The geologic formation of the fens at Otter Creek has influenced the ecological productivity and biodiversity of the area. Ecologically, this area is rich in water, nutrient dense soil, minerals, animals, and plants. Figure 6.33 illustrates the swamp forest that surrounds the fens, highlighting the lichens and decomposing fallen trees that contribute to the nutrient rich soil. Fens are defined by the United States Environmental Protection Agency (EPA) as:

> Peat-forming wetlands that receive nutrients from sources other than precipitation: usually from upslope sources through drainage from surrounding mineral soils and from groundwater movement. Fens differ from bogs because they are less acidic and have higher nutrient levels. They are therefore able to support a much more diverse plant and animal community. These systems are often covered by grasses, sedges, rushes, and wildflowers.

The overall ecology and specific ethnobotanical resources present at this site are significant to this study, because they are rare or sacred and highly dependent on the balance of the clay and soil pH within the fens. Marl clay is a unique substance and an important resource at the site. This particular sediment formed many millennia ago when chara, an aquatic plant, extracted calcium carbonate from melting glaciers, over time the dead plants sank to the bottom of the lake forming the marl clay (Meggit 2014).



Figure 6.33 Photograph of Otter Creek Fens

6.4.3 Special Features

Marl springs are a special feature present at the Otter Creek Fens. Odawa representatives also explained to UofA researchers the cultural significance of the marl clay, which is used as medicine and for ceremonial purposes (Figure 6.34). Several rare plants, like Marsh Marigold, grow around its banks.



Figure 6.34 Odawa Representatives Explaining the Importance of Springs to UofA Researchers

As a result of the geological formation of this area, the water emerging from this spring is calcareous and cold. The fens also serve as a place for fish to find shelter when the weather is hot. One tribal representative described the migration of fish into the fens:

- *One thing we've found here, we've done a lot of work checking on the brook trout, and with all the, since the logging and stuff, that stream doesn't really have tons of woody debris in it, and a lot of much overhang as far as dead trees and overhang, so there's not a lot of places in it for brook trout to hide, and it gets pretty hot in the summer time, the water, but these fens are putting out cold water constantly, so that's what helps the brook trout stay alive, because of the temperature. And we also found out that actually, the brook trout will be, the baby ones will be up there and growing and living in the summer time when it's so hot that maybe they'd die, they're right up by some of those fens, and using that cold water to stay alive.*

The area is not only unique ecologically, but is also considered to be sacred by the tribes who participated in this study. Odawa representatives were in awe of the spring and the Otter Creek Fens, which were viewed as extremely sacred.

6.4.4 Native American Comments

The Odawa have utilized the resources of the Otter Creek Fens for thousands of years. This ecosystem has been culturally significant since before Euro-American contact into the present time. UofA researchers worked with Odawa representatives to document the meaning of the Otter Creek Fens. Additionally, Odawa representatives and UofA researchers worked to identify traditional and contemporary ethnobotanical resources present at the site. The Odawa comments included in this report explain the significance of the area and assist in providing a better understanding of the impact that climate change is having on traditional use plants and other culturally significant resources.

The Otter Creek Fens were not visited in the previous 2001 study. In the recent 2014 study, Odawa representatives visited this site, discussing ethnobotany and climate change with UofA researchers. Table 6.7 illustrates the types of discussions held with Odawa representatives that visited Otter Creek Fens.

	2001 Landscape Forms	2001 Site Forms	2014 Site Form	2014 Plant List	2014 Informal Int.	2001 Totals	2014 Totals	Grand Total
Otter Creek Fens	0	0	5	5	0	0	10	10

Table 6.7 Discussions with Odawa Representatives that Visited the Otter Creek Fens in 2001 and 2014

The types of questions associated with the 2014 site form were designed to gather information on the ecology, geology, and special features of each site that Odawa representatives visited within the park. In contrast, the plant list provided the names and categories of use for 210 plant species that grow in the park. Odawa representatives pointed out the ethnobotanical resources present at each site, while UofA researchers noted the plants and their uses on the list.

Ethnobotany and Site Use

During the 2014 study, Odawa representatives identified 98 traditional use plants at the Otter Creek Fens. Table 6.8 provides a detailed listing of the ethnobotanical resources that the Odawa representatives identified at the site.

Striped Maple	*Acer pensylvanicum*
Red Maple	*Acer rubrum*
Silver Maple	*Acer saccharinum*
Sugar Maple	*Acer saccharum*
Mountain Maple	*Acer spicatum*
Yarrow	*Achillea millefolium*
White Baneberry	*Actaea alba*
Red Baneberry	*Actaea rubra*
Wild Leek	*Allium tricoccum*
Speckled Alder	*Alnus rugosa*
Angelica	*Angelica L.*
Common Burdock	*Arctium minus*
Alpine Bearberry	*Arctostaphylos alpina*
Bearberry	*Arctostaphylos uva-ursi*
Jack in the Pulpit	*Arisaema triphyllum*
Common Milkweed	*Ascelpias syriaca*
Yellow Birch	*Betula alleghaniensis*
Black Birch	*Betula nigra*
White/Paper Birch	*Betula papyrifera*
Low Birch	*Betula pumila*
Moss	*Bryophyta*
Marsh Marigold	*Caltha palustris*
Giant Puffball	*Calvatia craniformis*
Shepards Purse	*Capsella bursa-pastoris*
Pennsylvania Sedge	*Carex prensylvanica*
Atlantic White Cedar	*Chamaecyparis thyoides*
Common Thistle	*Cirsium vulgare*
Reindeer lichen/moss	*Cladonia rangifernia*
Goldthread	*Coptis aspleniifolia*
Red Osier Dogwood	*Cornus sericea*
Spikerush Sedge	*Eleocharis palustris*
Field Horsetail	*Equisetum arvense*
Scouring Rush	*Equisetum hymale*
Beech	*Fagus grandifolia*
Beefsteak Mushroom	*Fistulina hepatica*
Wild Strawberry	*Fragaria virginiana*
Reeds	*Fragmites sp.*
White Ash	*Fraxinus americana*
Black Ash	*Fraxinus nigra*
Red/Green Ash	*Fraxinus pennsylvanica*
Huckleberry	*Gaylussacia baccata*

Cow Parsnip	*Heracleum lanatum*
Sweetgrass	*Hierochloe odorata*
Jewelweed	*Impatiens sp.*
Cedar	*Juniperus sp.*
Shrub Juniper	*Juniperus communis*
Red Cedar	*Juniperus virginiana*
Chicken of the Forest/Woods	*Laetiporus sulphureus*
Tamarack	*Larix laricina*
Ground Cedar	*Lycopodium complanatum*
White Sweet Clover	*Melilotus alba*
Wild Mint	*Mentha arvensis*
Partridge Berry	*Mitchella repens*
Black Morel	*Morchella angusticeps*
Morel Mushroom	*Morchella esculenta*
Gray Morel	*Morchella esculentoides*
White Morel	*Morchella rufobrunnea*
Watercress	*Nasturtium officinale*
Tobacco	*Nicotiana sp.*
White Waterlily	*Nymphaea odorata*
Sweet Cicley	*Osmorhiza claytonii*
Ironwood	*Ostrya virginiana*
Spruce	*Picea sp.*
White Spruce	*Picea glauca*
Black Spruce	*Picea mariana*
Jack Pine	*Pinus banksiana*
Red Pine	*Pinus resinosa*
White Pine	*Pinus strombus*
Solomon's Seal	*Polygonatum sp.*
Balsam Poplar	*Populus balsamifera*
Fire Cherry	*Prunus pensylvanica*
Black Cherry	*Prunus serotina*
Chokecherry	*Prunus virginiana*
Brackenfern/Fiddlehead	*Pteridium*
White Oak	*Quercus alba*
Burr Oak	*Quercus macrocarpa*
Black Oak	*Quercus velutina*
Buttercup	*Ranunculus acris*
Sumac	*Rhus sp.*
Wild Rose	*Rose virginiana*
Red Raspberry	*Rubus idaeus*
Blackberry	*Rubus pennsylvanicus*

Ground Raspberry	*Rubus pubescens*	Cattail	*Typha latifolia*
Pussy Willow	*Salix discolor*	Stinging Nettle	*Urtica dioica*
Bulrush	*Scirpus americanus*	Blueberry	*Vaccinium angustifolium*
Dandelion	*Taraxacum officinate*	Mullein	*Verbascum thapsus*
Basswood	*Tililia americana*	Blue Vervain	*Verbena hastata*
Poison Ivy	*Toxicodendron radicans*	Violet	*Viola sp.*
Wild/Native Clover	*Trifolium*	Wild Grape	*Vitis labrusca*
Wake-Robin	*Trillium grandiflorum*	River Bank Grape	*Vitis riparia*

Table 6.8 Plants Identified by Odawa Representatives at the Otter Creek Fens during the 2014 Study

Odawa representatives that visited the Otter Creek Fens made several comments about the sacredness of this place, how it can be used, and what makes this place culturally significant. Comments regarding the uses of plants and the site as a ceremonial area are presented here (Figure 6.35).

- *This would be considered a sacred spot, because of those bubbling springs.*

- *Springs are very sacred sites for us, yeah we use them for everyday things like drinking water but we also use them to make our medicines, because of the strong healing natural energy coming up from mother earth. Any place we have natural springs, those are really sacred spots for us. We may not be able to drink the water, but it's still a sacred place for fasting.*

- *Any of the plants that you use from that area would be considered more powerful because this is a place that's regarded as sacred or special.*

- *The cedar's probably protecting, because cedar is a woman's medicine. So see, when we learn from nature we see women as caretakers of the water, so it doesn't surprise me that this special spot is surrounded by cedar.*

- *You see a lot of Spike Rush in swamps. When it grows in these fens, these are kind of unique, have their own unique community, it's not that you don't find them anywhere else, but you don't find the composition of plants other than in calcareous fens.*



Figure 6.35 Odawa Representatives Tells UofA Researcher about Plants at Otter Creek Fens

The fens present a wide variety of natural and cultural resources. The expansive cedar forests surrounding the fens and the medicinal plants growing near the springs offer ethnobotanical resources observed in few other places.

6.4.5 Ethnographic Comments

This section presents a contemporary ethnographic understanding of the fens at Otter Creek. It serves to support the expert Odawa knowledge about natural and cultural resources shared by the tribal representatives, and to demonstrate longstanding ties with this site and the greater SLBE area. The Great Lakes region has long been the home of the Odawa people, its forests and waters providing ample resources, with Odawa survival dependent on precise knowledge of the ways of animals, the cycle of the seasons, and the properties and uses of plants (Clifton, Cornell, and McClurken 1986: 14).

The Otter Creek Fens are both ecologically and culturally significant. The geological formation of the springs is rare, and creates a landscape with rich biodiversity and ceremonial opportunities. The mineral rich water is powerful, and in turn increases the power of the medicine and ceremonial plants that grow along the banks. Similarly, the fens are located in a clearing within a dense cedar forest. Cedar has many traditional and contemporary uses for Odawa people. One representative had never seen such a dense stand of cedar trees, and felt this added to the sacredness of the area.

Traditionally and contemporarily, this site would be used for various ceremonies, such as fasting. This area is particularly significant for women. One female representative described how for the Odawa people, women are the caretakers of water. Springs and fens are associated with Mother Earth, because the water rises to the surface from underground. At places like the fens at Otter Creek, women are responsible for keeping the springs clear of any debris. Cedar can also be used for various women's medicines, so the abundance of cedar in this area contributes to the power of the place and the protection of the fens.

6.4.6 Site Recommendations

According to the representatives, the fens are in good condition and relatively undisturbed. In this area, rare traditional and contemporary use plants and water sources thrive. The following recommendations were made by Odawa representatives regarding the use, management, and protection of the Otter Creek Fens (Figure 6.37).

- *This is a holy place. Keep this place safe.*

- *This would be a cultural site where we could come for contemplation, to place offerings. A lot of times we tend to gravitate toward unusual, natural phenomenon like unusual shaped trees, or like this with the water bubbling up, this would be a very special place to fast or to put your tobacco offering.*

- *We would like to hold ceremony here, just close off the area, nothing needs to be built or anything.*

- *I would say* [close the area off for] *up to a week. Because typically if a person were too fast here you would need a day ahead time to get your area set up, and then typically they fast for 4 days without food and water.*

- *If we could come in and clear away debris from some of these sites, that would be a sacred duty that we could resume again.*

- *Yeah, this would be a very sacred spot for us to come. We may not be able to go in the water, but we can sit by it here and fast, this would be a very powerful spot to fast, or to come in, even if it's not for days but just for* [a few] *hours and put our tobacco down there and ask the spirits of the water to help us. So, these places are very special and sacred for us.*

- *These fens ought to be protected, they're rare.*

- *I could definitely see using this as a sacred spot for fasting or contemplating.*

- *We would really like to see our cultural values, you know the significance of the springs* [fens] *here at Otter reflected in the interpretation of the area by the park. A sign or brochure, something that explains the sacredness that the area holds for the Odawa people.*



Figure 6.37 UofA Research Team and Odawa Representatives at the Marl Spring

The spiritual connection that the Odawa representatives felt with the Otter Creek Fens contributes to the importance of the area, and their strong desire to protect and preserve the integrity of the site. Water and cedar are culturally significant for Odawa people. The proximity of the springs to the cedar trees at Otter Creek Fens denotes the area as a sacred place for ceremony and fasting. Odawa representatives expressed concerns regarding the potential threats of changing climate, such as warming and drying trends, that may pose a tremendous risk for the fens.

6.5 Glen Lake Sugarbush

The Glen Lake Sugarbush site is located three miles southwest from Glen Arbor, Michigan, and north of Little Glen Lake, near the central portion of SLBE. The Glen Lake Sugarbush is on a slope and has an elevation of 619 feet at its highest point. This historic Odawa maple sugaring camp was first described by surveyor Orange Risdon in the 1850's, and is located today on the north side of West Day Forest Road, about one and three quarters miles west of Michigan State Highway 22 (M-22) (Figure 6.38). The area contains sugar maples and many types of northern hardwood forest species, and has an understory with wild leeks and other ethnobotanical resources. In addition to past Odawa use as a sugarbush camp and large village site, the Glen Lake area also has a history of Euro-American canning, fishing, and logging activity that took place during the late 19th and early 20th centuries.

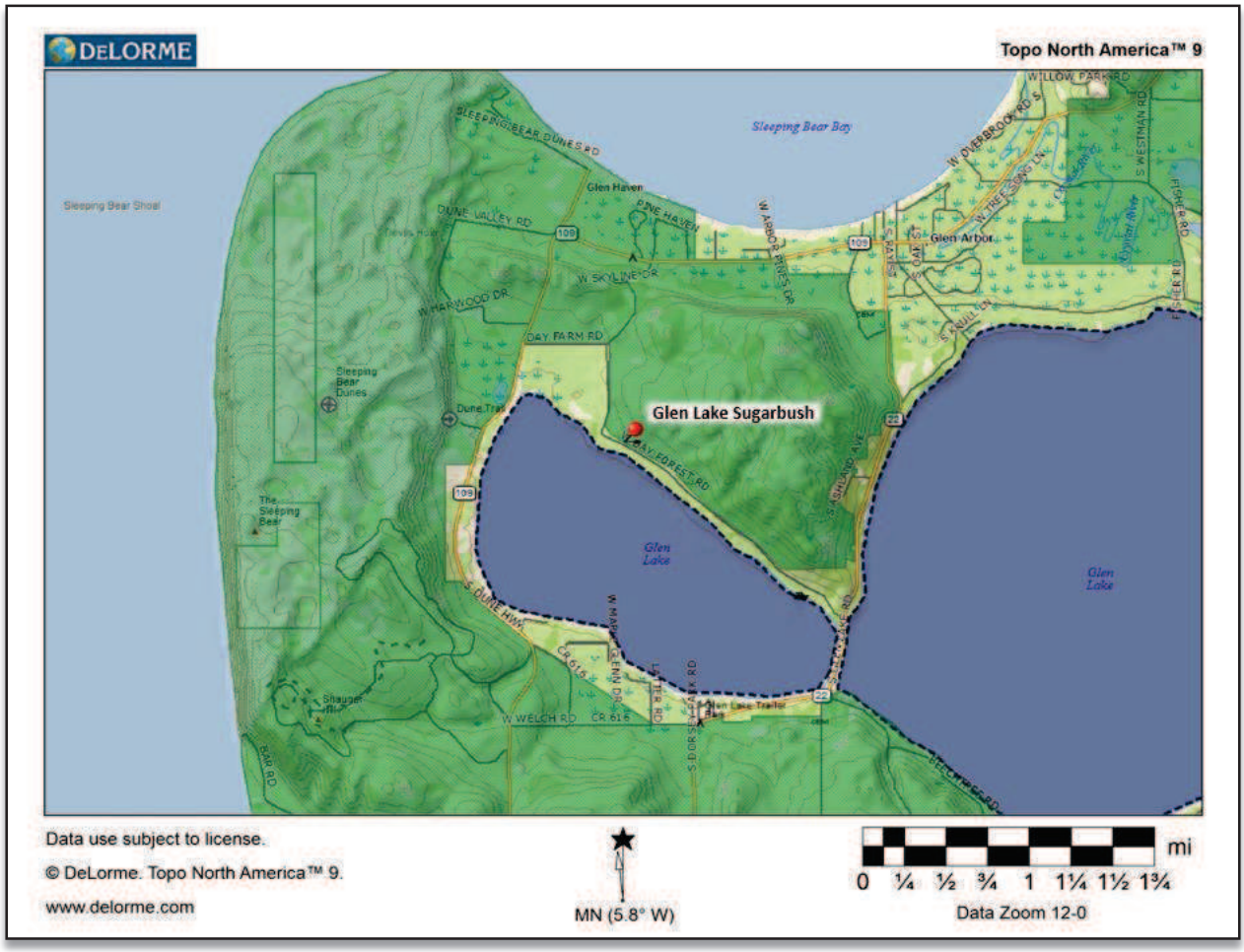


Figure 6.38 Map of Glen Lake Sugarbush

The following sections explore the geology, ecology, and special features of the area, and presents the ethnographic context of the site. Comments and recommendations from Odawa representatives who visited the Glen Lake Sugarbush are also included.

6.5.1 Geology

The Glen Lake Sugarbush occupies a tract of gently sloping land, surrounded by hills or moraines on the north and west sides near the northern shore of Little Glen Lake (Figure 6.39). Glen Lake actually consists of two large bodies of water connected by a narrow channel with the M-22 Bridge running across the divide. The larger body of water to the east is Glen Lake, and the smaller body to the west is called Little Glen Lake. Measurements from the Michigan Department of Natural Resources note Little Glen Lake as having a surface area of 1,415 acres and a maximum depth of 13 feet, in contrast Glen Lake covers 4,871 acres and has a maximum depth of 130 feet (Seites, Tonello, and Kalish 2010: 1). Both lakes have large stretches of rocky shoal area along the shoreline.

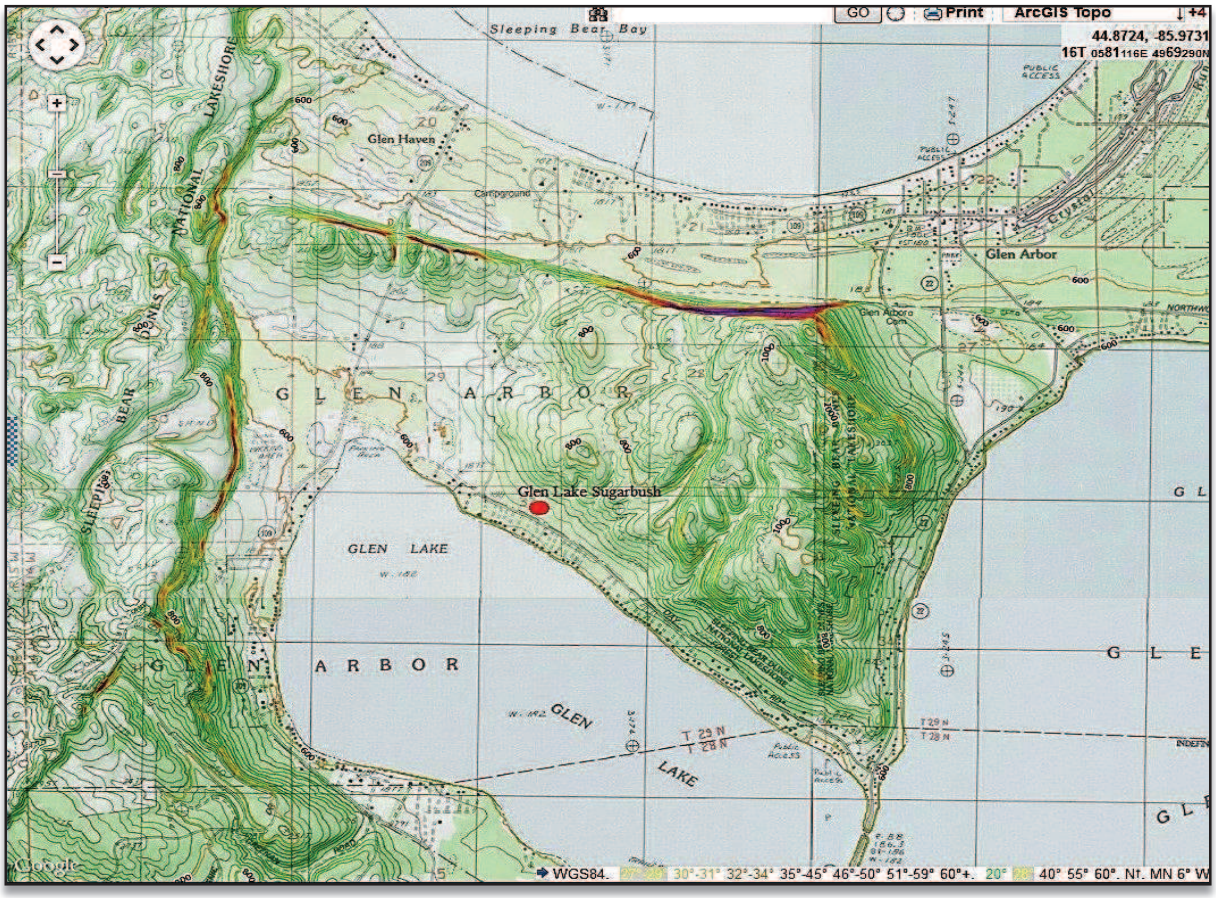


Figure 6.39 Topographic Map of Glen Lake Geology

The SLBE headquarters note that the blowing sand from the nearby Sleeping Bear Dune is slowly filling Little Glen Lake, contributing to the already shallow body of water. Bottom substrates in both Little Glen Lake and Glen Lake are very sandy, with marl in the deeper regions of the lakes (Seites, Tonello, and Kalish 2010: 2). Much like Otter Creek Fens, the marl clay at Glen Lake is the result of glacial activity and decaying plant matter that create the unique marl.

Alligator Hill, named for its profile that is reminiscent of an alligator, is located near Glen Lake Sugarbush. Alligator Hill is a ridge several hundred feet high, located on the northeast side of the Glen Lake Sugarbush site. The area that represents the alligator's snout is a wave-cut terrace from a lake that occupied the Glen Lake basin briefly during deglaciation (Sleeping Bear Dunes National Lakeshore 2005: Glen Lake Overlook).

6.5.2 Ecology

The Glen Lake Sugarbush area is a northern hardwood forest (Hazlett 1991). These forests originally had a beech-maple-hemlock association with lesser numbers of white pine and yellow birch, but suffered heavy deforestation during the height of the lumbering era (Zedeño et al. 2001: 87). In recent years, local sawmills carried out reforestation projects in the northwest portion of Glen Lake, including the Glen Lake Sugarbush site. Figure 6.40 illustrates the ecological diversity and reforestation at the Glen Lake Sugarbush site. Although reforestation has restored the original species, the structure of modern forests has changed; they now include fewer numbers of white pine and yellow birch than before logging (Zedeño et al. 2001: 87).



Figure 6.40 Glen Lake Sugarbush Ecological Diversity, Facing North

Understory species commonly include brushy plants such as sarsaparilla, witch hazel, berries, and a great variety of herbs (Hazlett 1991: 151). Wild leeks were blooming abundantly while visiting the site during the spring of 2014.

6.5.3 Special Features

The extensive history that this area has as an Odawa sugarbush is a very special feature. Thoughts of harvesting maple sugar in the traditional way, in the same spot as their ancestors, holds deep and meaningful connections for contemporary Odawa people. The Glen Lake Sugarbush was active as a traditional Odawa sugaring camp and village site since time immemorial, with use extending well into the 19th century, as documented by surveyors Sibley (1839) and Risdon (1850). Sugar maple, beech, and other ethnobotanical resources are available at the Glen Lake Sugarbush site today, and provide a glimpse of the past and promising possibility of sugaring again in this area.

6.5.4 Native American Comments

Odawa representatives visited the Glen Lake Sugarbush for the purpose of identifying ethnobotanical resources and discussing the impact that climate change may potentially present for the plants and trees represented in a northern hardwood forest. The comments from these discussions are presented here.

Discussions with Odawa representatives regarding ethnobotany and site use at the Glen Lake Sugarbush occurred only in 2014. No data or site visits to this particular area occurred in conjunction with the previous NPS sponsored study in 2001. Table 6.9 illustrates the types of discussions held with Odawa representatives that visited the Glen Lake Sugarbush in 2014.

	2001 Landscape Forms	2001 Site Forms	2014 Site Form	2014 Plant List	2014 Informal Int.	2001 Totals	2014 Totals	Grand Total
Glen Lake Sugarbush	0	0	6	7	1	0	14	14

Table 6.9 Discussions with Odawa Representatives that Visited Glen Lake Sugarbush in 2014

A variety of ethnobotanical resources were identified by Odawa representatives while visiting the area. Odawa representatives explained their cultural connections with the site as a sugar camp and village site occupied by their ancestors for many hundreds of years. Comments from the Odawa representatives present concerns regarding threats to ethnobotanical resources, such as invasive species, and the long-standing ties that the Odawa people have with this site and the surrounding area.

Odawa Ethnobotany and Site Use

A variety of plants and trees found growing within the Glen Lake area were noted as ethnobotanical resources currently used by Odawa people. Table 6.10 lists the ethnobotanical

resources that Odawa consultants identified during the 2014 study. Twenty-one types of ethnobotanical resources were identified at the Glen Lake Sugarbush while visiting in 2014.

Striped Maple	*Acer pensylvanicum*
Red Maple	*Acer rubrum*
Silver Maple	*Acer saccharinum*
Sugar Maple	*Acer saccharum*
Wild Leek	*Allium tricoccum*
American Hazelnut	*Corylus americana*
Adder's Tongue/Trout Lilly	*Erythronium*
Beech	*Fagus grandifolia*
White Ash	*Fraxinus americana*
Black Ash	*Fraxinus nigra*
Red/Green Ash	*Fraxinus pennsylvanica*
Chicken of the Forest/Woods	*Laetiporus sulphureus*
Morel Mushroom	*Morchella esculenta*
Ironwood	*Ostrya virginiana*
Wild Cherry	*Prunus emarginata*
Black Cherry	*Prunus serotina*
White Oak	*Quercus alba*
Red Oak	*Quercus rubra*
Basswood	*Tililia americana*
Eastern Hemlock	*Tsuga canadensis*
Mullein	*Verbascum thapsus*

Table 6.10 Plants Identified at Glen Lake Sugarbush by Odawa Representatives During the 2014 Study

When asked to discuss the ethnobotany and the use of this site, a variety of comments were provided, including maple sugaring, past use of the site in both historic and prehistoric times, and the types of resources presently available at the Glen Lake Sugarbush. Odawa representatives spoke with UofA researchers in detail about the ethnobotanical resources present at the site (Figure 6.41). These comments from Odawa representatives are included here.

- *Well, with the maple trees they grow around in clumps, so when you have a maple sugarbush camp, we say camp because in the old days we would set up camp, but today we go back to our houses, but then we go check them every day. We used to tap those trees, with different means, to get into the bark of the tree, and that would allow the maple sap to run though. It's just like water, but it's sweet, so when I've visited some sugar maple camps in my life time, that was always a treat to just take it right from the tree, and take a little sip. Then you boil it because there's so much, I forget what they say, so many gallons by the time you refine it down, it only makes so much maple syrup. So you boil it and someone's there watching it, then we get our maple syrup, then we would do some more boiling or whatever to make our maple sugar candy.*

- *We also use maple sugar like a medicine, because once we're able to tap that* [tree] *and process the sap from that then on we call it sweet water. It's good for a lot of little things, but we use that sweet water for medicine.*

- *There were a couple of the hollowed out trees, so that was interesting. I don't know why that happens, but I thought that was interesting. On the philosophical side, the Little People, Nim-e-gwe-suk, they like those kind of trees, they like to be around, you know, that's where you find them living.*

- *For me, when I walk through here I feel the presence of the ancestors, I couldn't walk anywhere in these woods without stepping on some of my ancestors footprints.*

- *The maple sugaring is the most important activity, it takes a lot of work, but they would have also need to have meat while they were here, so with the lake right down there they could easily have gotten some game or fish, so my guess is that this would have been a large camp.*



Figure 6.41 Odawa Representatives Showing UofA Researchers Plant Resources at Glen Lake Sugarbush

- *We would build our sugar camp in a clear spot, like this, maybe wherever the lodge was built we would clear the ground, but we wouldn't do much cutting unless we were using saplings to build our lodge. Again, the maple saplings or willow those are used for lodge spine. We would cover it with bark, birch bark was used a lot.*

- *You can smell the wild leeks all around here. We use them for cooking, I'm not sure what medicine specifically we use it for, but wild leek is also a medicine.*

6.5.5 Ethnographic Comments

The Glen Lake area has an extensive history of use by both Native American and Euro-American people. Surveyor Sylvester Sibley mapped the Glen Arbor Township and Range in July 1839. The diaries from the Sibley survey of the Glen Lake area in 1839 are described in a more resent publication.

> They began surveying the hill at the foot of the bay on the fifth day. There they discovered a deserted Indian maple sugar camp. Sibley observed the holes in the trees. This is where the Indians tapped the trees; we're about four months late for

> maple sugar, and a few minutes of investigation turned up more holes in the maple trees and the ashes of a fire pit where the sap was boiled (Rader 1977: 11).

However, Sibley's measurements were incorrect, so several years later Orange Risdon was asked to map Leelanau County, Michigan, in 1850. A portion of what is now SLBE is included within both the 1837 and 1850 survey areas. The Glen Lake and Little Glen Lake area was originally surveyed by Risdon in 1850 and noted as Bear Lake (Risdon Map 1850). As Risdon surveyed, he noted the location on the map of Odawa villages, camps, archaeological sites, and other Indian features; one of these notations was a very large Odawa village and "Indian Sugar Camps," or sugarbush previously mentioned by Sibley (Risdon 1850: 29N, 14W). A portion of Risdon's 1850 map has Indian Sugar Camp labeled near the center of the image (Figure 6.42). This sugar camp, noted by Risdon in 1850, is located near the current Glen Lake Sugarbush visited during the course of the 2014 study.



Figure 6.42 Risdon 1850 Survey Map of Glen Lake (Bear Lake) Glen Arbor, Leelanau County 29N, 14W

The Glen Lake Sugarbush is located off Day Forest Road. The forest surrounding Little Glen Lake was purchased by David Henry Day at the turn of the 20th century, and by 1910 he owned more than 5,000 forested acres (Kelly 2011: 10; Weeks 2005: 57). In 1922, Day sold a large portion of land, including Alligator Hill, for real estate development that was called Day Forest Estates, which included an 18-hole golf course, air strip, and clubhouse site, but the venture failed during the Great Depression (Weeks 2005: 76).

Day sold the forest south of Glen Haven to Pierce Stocking in 1948. When Pierce Stocking purchased the land, there was enough new growth to warrant a selective harvest because Day had carefully managed the forest over the past 25 years, making sure to protect the smaller trees to promote a future lumber harvest (Sleeping Bear Dunes National Lakeshore 2014: Pierce Stocking). Day Forest Hill was one of the first managed forests in Northern Michigan

(Kelly 2011: 10). Stocking built a sawmill near the forest, and burned the waste from the sawmill in giant kilns to sell as charcoal. An image of the remaining kiln structures is displayed below (Figure 6.43). After all of the mature trees had been harvested, the mill was closed and the kilns were abandoned (Sleeping Bear Dunes National Lakeshore 2014: Pierce Stocking). The large cement kilns are located at the present site of the trailhead for the Alligator Hill hiking trail.



Figure 6.43 Odawa Representative and UofA Researchers Visiting Kilns near Glen Lake Sugarbush 2014

The sugarbush is located at the base of Alligator Hill, south of the kilns. It is situated in a reseeded or reforested area, meaning that the timber in the area has been harvested, and then re-planted. Although reforestation has restored the original species, the structure of modern forest has changed; they now include fewer numbers of white pine and yellow birch than before logging (Zedeño et al. 2001: 87). The current growth in the area is third generation reseeding, noted one Odawa representative.

6.5.6 Site Recommendations

After visiting the Glen Lake Sugarbush, Odawa representatives commented on the possible use of the historic sugar campsite in contemporary times. Figure 6.44 illustrates one Odawa representative explaining the maple sugaring process to a UofA researcher. The desire to build a sugar camp within the park for educational purposes was a point brought up by nearly all Odawa representatives individually. The recommendations for contemporary use of the Glen Lake Sugarbush and surrounding area are presented here.

- *This would be an awesome spot to tap again. This is still a great spot to be used for maple sugaring. Maple sugaring takes a good two to four weeks, about a month. No need to shut the area off, but allow access so that the tribal people can come and tap the trees.*

- *This area of the park is easily accessible from the road. It would be an ideal spot to set up a traditional sugar camp for educational purposes.*



Figure 6.44 Odawa Representative Explaining Maple Sugaring Process to UofA Researcher

- *I could see the camp being used to show our tribal youth about gathering maple syrup, but also all the local schools that are within bussing range, it would be an ideal situation to show how a traditional sugaring camp was operated; it would be a great learning opportunity for all kinds of students. They could have students come out from all over. So, if you're thinking about things like that, then I guess you might want to build a shelter, something with a roof and some picnic tables with places for people to sit. Off to the side you would have the camp and materials showing how the camp was operated, with tribal youth and members out there to tell about tools, and harvesting sap.*

Maple sugaring has been an important activity within Odawa culture since time immemorial. The maple sap serves as a medicine, while the process of sugaring generates food resources. Additionally, the sugarbush, or sugaring camp, serves as a place where teaching, learning, storytelling, and passing on of Odawa lifeways takes place. Despite a history of logging and Euro-American use, the Glen Lake Sugarbush contains many sugar maples today and offers a place for Odawa people to continue the tradition of maple sugaring.

6.6 Pyramid Point

Pyramid Point is located within the northern portion of SLBE, approximately 14 miles northeast of Empire, Michigan, and 16 miles southwest of Leland, Michigan (Figure 6.45). Good Harbor Bay is found to the east of Pyramid Point with Port Oneida to the west. Facing north from the top of Pyramid Point visitors have a clear view of North Manitou Island, and turning to the west, South Manitou Island is visible. A steep trail, about 0.6 mile, leads visitors through a northern hardwood forest to access the top of the dune. From the trailhead, the elevation changes quickly from 723 feet to an elevation of 955 feet at the top of the Pyramid Point dune bluff. Tree species found at Pyramid Point are predominately beech, maple, and birch. Odawa representatives visiting this site noted the cultural significance of the area as a vision questing site, made more powerful by its proximity to water.

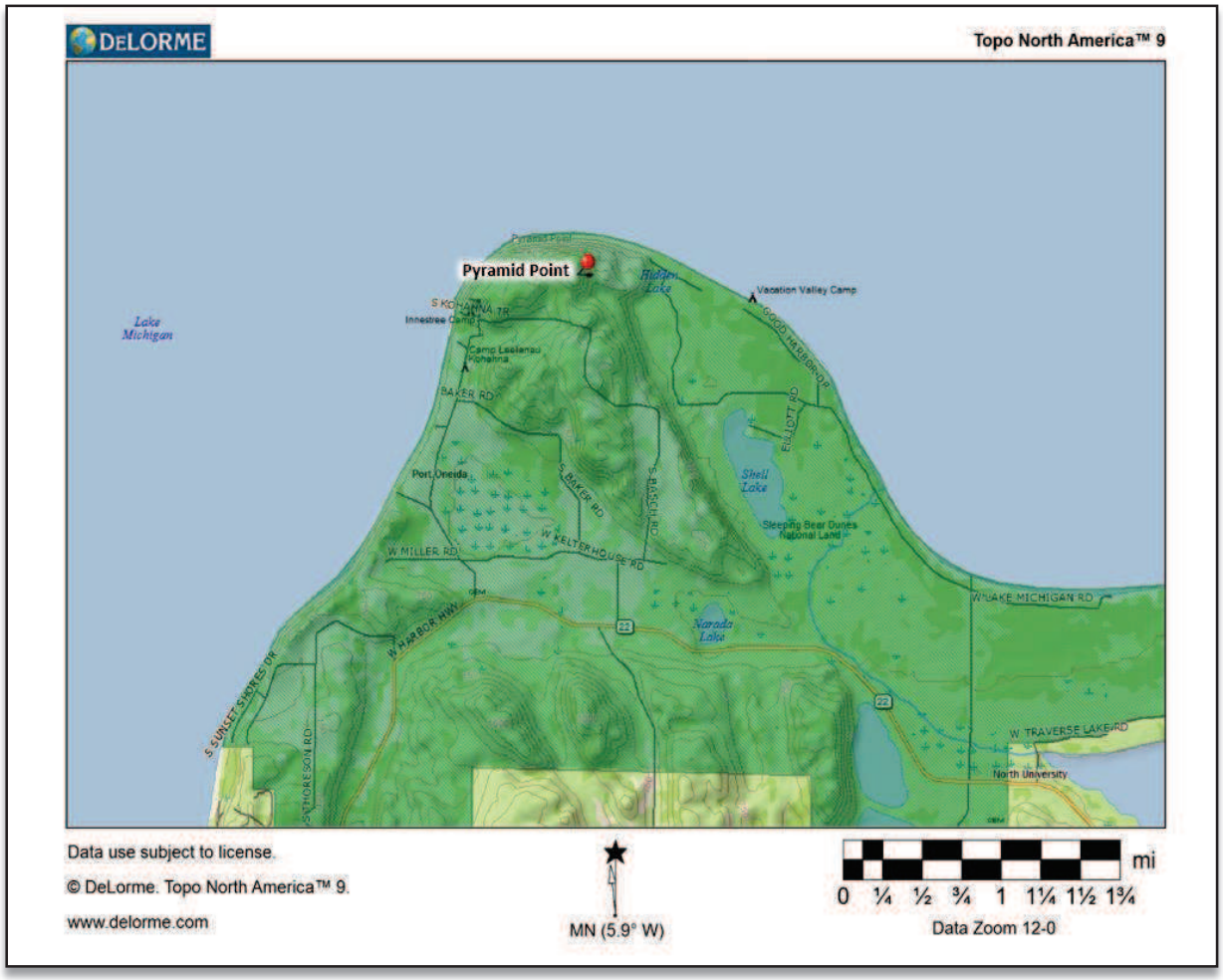


Figure 6.45 Map of Pyramid Point

Additionally, Pyramid Point has a long history of Odawa use and occupation, and served as a campsite along a key Odawa seasonal migration route. The geology, ecology, and

ethnography of Pyramid Point is described in greater detail throughout this section, with comments on ethnobotany, site use, and recommendations provided by Odawa representatives.

6.6.1 Geology

Geological features of the Pyramid Point area are the direct result of glaciation in the region. Pyramid Point is considered a perched dune, because the sand sits on top of a glacial moraine. As waves and wind along the lakeshore cut away the headlands of the glaciers, the wind blows the lighter sands higher up on top of the moraines, resulting in the formation of giant dune bluffs (Sleeping Bear Dunes National Lakeshore 2014: Glaciers and Glacial Features). Figure 6.46 presents a topographic overview of the region and illustrates the highly visible moraine. The topographic map further illustrates the extreme contrast in elevation of Pyramid Point in comparison with the surrounding area.



Figure 6.46 Topographic Map of Pyramid Point and Surrounding Area

Steep bluff faces are prone to occasional slumping or avalanches into Lake Michigan, which contributes to enormous quantities of sand and gravel along the shore. Some individual landslides have dumped a million cubic yards of sand into the lake in a single event (Sleeping Bear Dunes National Lakeshore 2014: Coasts and Shorelines). The dunes are part of a continuously changing landscape.

Shell Lake, Narada Lake, and Shalda Creek are all located near the giant dune. Shell Lake is a shallow spring fed inland lake on the southeastern side of Pyramid Point. The nearby Shalda Creek hydrological system flows west from Little Traverse Lake and splits into two channels after 1.6 miles. One channel flows southwest into Narada Lake, and the other flows east into Lake Michigan. A series of regressional beaches are noticeable to the east of Pyramid Point (Lovis, Aroborgast, and Monaghan 2012: 63).

6.6.2 Ecology

As a giant sand dune bluff, the ecology of Pyramid Point is drastically different from one area to the next. Large forested dunes in the park have basswood as the dominant upper story species, and perched dune vegetation exists in the Pyramid Point dune fields and on the west side of South Manitou Island (Hazlett 1991: 163).

South of Pyramid Point, at a lower elevation, there is a basin with blueberry patches and bogs. Sphagnum bogs are characterized by a unique set of plants that are adapted to the stresses of this nutrient-poor, acidic habitat (Zedeño et al. 2001: 166). Typical species included in a Sphagnum bog are pitcher plant, cranberries, leatherleaf shrubs, and several types of hollies (GLIFWC 1993: 4). Sphagnum bogs occur in the Crystal River and Pyramid Point area near Port Oneida, as well as Bow Lake and Tamarack Lake on North Manitou Island, representing a unique ecosystem (Figure 6.47).



Figure 6.47 Ecology near Pyramid Point 2014

In addition to the forested dune and sphagnum bog, Pyramid Point also presents the coastal dune ecology noted at other dune bluffs. Dunes are generally areas lacking a well-

developed soil, and have vegetation that includes beach grass, wild rye, beach pea, poison ivy, sand cherry, sumacs, bayberries, pitch pine, cottonwoods, and red and white pine (Zedeño et al. 2001: 166). The Pyramid Point area represents a unique series of ecological transitions from dune, to forest, to sphagnum bog ecology, with each type of ecosystem harboring a diverse assortment of ethnobotanical resources.

6.6.3 Special Features

Pyramid Point has a long history of Odawa use. It served as a landmark during seasonal migrations, was used in vision questing ceremonies, and was continuously used as a village or camp site. Towering over the surrounding area, Pyramid Point serves as a directional aide for the Odawa people following their annual migration routes south and north across Lake Michigan (Figure 6.48). Historically, when canoes were not useful, land trails were used. One of these land trails used by Odawa people began at the base of Pyramid Point and led to Suttons Bay. Similarly, the Mackinac trail that passes through the strait to Sault Ste. Marie was used when water routes were frozen over (Zedeño et al. 2001: 239).



Figure 6.48 Photograph of Pyramid Point Facing North with North Manitou Island in the Background

Odawa representatives often referred to the water as being sacred, one of the strongest medicines, and one of the four basic elements in nature together with sky, fire, and earth (Zedeño et al. 2001:102). Similarly, Odawa representatives explained that high points on the landscape, like Pyramid Point, are considered to be excellent spots for vision questing, especially those in close proximity to water. Pyramid Point, therefore, is considered an extremely powerful site and is an important spot to hold ceremony or use for vision questing.

The Pyramid Point area has been used for thousands of years as a campsite by inhabitants in the region. The earliest occupations in the Sleeping Bear Dunes area have pottery dating between AD 200-600, and are representative of the other sites in the park that were probably seasonal hunting or fishing villages used by people passing through the area (Manifort, Noble, and Lovis 1976; Sleeping Bear Dunes National Lakeshore 2014: Native Americans). The use of Pyramid Point extends into contemporary times, with traditional Odawa potters who collect a unique type of clay only available at this site (Zedeño, Miller, and Hollenback 2011: 58).

6.6.4 Native American Comments

Odawa representatives were taken to visit Pyramid Point and the surrounding area during 2014 study. The view from Pyramid Point facing north offers a vista of sacred North Manitou Island and looking west, South Manitou Island can be seen. Sites on top of these giant dune bluffs are culturally significant for vision questing and ceremonial purposes, and the birch and maple forests surrounding the site contribute to the desire for contemporary use.

Discussions with Odawa representatives regarding ethnobotany at Pyramid Point occurred in 2001 as part of a previous NPS study facilitated by the UofA. The details of these 2001 discussions and site visits can be found in Chapter 5 of this report. In the recent 2014 study, Odawa representatives also visited Pyramid Point, discussing ethnobotany and climate change with UofA researchers. Table 6.11 illustrates the type of material covered during discussions with Odawa representatives as they visited Pyramid Point.

	2001 Landscape Forms	2001 Site Forms	2014 Site Form	2014 Plant List	2014 Informal Int.	2001 Totals	2014 Totals	Grand Total
Pyramid Point	4	0	4	7	4	4	15	19

Table 6.11 Discussions with Odawa Consultants that Visited Pyramid Point in 2001 and 2014

The forms referenced in Table 6.9 assisted in the documentation and understanding of sites within SLBE. Landscape Forms from 2001 and Site Forms from 2014 assisted in learning about the ecological, geological, and cultural significance of Pyramid Point, while the 2014 Plant List assisted in the documentation of ethnobotanical resources at the site.

Odawa Ethnobotany and Site Use

The ethnobotanical resources identified by Odawa representatives at the Pyramid Point Site include a total of 51 species. The complete list is detailed below in Table 6.12. As an ecologically rich and diverse area, the identified plant and tree resources at Pyramid Point represent some of the most culturally significant ethnobotanical resources found within SLBE. The large stands of maple and birch trees offer opportunities for setting up sugaring camps, with the additional possibility of teaching about and making birch basketry.

Striped Maple	*Acer pensylvanicum*
Red Maple	*Acer rubrum*
Silver Maple	*Acer saccharinum*
Sugar Maple	*Acer saccharum*
Mountain Maple	*Acer spicatum*
Yarrow	*Achillea millefolium*
Wild Columbine	*Aquilegia canadensis*
Wild Sasparilla	*Aralia nudicaulis*
Jack in the Pulpit	*Arisaema triphyllum*
Common Milkweed	*Ascelpias syriaca*
Aster	*Aster Sp.*
Yellow Birch	*Betula alleghaniensis*
White/Paper Birch	*Betula papyrifera*
Brome	*Bromus*
Cohosh Blue	*Caulophyllum thalictroides*
Lily of the Valley	*Convallaria majalis*
Dogwood	*Cornus Sp.*
Gray Dogwood	*Cornus racemosa*
Queen Anne's Lace	*Daucus carota*
White Ash	*Fraxinus americana*
Cedar	*Juniperus sp.*
White Sweet Clover	*Melilotus alba*
Forget-me-not	*Myosotis Sp.*
Sweet Cicley	*Osmorhiza claytonii*
Ironwood	*Ostrya virginiana*
Ginseng	*Panax quinquefollum*
White Pine	*Pinus strombus*
Solomon's Seal	*Polygonatum sp.*
Large Tooth Aspen	*Populus grandidentata*
Wild Cherry	*Prunus emarginata*
Fire Cherry	*Prunus pensylvanica*
Black Cherry	*Prunus serotina*
Brackenfern/Fiddlehead	*Pteridium*
Wild Crab Apple	*Pyrus coronaria*
Black Oak	*Quercus velutina*
Red Oak	*Quercus rubra*
Buttercup	*Ranunculus acris*
Sumac	*Rhus sp.*
Wild Rose	*Rose virginiana*
Blackberry	*Rubus pennsylvanicus*
Willow	*Salix sp.*
Red Willow	*Salix laevigata*
Goldenrod	*Solidago Sp.*
Ground Hemlock	*Taxus canadensis*
White Cedar	*Thuja occidentalis*
Poison Ivy	*Toxicodendron radicans*
Eastern Hemlock	*Tsuga canadensis*
American Elm	*Ulmus americana*
Blueberry	*Vaccinium angustifolium*
Mullein	*Verbascum thapsus*
Wild Grape	*Vitis labrusca*

Table 6.12 Plants Identified at Pyramid Point by Odawa Representatives during the 2014 Study

Long standing cultural practices, seasonal migrations, and ceremonial use have drawn Odawa people to this area for thousands of years. The contemporary uses for ethnobotanical resources at Pyramid Point are numerous, as are the uses of the site both past and present. Comments from Odawa representatives regarding site use and ethnobotanical resources are presented here.

- *This would be a place to gather sap, lots of Maples here. Maple syrup in the springtime is medicine to us. We need to have that early because it cleanses all those toxins that have been sitting around, building up and we knew that we needed to collect that, and drink that first sap that runs.*



Figure 6.49 Odawa Elder Discussing Plants at Pyramid Point for UofA Researcher

The plant resources at Pyramid Point provide teaching opportunities for youth and community members. Additionally, the location of these plants at a powerful cultural place enhances their importance as ethnobotanical resources used as medicines, and for a variety of cultural purposes.

6.6.5 Ethnographic Comments

Odawa presence in the Pyramid Point area is documented by archaeological excavations at the dune bluff and surrounding area. Prehistoric occupation and historic Odawa occupation of the area were documented through the presence of pottery, rock rings, and other items (Manifort, Noble, and Lovis 1976). Conversations with contemporary Odawa representatives confirmed that the Pyramid Point site was used as a campsite and seasonal stop on migratory routes both overland and via waterways. Additionally, the highest part of Pyramid Point that looks out over the Manitou Islands was used in the past and still serves as a vision questing site.

The history and previous ethnographic interpretations of the Pyramid Point area are poorly documented. The earliest non-Native presence in the region notes Carsten Burfiend, as Port Oneida's first Euro-American resident in 1846.

> German immigrant, Burfiend traveled by steamship to North Manitou Island where he built a cabin and worked as a fisherman until 1852, until the U.S. Government opened mainland Michigan for settlement, where he then purchased 275 acres of land on the west side of Pyramid Point. Continuing to work as a fisherman, Burfiend also ferried early settlers between the islands and mainland on his fishing boat. The Burfiend family lived in a three-story log cabin on the beach until the

> fierce storms forced them to move their home to the bluffs above the lake (Sleeping Bear Dunes National Lakeshore 2014: Port Oneida History).

Following the settlement of Burfiend at Pyramid Point, other Euro-American families came to the area. These families founded the Port Oneida community, which eventually became a center of logging activity. In the 1860's, Thomas Kelderhouse settled in the area. In a short time he came to own most of the commercial buildings at Port Oneida and about half of the land on Pyramid Point, one of the areas that he harvested timber from (Sleeping Bear Dunes National Lakeshore 2014: Port Oneida Interpretive Panel).

By the 1890's, most of the land had been logged off and most Great Lakes steamships were burning coal, so men like Kelderhouse were unable to compete with larger operations, such as that of D.H. Day in Glen Haven and the dock and mill at Port Oneida (Sleeping Bear Dunes National Lakeshore 2014: Port Oneida Interpretive Panel). The lumbering of the area drastically altered the appearance of the landscape, in much the same way as the nearby Glen Lake Sugarbush site (Figure 6.50).



Figure 6.50 Open Meadow at the base of Pyramid Point Showing Evidence of Clear Cutting

Large areas of meadow that are visible today illustrate nearly a century of logging and agricultural activity in the area. Birch and maple forest found at Pyramid Point today represent reseeding efforts in the mid-20th century.

6.5.6 Site Recommendations

After visiting Pyramid Point, Odawa representatives offered opinions and recommendations for the future use of this area. Features at Pyramid Point that make the area attractive for future use from an Odawa perspective include the variety of plants and trees that

could be used for teaching and community education. Odawa representatives explained these features to UofA researchers (Figure 6.51). Pyramid Point is culturally powerful site based on its close proximity to water and high overlook of North and South Manitou Islands.

- *The environment has a lot to do with storytelling. So if you brought youth into the wild, there's a lot of positive energy, and it creates a positive environment for learning. My grandmother would act out stories, getting really involved in the story, animating it. A place like Pyramid Point would be great for that storytelling and teaching youth about plants.*

- *This is a good place for teaching. Locations like this could help children with Attention Deficit Disorder* [ADD] *learn to quiet themselves.*

- *We might bring children here, take them out and show them plants, tell them about what they are seeing, or bring tobacco and offer it. That would be really cool.*



Figure 6.51 Odawa Elder Discussing Recommendations for Pyramid Point with UofA Researcher

The significance of Pyramid Point spans cultural, spiritual, and natural features. From the top of the giant dune bluff, the viewscape holds spiritual importance for the Odawa people as a ceremonial and vision questing site. In the past, the Anishinaabeg people in the region would have used the area for similar purposes, as well as a look-out point to keep watch over the communities using Pyramid Point for a camping or village area. While visiting the area, Odawa representatives noted the assortment of ethnobotanical resources representing plants used for everyday purposes like sugar maples. Likewise, cedar identified at the top of the bluff was indicative of the sacredness of the spot. Pyramid Point represents many aspects of culture and history for the Odawa people, who would like to continue visiting and using this place for the same purposes as their ancestors.

6.7 Good Harbor Beach and Wetlands

Good Harbor is located in the northeast corner of SLBE. The Good Harbor Beach and Wetlands can be accessed from Good Harbor Trail, which is located 1,500 feet northeast of Good Harbor Creek. Good Harbor is located 16 miles northeast of Empire, Michigan, at an elevation of about 600 feet. The geology and ecology of the wetlands and the beach differ greatly. Due to the proximity of the beach and wetlands, about 1,000 feet apart, these two areas will be discussed within the same site description (Figure 6.52).

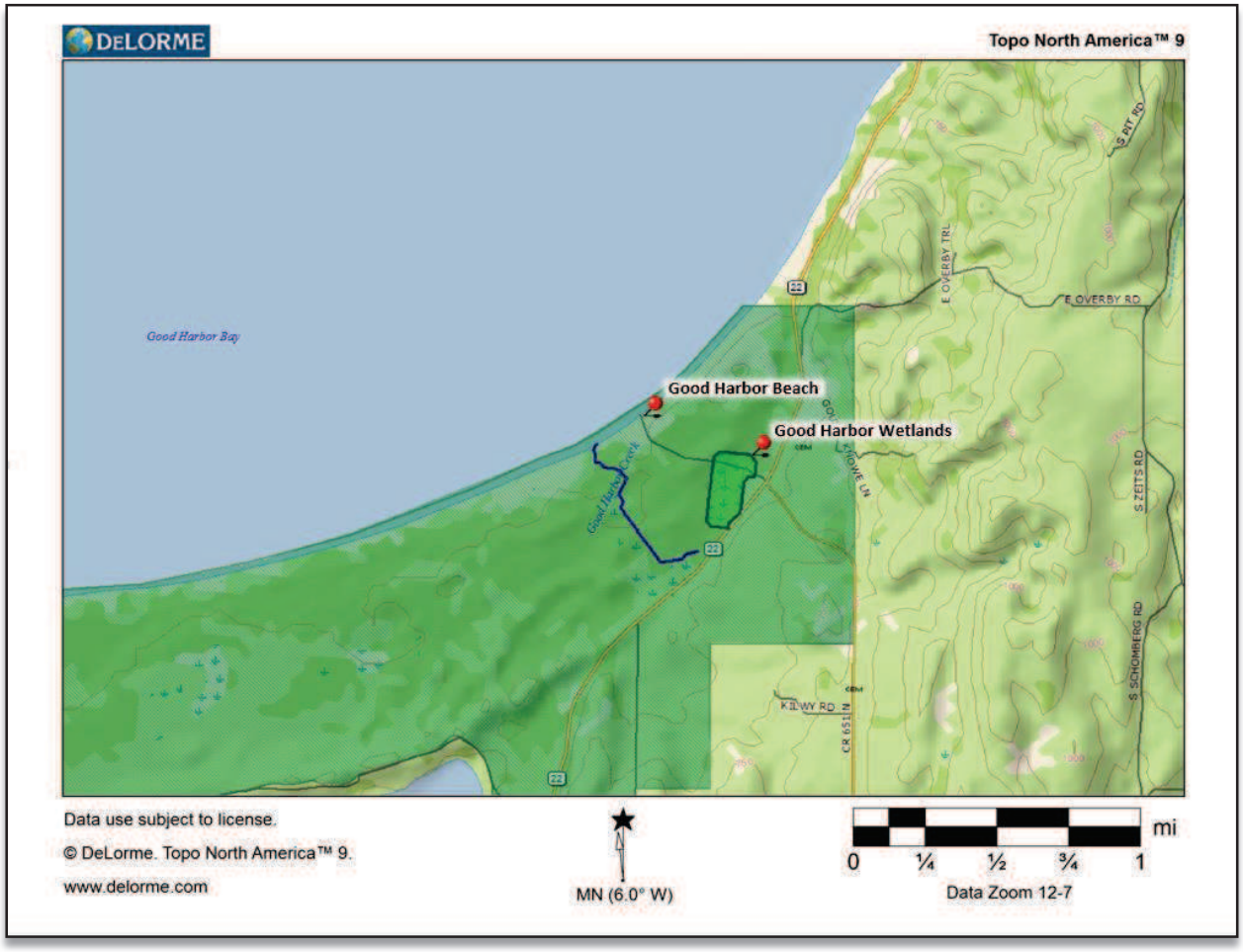


Figure 6.52 Map of Good Harbor Beach and Wetlands

This site provides significant information in the assessment of the health and availability of ethnobotanical resources within SLBE, as well as the effects of the changing climate. Aspects of the ecology, geology, and cultural landscape of Good Harbor Wetlands and Beach are addressed in the following sections, with comments and recommendations for the continued use and preservation of the site presented by Odawa representatives.

6.7.1 Geology

The last glacial period has shaped the geological formations at Good Harbor. Moving and then melting sheets of ice transformed the surface of the earth, and created the Good Harbor Wetlands and Beach as they exist today. Figure 6.53 provides a topographic overview of Good Harbor regional geology and hydrological system.

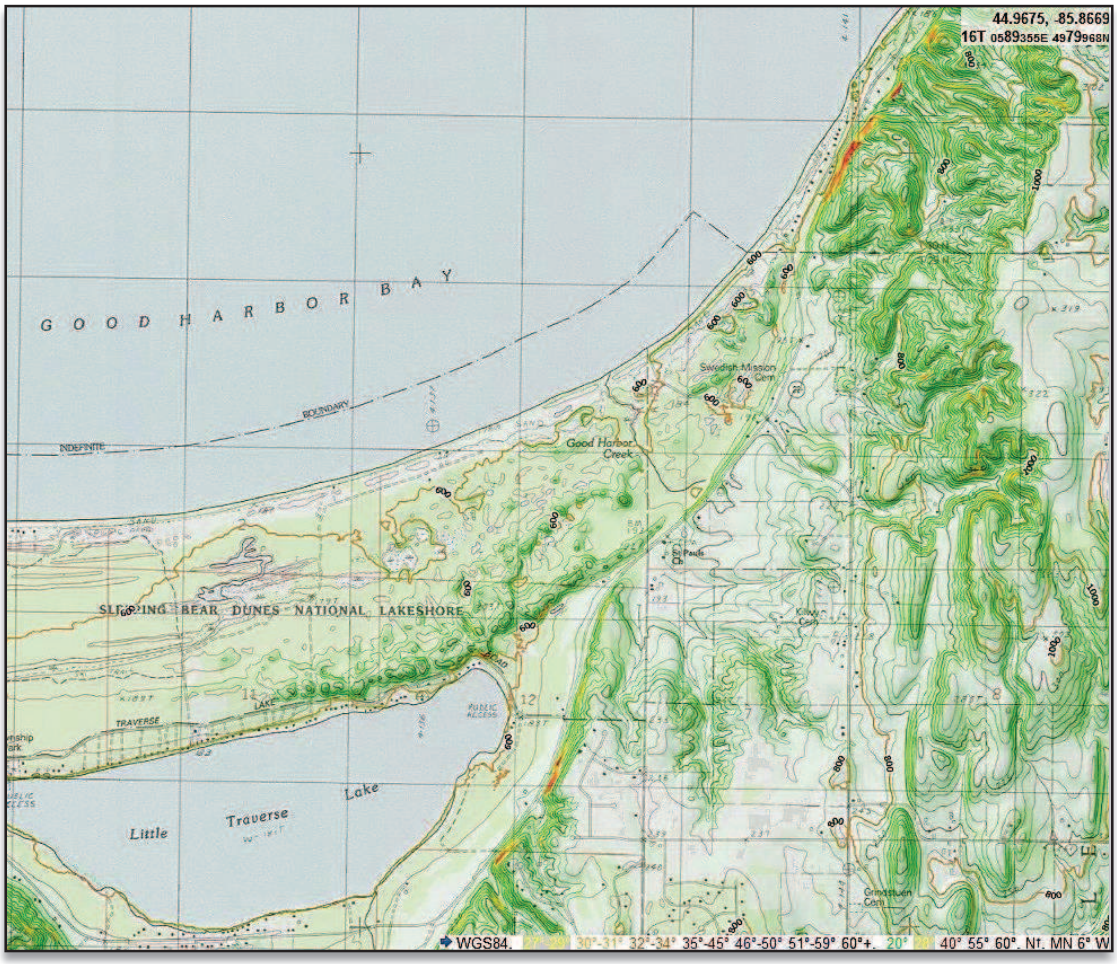


Figure 6.53 Topographic Map of Good Harbor Beach and Wetlands

The geological formations at the wetlands and the beach differ dramatically. In order to incorporate more specific details about each area they will be discussed separately.

Good Harbor Wetlands

The wetlands at Good Harbor were created by the movement of glaciers. As the glaciers moved, they created depression in the earth. These depressions remain today and, due to the proximity to the water table, remain much wetter than the surrounding land.

> Thank the glaciers of bygone eras for gouging out the earth and leaving small depressions and lakes. Thousands of years of wind and active dunes have left a myriad of interdunal swales. Both of the processes have created a wonderful assortment of bogs and marshes for nature to use (Sleeping Bear Dunes National Lakeshore 2014: Geology: Oh Ranger).

The way in which these wetlands were formed geologically is common to the region. Soil type, bed rock, and the water table are all key players in the geology of this location. These geological features then also influence the specific ecology in the area.

Good Harbor Beach

The beach at Good Harbor was also shaped during the last glaciation (Figure 6.54). Glaciers pushed the earth into ridges, or moraines, and the current and wind from Lake Michigan formed sand dunes creating the beach environment.

> The last advances of the glaciers, the Port Huron and Valders substages of the Wisconsin ice sheet, followed valleys carved out by the earlier, larger glaciers. The last of the glacial ice melted away from this area 10,000 - 14,000 years ago. The headlands and moraines from earlier, larger glacial ice lobes, such as Pyramid Point, Sleeping Bear Plateau, and Empire Bluffs steered more recent glacial ice into Good Harbor (Sleeping Bear Dunes National Lakeshore 2014: Geology: Oh Ranger).



Figure 6.54 Photograph of Good Harbor Beach Facing Northeast

Glaciers moved the earth creating depressions, valleys, and lakes. As temperatures fluctuated, the water levels of Lake Michigan rose and fell. Initially, the edges of the lake were jagged, but over thousands of years the lake settled. Overtime, the currents of Lake Michigan became more consistent, which led to the development of a smooth sandy shoreline at Good Harbor. Waves and wind continue to move sediment and change the landscape, causing dunes and hydrological systems to grow or change path.

6.7.2 Ecology

The Good Harbor site consists of a variety of different ecozones. The two zones that will be discussed in detail are the wetlands and the beach area. Though there is a short distance between these two zones, each has a different ecological composition. Good Harbor is a complex site that contributed to the understanding of Odawa ethnobotanical knowledge and impacts of climate change at SLBE.

Good Harbor Wetlands

The ecology of the Good Harbor Wetlands includes an impressive biodiversity of plants, wet nutrient-rich soil, and has been utilized by Anishinaabeg people for thousands of years. Based on the plant resources, water, and soil, this specific ecology is defined as a swamp (Figure 6.55).



Figure 6.55 Good Harbor Wetlands

> Swamps can best be described as flooded woodlands or shrublands. Unlike marshes, they are dominated by woody plants. The soil is usually waterlogged throughout the growing season, though some swamp soils may become dry during the hot summer months. In Michigan, trees and shrubs found in swamps include red and silver maple, cedar, balsam, willow, alder, black ash, elm, and dogwood. Swamps occur most often along streams or on floodplains, in flat uplands, or shallow lake basins. Numerous wildflower species are found in swamp habitats, including the cardinal flower and yellow ladyslipper (Michigan Department of Natural Resources).

The wetland ecosystem also provides a niche environment for animals, such as birds, frogs, snakes, and turtles. Areas like the Good Harbor Wetlands, are at high risk for negative impacts associated with changing climate in Michigan based on the current predictions for warmer temperatures.

Good Harbor Beach

The beach at Good Harbor separates the wetlands from Lake Michigan. The ecology of the Good Harbor Beach differs greatly from the Wetlands. The soils and annual water levels affect plant species and growth in this area. Beach ecology has limited flora and fauna compared to other ecozones within SLBE, however, this specific landscape has cultural and ceremonial significance for the Odawa people (Figure 6.56). The Michigan Department of Natural Resources defines the various elements of beach ecology as follows:

> Beaches are zones where water meets land. The constant movement of sand by the wind, pounding storm waves, and winter ice and snow make this a formidable habitat for any living thing. For this reason, few plants or animals live on the beach. Most wildlife seen there are just visitors. Among these visitors are scavengers ranging in size from small flies and beetles to shore birds, herring gulls, and even bald eagles. The remains of fish, birds, and insects washed ashore provide food.
>
> The foredune is the first ridge behind the beach. Although foredunes are above wave action most of the time, they are regularly subject to storm waves.
>
> A foredune stabilized by these grasses can host a wide variety of wildflowers and shrubs. They include beautiful clusters of the yellow hairy puccoon, the common milkweed, beach pea, sand cress, smooth rose, bearberry, poison ivy, wild grape and sand cherry. Foredunes will remain stable as long as the vegetation is undisturbed.



Figure 6.56 Good Harbor Beach

Beach ecology provides a habitat for plants, mainly grasses, which are adapted to the sandy soil. These plants are unique to the sandy beach ecosystem, and they serve to prevent erosion caused by blowing sands and water.

6.7.3 Special Features

Special features of Good Harbor include 1) the viewscape from the beach, and 2) the abundance and variety of medicinal plants growing in the wetlands. Together, these aspects contribute to the sacredness of the area.

The Good Harbor Beach is important because the element of water is needed for fasting ceremonies (Figure 6.57). Likewise, the viewscape is special because it overlooks North and South Manitou Islands. The National Park Service recorded *The Legend of Manitou* as,

> Long ago, along the Wisconsin shoreline, a mother bear and her two cubs were driven into Lake Michigan by a raging forest fire. The bears swam for many hours, but eventually the cubs tired and lagged behind. Mother bear reached the shore and climbed to the top of a high bluff to watch and wait for her cubs. Too tired to continue, the cubs drowned within sight of the shore. The Great Spirit Manitou created two islands to mark the spot where the cubs disappeared and then created a solitary dune to represent the faithful mother bear.

The visibility of the Manitou Islands from the Good Harbor Beach makes this a special place.



Figure 6.57 The View of North Manitou Island from the Beach at Good Harbor

A dense concentration of medicinal plants serves as a marker of the sacredness of the area, because the plants are often rare and hold significantly more power. The wetlands are special because medicinal plants like trees, shrubs, rushes, berries, flowers, and fungi, grow in the area. One example of a medicinal plant growing in the wetlands is wintergreen (Figure 6.58 L). Other plants and fungi, such as tree fungus are used as a ceremonial resource (Figure 6.58 R).



Figure 6.58 Wintergreen (L) and Tree Fungus (R) Growing in the Wetlands

Traditional and contemporary Odawa knowledge of ethnobotanical resources notes that bogs, swamps, and wetlands as key places to find medicinal plants. In addition to these plants, and other natural and cultural resources at the Good Harbor Wetlands and Beach contribute to the importance of the area.

6.7.4 Native American Comments

The Good Harbor Wetlands and Beach area have been utilized for thousands of years. These ecozones have been culturally significant for the Odawa since time immemorial and into the present time. UofA researchers worked with Odawa representatives to document the meaning of the wetlands and beach at Good Harbor, and they identified traditional and contemporary ethnobotanical resources present at the site (Figure 6.59). The Odawa comments included in this report explain the significance of the area, and assist in providing a better understanding of the impact that climate change is having on traditional use plants and other culturally significant resources.



Figure 6.59 Odawa Representatives Working with UofA Researchers at Good Harbor Wetlands

Good Harbor was not visited in the previous 2001 study. In the recent 2014 study, Odawa representatives felt strongly about the area and requested to visit this site, and discuss ethnobotany and climate change with UofA researchers. Table 6.13 illustrates the types of discussions held with Odawa representatives that visited the Good Harbor Wetlands and Beach. Six Site Forms, seven Plant Lists, and three Informal Interviews were completed totaling 16 interviews about the plant resources and impacts of climate change at Good Harbor Wetlands and Beach.

	2001 Landscape Forms	2001 Site Forms	2014 Site Form	2014 Plant List	2014 Informal Int.	2001 Totals	2014 Totals	Grand Total
Good Harbor	0	0	6	7	3	0	16	16

Table 6.13 Discussions with Odawa Representatives at Good Harbor Wetlands and Beach in 2014

The types of questions associated with the 2014 site form were designed to gather information on the ecology, geology, and special features of each site that Odawa representatives visited within the park. Odawa representatives pointed out the ethnobotanical resources were present at each site, while UofA researchers noted the plants and uses on the list.

Ethnobotany and Site Use

During the 2014 study, Odawa representatives identified 85 traditional use plants at the Good Harbor. Table 6.14 provides a detailed listing of the ethnobotanical resources that the Odawa representatives identified at the site.

Balsam Fir Tree	*Abies balsamea*
Striped Maple	*Acer pensylvanicum*
Red Maple	*Acer rubrum*
Silver Maple	*Acer saccharinum*
Sugar Maple	*Acer saccharum*
Mountain Maple	*Acer spicatum*
Sweet Flag	*Acorus calamus*
White Baneberry	*Actaea alba*
Wild Leek	*Allium tricoccum*
Alder	*Alnus glutinosa*
Common Burdock	*Arctium minus*
Bearberry	*Arctostaphylos uva-ursi*
Jack in the Pulpit	*Arisaema triphyllum*
Common Milkweed	*Ascelpias syriaca*
Yellow Birch	*Betula alleghaniensis*
Black Birch	*Betula nigra*
White/Paper Birch	*Betula papyrifera*
Low Birch	*Betula pumila*
Buffalo Grass	*Bouteloua dactyloides*
Moss	*Bryophyta sp.*
Marsh Marigold	*Caltha palustris*
Giant Puffball	*Calvatia craniformis*
Common Thistle	*Cirsium vulgare*

Reindeer lichen/moss	*Cladonia rangifernia*
Goldthread	*Coptis aspleniifolia*
Field Horsetail	*Equisetum arvense*
Scouring Rush	*Equisetum hymale*
Boneset	*Eupatorium perfoliatum*
Joe Rye Weed	*Eupatorium purpureum*
Beech	*Fagus grandifolia*
Beefsteak Mushroom	*Fistulina hepatica*
Wild Strawberry	*Fragaria virginiana*
Reeds	*Fragmites sp.*
White Ash	*Fraxinus americana*
Black Ash	*Fraxinus nigra*
Red/Green Ash	*Fraxinus pennsylvanica*
Wintergreen	*Gaultheria procumbens*
Huckleberry	*Gaylussacia baccata*
Sweetgrass	*Hierochloe odorata*
Jewelweed	*Impatiens sp.*
Wild Iris	*Iris sp.*
Cedar	*Juniperus sp.*
Red Cedar	*Juniperus virginiana*
Creeping Juniper	*Juniperus horizontalis*
Shelf mushroom	*Laetiporus sp.*
Tamarack	*Larix laricina*

White Sweet Clover	*Melilotus alba*
Wild Mint	*Mentha arvensis*
Partridge Berry	*Mitchella repens*
Morel Mushroom	*Morchella esculenta*
Black Spruce	*Picea mariana*
Pine	*Pinus sp.*
White Pine	*Pinus strombus*
Balsam Poplar	*Populus balsamifera*
Brackenfern/Fiddlehead	*Pteridium*
Oak	*Quercus sp.*
White Oak	*Quercus alba*
Burr Oak	*Quercus macrocarpa*
Black Oak	*Quercus velutina*
Sumac	*Rhus sp.*
Prickly Wild Rose	*Rosa acicularis*
Wild Rose	*Rose virginiana*
Black eyed Susan	*Rubeckia hirta*
Red Raspberry	*Rubus idaeus*
Blackberry	*Rubus pennsylvanicus*
Willow	*Salix sp.*

White Willow	*Salix alba*
Pussy Willow	*Salix discolor*
Red Willow	*Salix laevigata*
Bulrush	*Scirpus americanus*
Hedge Nettle	*Stachys palustris*
Skunk Cabbage	*Symplocarpus foetidus*
Dandelion	*Taraxacum officinate*
Ground Hemlock	*Taxus canadensis*
Basswood	*Tililia americana*
Poison Ivy	*Toxicodendron radicans*
Cattail	*Typha latifolia*
American Elm	*Ulmus americana*
Slippery Elm	*Ulmus rubra*
Blueberry	*Vaccinium angustifolium*
Cranberry	*Vaccinium oxycoccos*
Mullein	*Verbascum thapsus*
Nannyberry	*Viburnum lentago*
Wild Grape	*Vitis labrusca*
River Bank Grape	*Vitis riparia*

Table 6.14 List of Plants Identified at Good Harbor Beach and Wetlands

The Odawa comments recorded during this study document the cultural significance of this place. They also note a vast amount of traditional and contemporary use plants growing in this area (Figure 6.60).



Figure 6.60 Rich Biodiversity at Good Harbor Wetlands

- *Well this is where the concentration of medicinal plants are, is in wetlands.*

- *This area is really great. And Bull rushes and cattails, they were a big cultural resource for making those mats and bags. So this would be a tradition and a product we'd love to revitalize, because it was so prevalent in our culture, is these bags and mats. And these mats, I can send you some pictures when I get back to my office. They were so intricate that the French traders compared them to Turkish rugs. And they had a high durability, multi-use, you could sleep on it, throw it over your wig-wam, lay it out, put your food on it. So if you had a good strong mat you could use it for a lot of things. But it was also a trade item. Tribes really valued Odawa mats and they would trade goods for them. But weaving, the making of the mats has really been lost. It died out in the early 1900's. Some groups in Ontario still do it, in Minnesota, we'd like to bring them back and teach us how to do that again. But having that resource to do it first is the most important thing. An area like this would be just perfect to harvest those. And again, we made those bags. Bags out of bull rushes, basswood, bark was a big thing. So I know there would probably be basswood in here. This is the type of area it grows in too. And those bags were made out of basswood. And they made a lot of our rope out of the inner bark of basswood, so that was a huge resource for us. They just, it peals real easy and you just braid it. And that was our rope.*

- *Pretty much all the tribes in Michigan believe there are four sacred medicines: sweetgrass, sage, cedar, and tobacco. Those are the most important.*

6.7.5 Ethnographic Comments

Good Harbor significantly contributes to the study of Odawa enthnobotany and climate change issues in SLBE. The interviews that took place at this site assisted in building the ethnographic understanding of the area. American Indians have continuously utilized plant resources that presently grow in this area for thousands of years, and the Odawa representatives provided an abundance of insight regarding traditional and contemporary use. The following ethnographic comments aim to expand on the comments provided by the tribal representatives.

Good Harbor Wetlands

The wetlands at Good Harbor are a special feature because of the rich concentration of Odawa traditional use plants, particularly medicinal plants. The four sacred plants of the Odawa, sweetgrass, sage, cedar and tobacco, grow within this habitat. Similarly, other rare or significant traditional and contemporary use and foods plants grow in abundance in this area. According to Odawa representatives (Figure 6.61), this specific wetland ecosystem at Good Harbor has higher levels of water, as well as more biodiversity of plants and animals compared to other environments of this type. Just as rare plants thrive in this wetland, rare animals, such as snakes and turtles, were seen at this site.



Figure 6.61 UofA Researchers Recording the Comments of One Odawa Representative

The UofA researchers were told by an Odawa representative that snakes, turtles, and porcupines are all becoming increasingly rare to see. The condition and plant variety present at this site make it unique to this study.

Good Harbor Beach

The Good Harbor Beach is significant to Odawa people. The ecosystem and viewscape create a suitable area for fasting or other ceremony. Several representatives expressed their interest in being able to utilize this location for fasting. It is important to conduct these practices in places with good visibility. From this site, the Manitou Islands are also within view to the northwest (Figure 6.62). These islands are strongly connected to Odawa culture, including playing a significant role in the Odawa creation story of the Sleeping Bear Dune.

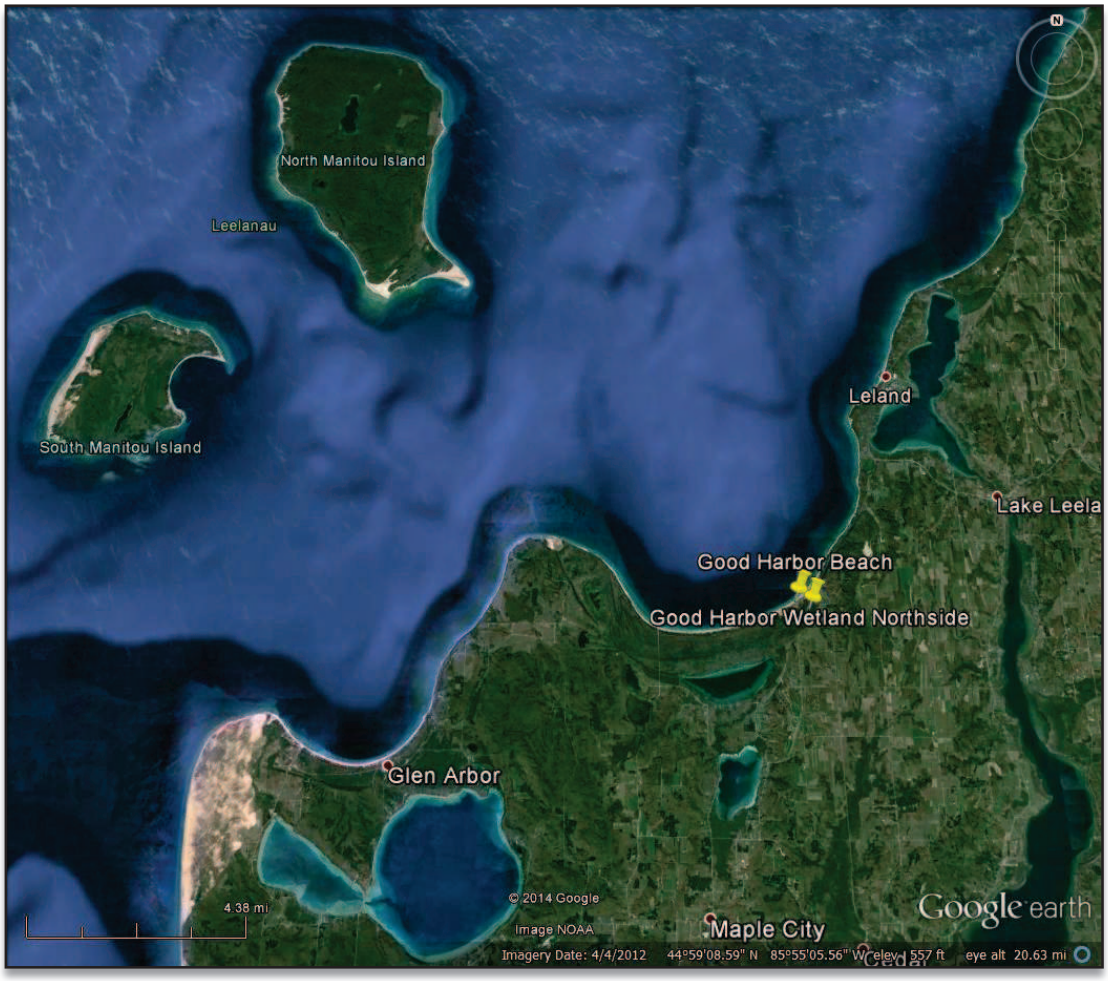


Figure 6.62 North and South Manitou Island are Located Northwest of Good Harbor (Google Earth 2014)

North and South Manitou Island were not visited during the 2014 study at SLBE, but interviews were held on North Manitou Island in 2001. This information is presented in chapter five. The ecological and cultural resources present on the islands are slightly different than the types of resources viewed by Odawa representatives who visited sites on the mainland.

6.7.6 Site Recommendations

After visiting the Good Harbor Wetlands and Beach, Odawa representatives offered comments and recommendations for the future use of this area. Various aspects of these ecozones make the region a place of interest for future use from an Odawa perspective were the variety of plants and trees that could be used for teaching, community education, plant collection, and fasting.

- *The temporary closure of some special areas where traditional activities are requested.*

- *We would like to work with the park to establish an agreement, which would permit people from culturally affiliated tribes to gather plants in the park.*

  - *One specific issue would be to gather already infected* [but not totally dead] *trees for traditional use by tribal members.*

  - *We would like to have another study that would extend the current study to include one or both of the park islands for the further identification of plants and ecological areas.*

  - *We would like to work with the park to stabilize and potentially mitigate plant communities especially those being impacted climate change* (Figure 6.63).

  - *The Odawa tribes would like to gather the dead and dying trees within the park to use for traditional activities like crafts, lodges, and other cultural purposes.*



Figure 6.63 Good Harbor Wetlands Impacted by Climate Change

Good Harbor Beach and Wetlands represents diverse ecozones and resources. Both the beach and wetlands offer ethnobotanical species needed for food, medicine, craft, and other types of culturally significant activities. Likewise, the locations themselves represent a place for ceremonial and cultural practices. Odawa representatives expressed their concerns for the wetland area at Good Harbor with regard to climate change.

CHAPTER SEVEN
ETHNOBOTANICAL DATA

During the course of the 2014 study on ethnobotany and climate change at Sleeping Bear Dunes National Lakeshore (SLBE), Odawa representatives were asked to identify plants within the park that are considered traditional and contemporary ethnobotanical resources (Figure 7.2). Through their efforts, a list of 210 contemporary ethnobotanical resources were identified in the park. A complete list of the 210 Odawa identified plant resources is present within Appendix A. University of Arizona (UofA) researchers recorded the Odawa representatives' plant identifications using a form listing plants available within SLBE park (Figure 7.1). A copy of the plant recording form is found in Appendix B.



Figure 7.1 Odawa Representative and UofA Researcher Documenting Plant Resources

The form had additional categories for types of contemporary plant use such as construction, medicine, crafts, food, and other (Figure 7.3). A third graph displays the number of plants identified as having multiple uses (Figure 7.8). The list of plant species also included categories that enabled researchers to document the season in which each identified plant was collected (Figure 7.8), and the amount of each resource that should be gathered or harvested at any given time (Figure 7.11). Visible evidence of change or lack of evidence of change for each

of the 210 identified plants, is presented by Figure 7.14. In Figure 7.15, the categories or types of environmental impact thought to be affecting plants are detailed.

Discussions about the types of ethnobotanical resources present within the park and their contemporary uses assisted in providing an understanding of the role that each plant serves for Odawa people in the 21st century. The following section explains the information gathered from the plant recording sheet used by the UofA researchers while visiting sites within SLBE. A copy of the Native Plant Checklist and Use Recording form is available in Appendix B.

7.1 Contemporary Plant Use

Previous studies conducted by UofA researchers have identified the idea that plants frequently are found to have multiple uses (Stoffle et al.1990; Halmo, Stoffle, and Evans 1993; Stoffle, Halmo, and Evans 1999). Categories of use, such as food, craft, or medicine should not be viewed as mutually exclusive. Many plants have multiple uses. During the 2014 SLBE study, 33 percent of the 210 Odawa identified plants had at least five different categories of use. Figure 7.2 presents the number of Odawa ethnobotanical resources that were identified as having multiple uses.

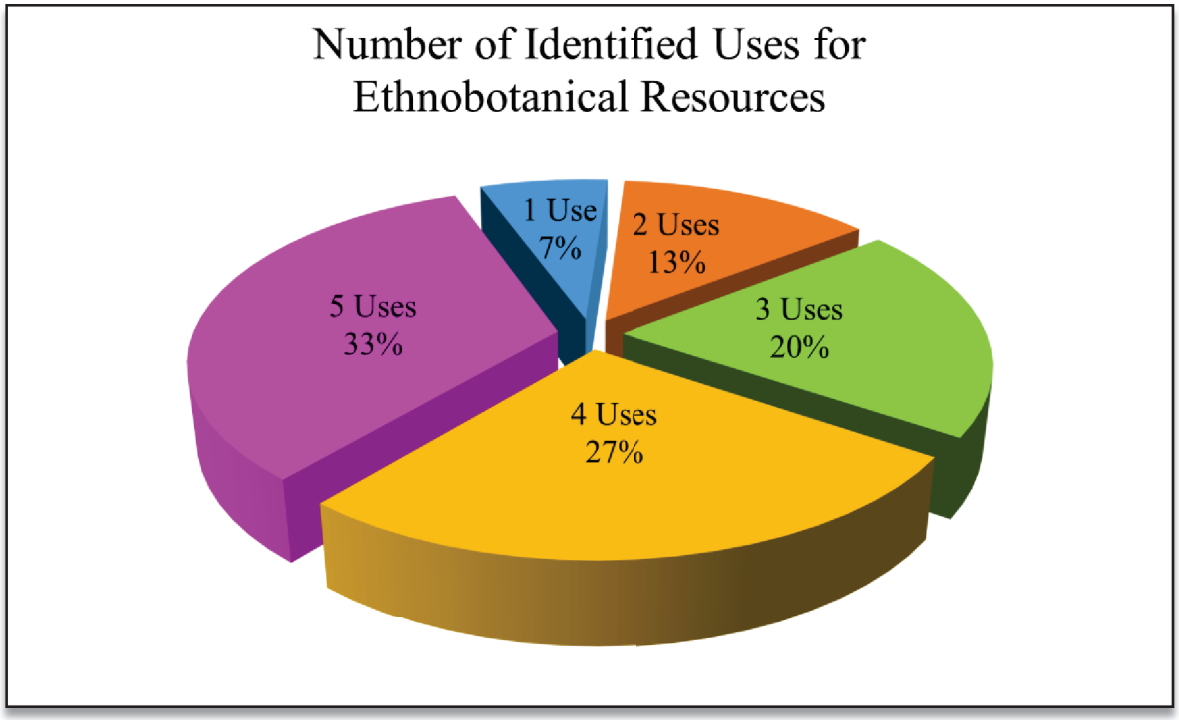


Figure 7.2 Number of Identified Uses for Odawa Ethnobotanical Resources in SLBE

Approximately 27 percent of the Odawa identified ethnobotanical have four categories of use. Ethnobotanical resources with three different categories of use amounted to 20 percent of the Odawa identified plants. Two categories of use were noted for 13 percent of the plant

resources identified in SLBE, while only 7 percent of the Odawa identified plants had a single use (Figure 7.2).

Multiple categories of use were selected for 93 percent of the Odawa identified plants (Figure 7.3). From the total 210 Odawa identified ethnobotanical resources, 195 are used for at least two different purposes. The categories presented by the UofA researchers indicated medicine, food, craft, construction, and other uses. Some of the participating Odawa representatives selected multiple uses for the same part of the plant, such as bark and its use as a construction, craft, and medicinal resource. In contrast, other representatives based their distribution of uses on different portions of a plant, such as roots used for craft, while sap was used in construction, and flowers were used as a medicine. In either case, the applicability of the plant fulfilling multiple categories of use was justified.

Categories of use for the contemporary ethnobotanical resources include medicinal, food, craft, construction, and other. Figure 7.3 presents the breakdown of these 210 contemporary ethnobotanical resource into categories of use. The total 210 plants were not limited to use in a single category, therefore the data reflects the number of plants used in each category out of the 210.

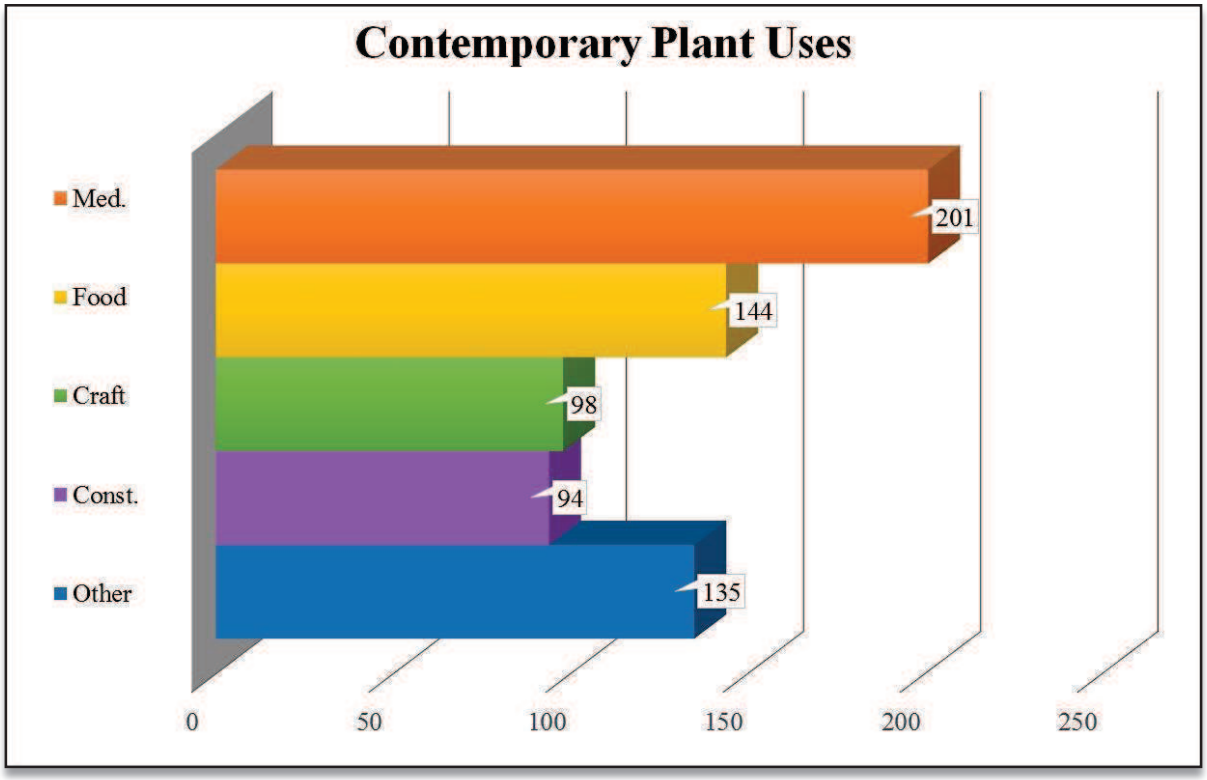


Figure 7.3 Categories of Contemporary Plant Use among Odawa People

From the list of 210 traditional use plants, a total of 201 were considered medicinal, and 144 of the plants were used as a food resource. A total of 98 plants out of the 210 served in craft

production, this includes basketry, box making, and other art forms, while 94 of the 210 were used in construction related activities. Within the category of 'Other', a total of 135 contemporary use plants out of 201 were noted. The following sections present the findings in greater detail and explain the categories.

7.1.1 Contemporary Medicinal Plant Use

Medicinal plant use was the most frequently selected use category totaling to 96 percent, or 201 of the total 210 Odawa identified species (Figure 7.3). Among the Odawa people medicine is a broad category of use, not simply restricted to treatments for physical illnesses. Many plants found growing within SLBE serve as a treatment or part of a remedy for a wide variety of ailments.

Trees, like the sugar maple, fill one role as a food source, and another as a construction material, and also serve as a source of medicine. The first sap to run from the sugar maple each spring is considered one of the most important medicines. It serves as a cleansing tonic to rid all of the impurities that have accumulated in the body during the long Michigan winters, explained one Odawa representative (Figure 7.4).



Figure 7.4 Odawa Representative and UofA Researcher Discuss the First Maple Sap as Medicinal

The use of the maple sap in the process of making maple sugar is very different from the role that it serves as a medicine. This illustrates the complexity in ethnobotanical resource use and difficulties associated with categorizing types of use.

7.1.2 Contemporary Food Plants

Interestingly, 68 percent or 144 of the 210 Odawa identified ethnobotanical resources were considered to be used as food resources (Figure 7.3). In addition to plants such as strawberries, blackberries, and cranberries that are well-known food resources, Odawa representatives identified a variety of other contemporary food plants while visiting SLBE.

The ethnobotanical resource known as Giant Puffball (*Calvatia craniformis*) is a traditional and contemporary Odawa food source (Figure 7.5). The Giant Puffball grows in wetland environments and is threatened by climate change. Many Odawa representatives noted the limited presence of this species in areas outside of the park, due to a decrease in bog and marsh areas.



Figure 7.5 Odawa Representative Discussing the Use of Giant Puffball (L); Giant Puffball (*Calvatia craniformis*) (R) (Creative Commons Attribution 2005: Giant Puffball)

Many of the ethnobotanical resources identified within SLBE are considered to be food resources that people would like to make use of today. Odawa representatives discussed blueberries, huckleberries, mushrooms, maple sap, and a variety of other resources in detail.

7.1.3 Other Types of Contemporary Plant Use

The category of 'Other' is meant to encompass ethnobotanical resources that hold non-consumptive uses, cultural preservation features, and any other function that does not fall within either food, craft, construction, or medicine. A total of 64 percent or 135 of the 210, Odawa identified ethnobotanical resources fell within the 'Other' category (Figure 7.3).

One of the ethnobotanical resources that was identified within this category is birch bark. Historically, birch bark was used as a tool for recording stories, oral history, origin narratives, and many other things (Howey 2012). Today, birch bark is used to create scrolls, similar to those from the past, with the contemporary use of the plant serving in cultural preservation efforts and teaching tribal youths about the history of the Odawa people. Likewise, birch bark serves as a source of spiritual protection.

7.1.4 Contemporary Plant Use for Crafts

Ethnobotanical resources that are used in crafts totaled to 47 percent or 98 of the 210 Odawa identified plant species (Figure 7.3). Many of these identified contemporary use plants were trees, such as birch, red willow, and black ash, which play an essential role in the construction of basketry. Basketry is an important cultural tradition and serves as a livelihood for many contemporary Odawa people. Poor harvesting practices harm the tree and prevents future use of the bark, therefore it was concerning for Odawa representatives to see poor harvesting had occurred at many locations throughout the park (Figure 7.6).



Figure 7.6 Odawa Elder Explains Differences between Good and Bad Bark Harvesting

Birch bark is used in the construction of baskets and containers used to harvest and store maple sugar. One of the chemical properties that exists within the birch bark serves as a natural pesticide. This is a feature that makes the storage of maple sugar in birch bark containers more preferable than other options. Odawa representatives explained many of the gathering and processing techniques that are required for use of the contemporary craft resources.

Other types of plants found within the park that fall under the category of craft include plants that are used for dyes, stains, and sealants, like pine pitch. Walnuts, acorns, and birch bark make a brown color that can be used in staining wood, or dying cloth. One Odawa representative explained that pine sap was used in the past and is still used to make certain items waterproof or water repellant today. A large number of Odawa identified plants within SLBE were noted as having multiple uses.

7.1.5 Contemporary Plant Use for Construction

Plants identified by Odawa representatives that can be used in construction amounted to 94 of 210 plants, or about 45 percent (Figure 7.3). Construction uses include making lodges, canoes, and tools, and the use of plants for binding and lashing materials.

Wild Grape as a food source is well documented. Odawa representatives brought to the attention of UofA researchers that it is also used for construction, a non-intuitive use. The vines are used to tie and fasten things like lodge poles, baskets, and other items (Figure 7.7). Lashings fashioned from grapevine are just one of many contemporary uses that this plant serves.



Figure 7.7 Wild Grape Growing at Sleeping Bear Dune National Lakeshore (David Fourer 2009)

Following the non-intuitive use of predominately food plants, it was of interest to UofA researchers to learn that maple trees are often used for construction. Maple saplings were noted by Odawa representatives for construction use in making lodges by gently bending the maple saplings into a low, rounded lodge. One does not necessarily even have to cut them if they are growing close together. The use of the maple tree in construction is not only unique, but offers a sustainable use pattern, much like sugaring.

7.1.6 Odawa Comments on Plant Use

While visiting sites within SLBE and identifying plants, Odawa representatives provided comments on different types of plant uses. They explained contemporary uses and offered notations on the use of the plant in a traditional context as well. Several of the Odawa representatives' responses are presented here.

- *We use the birch bark a lot, for a lot of things, again for medicine, crafts, everyday things, but we would use our birch bark baskets to hold some of the sap and things too, and the maple sugar syrup.*

- *Cattail can be used for a food source; to a medicinal source; to a construction source.*

- *Sweetgrass is a medicinal source, and craft source as well, and then it's also used for, like a cleansing product, a hygiene product.*

- *Bull rushes and cattails, are a big cultural resource for making those mats and bags.*

- *Pretty much all the tribes in Michigan believe there are four sacred medicines: Sweetgrass, sage, cedar and tobacco. Those are the biggies, very important use plants.*

These responses provide context for the multiple uses associated with certain plants. Multiple uses were very common in UofA researcher's discussions with Odawa representatives. A detailed list of the uses for each Odawa identified plant at SLBE is available in Appendix A.

7.2 Seasonal Gathering Patterns for Ethnobotanical Resources

Data about the season that certain plant resources were collected was identified during the course of the 2014 study. Odawa representatives explained that many ethnobotanical resources are gathered throughout the year as needed, but some of the plants are harvested only during a particular season. Figure 7.8 displays the percentage of plants gathered during each season.

7.2.1 Year Round Collection

Odawa representatives identified 68 percent of the 210 ethnobotanical resources within the park as available to gather year round (Figure 7.8).The long, cold winters that Northern Michigan experiences allow few resources to be collected in the winter months, but the bark and other parts of some trees, such as cedar, can gathered when it is cold, as well as during warmer seasons. Year round collecting encompasses the winter months in addition to spring, summer, and fall.

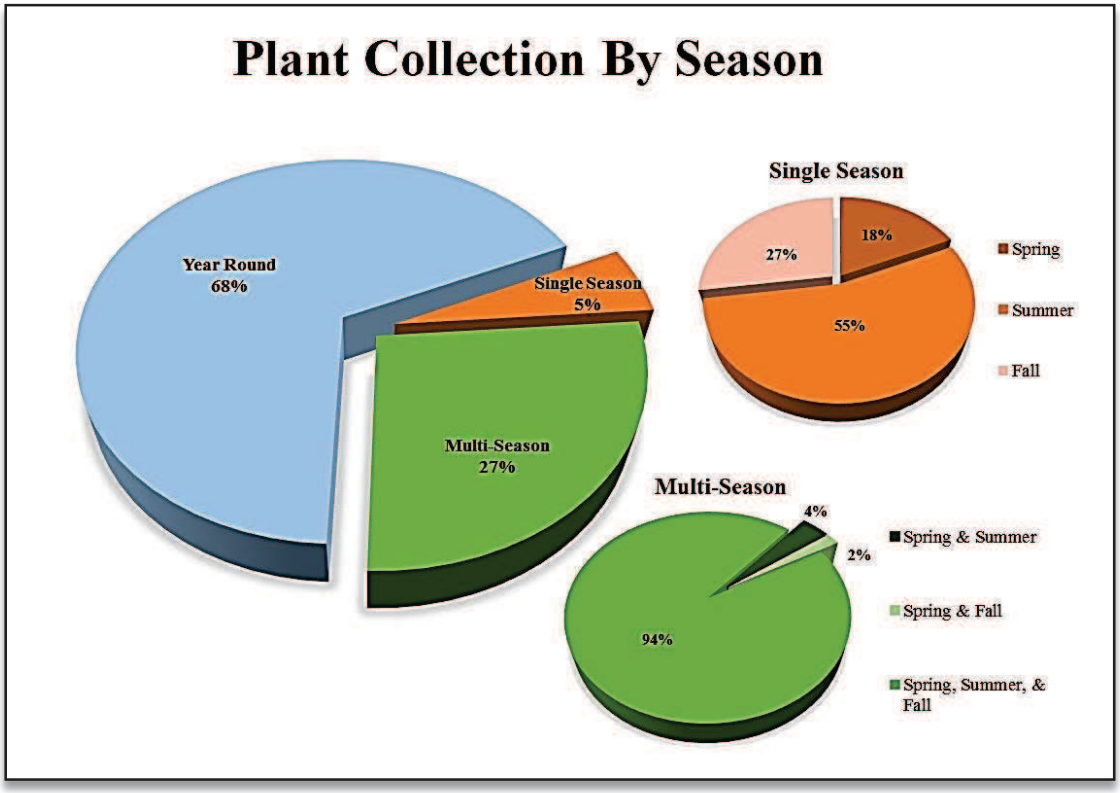


Figure 7.8 Plant Collection by Season

Year round collection is possible given knowledge of the land and the plant resources in the area. Changes in seasonal averages, and weather patterns have been very unpredictable in recent years, explained Odawa representatives, therefore it has become difficult to know when and where to harvest these seasonal resources today.

7.2.2 Multi-Season Collection

Many plant resources are collected during multiple seasons, such as wild grape, with the vine collected in spring and fall, while fruit is harvested in the summer. A total of 27 percent, or 57 of the 210 Odawa identified ethnobotanical resources were categorized as multi-season collection (Figure 7.8). Different parts of the plant are accessible at different times of the year,

allowing for multi-season collecting. The data for multi-season use plants is presented in Figure 7.8, illustrating the division of collecting seasons in detail.

Approximately 94 percent of the 57 plants that could be collected during multiple seasons were noted by Odawa representatives as being collected in spring, summer, and fall (Figure 7.8). Similarly, the ethnobotanical resources collected only during spring and summer amounted to 4 percent or eight of the 57 identified resources, and approximately 2 percent or four of the 57 multi-season collection plant resources were noted as being harvested during both the spring and fall.

7.2.3 Single Season Collecting

Ethnobotanical resources noted as available during a single season were significantly less than those available during multiple seasons, or year round. Of the 210 Odawa identified ethnobotanical resources a total of 55 percent or 115 plants were available for collection only in the summer, while 57 plants or 27 percent were collected only during the fall. In comparison, only 18 percent or 38 plants were available for collection during the spring (Figure 7.8).

Single season collecting is illustrated by the limited time period that Balm of Gilead (*Populus gileadensis*) and morel mushrooms (*Morchella esculenta*) can be gathered. The Balm of Gilead is shown in Figure 7.9. With only a two-week harvesting window in Northern Michigan. Balm of Gilead is difficult to gather without expert knowledge of the seasons.



Figure 7.9 Budding Balm of Gilead (*Populus gileadensis*) (APhotoflora 2004: Balm of Gilead)

Morel Mushroom (*Morchella esculenta*) is a well-known food plant that Odawa people gather in large quantities each spring, but it also serves as a seasonal predictor. Requiring a very specific type of weather condition, the morel mushroom harvest is highly variable, and can be minimal, mediocre, or abundant each year. One Odawa representative explained that if the spring is not moist and warm, the morels do not come up. In addition to the already limited seasonal availability, Odawa representatives noted their concerns regarding changing weather conditions and future availability of this contemporary use plant.

7.2.4 Odawa Comments on Seasonal Collecting

Odawa representatives explained their collecting requirements for each plant as they visited sites around SLBE (Figure 7.8). An image of one Odawa elder explaining seasonal collecting is presented in Figure 7.10. Over time, Odawa people have mastered the intricate process of timing the collection of ethnobotanical resources so that the plants they need are continuously available. Comments regarding collecting by season or within multiple seasons are presented below.

- *This tree is called Balm of Gilead (Populus gileadensis). We make a salve like Bengay or Tiger Balm. We pick it first in the spring. We pick when it's budding out, they look like brown fingernails, it's very sticky. It's a Populus tree. Very short time frame to get it, before it blooms out, just when sap comes to the branches. Golden nugget type of drops on the branches, but if we don't get it in that time then it's gone for another year.*

- *Blooming wild roses are an indicator of when you can harvest birch bark. It's usually very hot when it is time to harvest the bark, muggy. Bark pops off, sounds like a gun. You've got to know what you're doing so you don't hurt the tree. Some people cut way to deep and kill the tree. You never hardly see the big Birch trees anymore. Birch is used for canoes, containers, cover houses, start fires, and then they would bury people wrapped in Birch bark a long time ago. Lots of different components to Birch, medicine, the ski-tagen* [thunder medicine=shelf fungus]. *It's a pretty important tree.*

- *It's getting harder and harder to find plants, and some plant we can only pick right when we need them, you can't pick them ahead of time and if they aren't there right when we need them then that's really a crisis. We can try to use a substitute, but it might take longer or it won't work as well, the spirits told the healer that the person needed. Very rarely is there something that we can't get. We've been pretty lucky until now.*

- *We have a gauge of how we pick when we are picking medicines for the healers, and the people we see. So if we see a lot of a certain type of plant growing, we know we need a lot of that plant that year, that's the sickness will be seeing a lot of that*

year, so it's like a natural gauge and it works like that. Like some years we see a lot of yarrow, and it's like its telling us, you better get ready.



Figure 7.10 Odawa Representative Identifying Spring Plant Resources

Knowledge of when to gather certain plants is shared by elders, healers, and among family members, in much the same way as it has been done since time immemorial. For the Odawa people, education regarding plant collection is a hands-on learning experience. Many of the representatives who spoke with UofA researchers over the course of this study remembered the season that a resource was collected based on their initial experience gathering that plant. Knowledge of seasonal availability is critical for understanding Odawa plant use. Changing seasonal availability presents many difficulties for Odawa traditional knowledge about gathering.

7.3 Collection Volume of Plant Resources

When discussing plant gathering with Odawa representatives it was important to understand the necessary volume for each ethnobotanical resource that was identified in the park. Questions regarding the required collection amounts of each contemporary use plant by Odawa people were based on a scale ranging from 1) a handful or less; 2) a bucket or small container; 3) a large container or bushel basket; or 4) as much as an individual can carry. The amounts needed for each resource are detailed in Figure 7.11, with each of the previously described categories represented by percentage.

7.3.1 Collection of Small Amounts of Ethnobotanical Resources

The smallest quantity of any contemporary ethnobotanical resource gathered was assigned a measurement of a handful. Of the Odawa identified plant resources within SLBE, 16 percent or 33 of the 210 Odawa plant resources fell within this collecting measurement (Figure 7.11). Odawa representatives explained what plants required each type of measurement. Within the category of a few handfuls, small amounts of resources such as marsh marigold, yarrow, and sweet flag were desired.

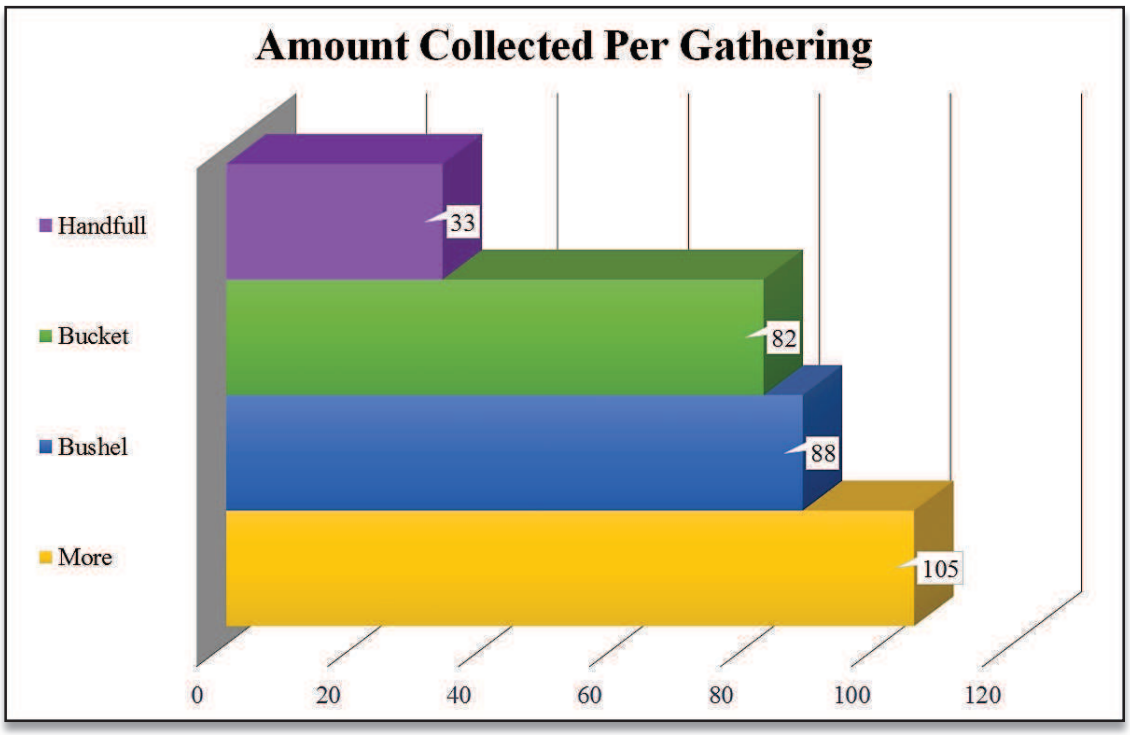


Figure 7.11 Amount of Ethnobotanical Resource Collected by Odawa Users

Sweet flag (*Acorus calamus*) highlights the minimal amount needed of a resource that is highly significant among the Odawa people. Referred to as *wiikehn* in Anishinaabemowin, the Odawa language, the root of the sweetflag plant is harvested at the size of a small fist. One or two roots will last an extended family for the duration of the year explained Odawa representatives. The plant is used to make a tea, earning it the common name of Singer's Root since the tea is often made on ceremonial occasions when a great deal of singing takes place. Sweetflag has become increasingly difficult to find due to wetland loss.

7.3.2 Collection of a Bucket Full of Ethnobotanical Resources

The next type of gathering measurement amounts to large bucket, approximately three gallons or less. Ethnobotanical resources that are collected at this volume amount to 39 percent, or 82 of the 210 Odawa identified plant resources within the park (Figure 7.11). Odawa

representatives explained that a large bucket full of berries, maple sap, wild mint, or mushrooms would be the type of resource generally measured by this quantity. Odawa representatives explained their specified measurements to UofA researchers (Figure 7.12).



Figure 7.12 Odawa Representatives Identify Hemlock (L) and Mullein (R) Collection Volumes

Plants, such as mullein (*Verbascum thapsus*), are desired in quantities equating to about a bucketful. One Odawa representative explained that the mullein is very important for treating upper respiratory illnesses. A large quantity of the plant is needed because it is dried for use in smoking mixtures. Fortunately, mullein is available nearly year round and is a plentiful resource within and outside of the SLBE park.

7.3.3 Collection of a Bushel Basket of Ethnobotanical Resources

A bushel basket is a unit of measurement most often used for dry volume, the equivalent of eight gallons. Using the bushel basket as a measurement standard, Odawa representatives noted only 42 percent, or 88 of the 210 ethnobotanical resources were required in such a quantity (Figure 7.11). Plant resources that are gathered at this measure include strawberries, daisies, and wild roses.

7.3.4 Collection of Large Amounts of Ethnobotanical Resources

Within the fourth category, the scale of measurement for gathering ethnobotanical resources is as much as a person can carry or a large amount. This measure amounts to 50 percent, or 105 of the 210 Odawa identified ethnobotanical resources in the park (Figure 7.11). This is inclusive of several buckets of a resource, an armload of birch bark, or a stack of cedar

boughs; predominantly resources that are needed in significant volume or that do not fit into a container.

7.3.5 Ethnobotanical Resource Collection Assessment

A large amount or more than a person can carry is the most widely used measurement for gathering ethnobotanical resources at 50 percent (Figure 7.11). A better understanding of the harvesting needs and volume of resources that the Odawa communities may require is presented through the analysis of amounts of ethnobotanical resources gathered by Odawa people. In combination with knowledge regarding ethnobotanical use categories, and the desired volume that Odawa people wish to gather, an understanding of the significance and necessity of plant resources becomes clearer.

7.4 Gender Division in Collection of Ethnobotanical Resources

Gender division in ethnobotanical resource collection was of interest to the current study. From the 210 Odawa identified plant resources found within the park 99 percent could be collected by both males and females.

One Odawa representative explained that the gender division in gathering was much more rigid in the past. Today, the goal for preserving the knowledge of plant use supersedes the need for gender specific plant gathering, so men, and women, anyone available and able bodied might go to collect resources these days. Additionally, resources like blueberries and strawberries can be collected as a family activity, in which all genders and ages participate, as long as females are not on their menstrual cycle, explained an Odawa representative. Odawa cultural regulations continue to dictate when women can participate in certain activities and gather plants.

7.4.1 Gender Specific Gathering

Only one percent of the identified plants were designated as women's plants, or plant materials that should be collected only by women. Odawa representatives explained that women are connected with water, and certain types of the ethnobotanical resources that grow near springs, rivers, and lakes, should be carefully collected by women since the connection with that resource is strongly female. Plants used in a medicinal capacity for female health problems, or fertility serve as examples of ethnobotanical resources best gathered by women if possible.

7.4.2 Odawa Comments on Gender Specific Gathering

Contemporary Odawa plant gathering does not appear to have a rigid gender division. Odawa representatives noted a number of cultural guidelines or regulations though. When asked about these specific gathering regulations Odawa representatives presented the following responses.

- *Women when they're on their, we call it moon cycle or moon time, are not to harvest at all. Such is the basics for us, for what we believe in. And it's not just women are, not that they're dirty or tainted in some way, their spiritual power is so high at that time. They're getting ready to create life, so their energy is off the charts. It can really throw off a lot of different other energies. So in our traditions women don't touch a man, or handle his food or his clothes while she's having moon time, because her power overrides everything. So we have to respect that.*

- *When people just lost a loved one they're encouraged to not gather for a year, at all. Not even be out gathering. That's just one of our protocols.*

- *Traditionally, only women that have gone through their change can pick and grow tobacco. That's one of the main restrictions that we have, people picking plants if their women. Women can't pick plants when they are on their menstrual cycle. Up north there's a lot of blueberry planes and you can go but there but they never grow berries, just green no blueberries, so we feel that women were picking during their cycle, so that's why there's no berries. Women are very powerful during that time, you're supposed to rest and take care of yourself* (Figure 7.13).

- *The cedars are probably protecting* [the spring]*, because cedar is a woman's medicine. So you see, when we learn from nature we see women as caretakers of the water and the cedar. The cedar is a woman's medicine too so it doesn't surprise me that this special spot is surrounded by cedar trees.*



Figure 7.13 Odawa Representatives and UofA Researchers Discussing Gender Specific Gathering

While gender does not currently serve as a defining factor in who can gather plant resources, it still plays an important role within Odawa culture and governs the timing when people can gather. Gender regulations play an important role in understanding the power that life events such as giving birth, menstruation, menopause, and the death of a family member have on the collection of ethnobotanical resources among Odawa people.

7.5 Plants with Noticeable Environmental Changes

Evidence of environmental changes on plants within SLBE was noted by all Odawa representatives. Approximately 77 percent or 162 of the 210 Odawa identified ethnobotanical resources exhibit evidence of some type of environmental impact. The total number of Odawa identified plants within SLBE that are thought to exhibit some type of noticeable negative change is visible in Figure 7.14.

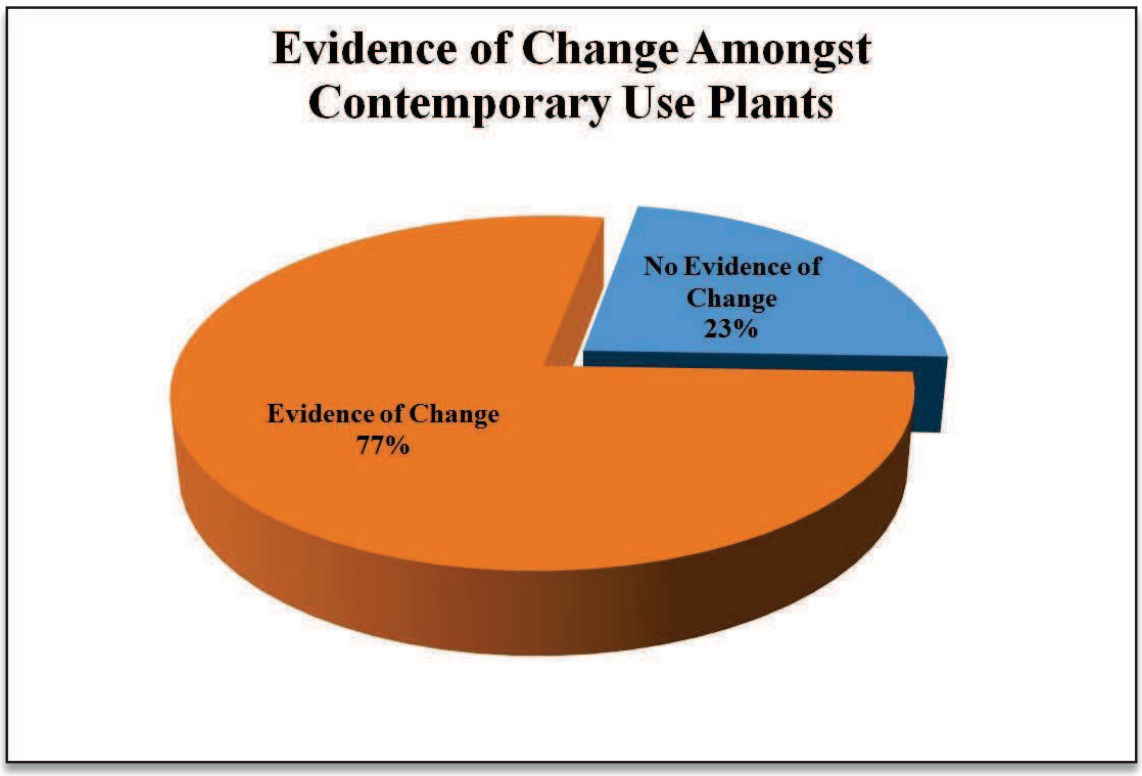


Figure 7.14 Evidence and No Evidence of Change in Ethnobotanical Resources

Within the category labeled as 'no evidence of change', only 23 percent of the Odawa identified plants within SLBE were noted (Figure 7.14). The category of no evidence of change was used by Odawa representatives to indicate that a given plant resource was 1) as abundant as normal, or 2) the plant was healthy and growing where one would expect to find it. The following sections outline the findings for each of these environmental impact categories in further detail and examine the evidence of change.

While discussing the availability of contemporary ethnobotanical resources within the park, Odawa representatives were given the opportunity to describe any environmental changes seen or experienced in their lifetime that they felt were affecting plants. These responses were compiled into a chart (Figure 7.15).

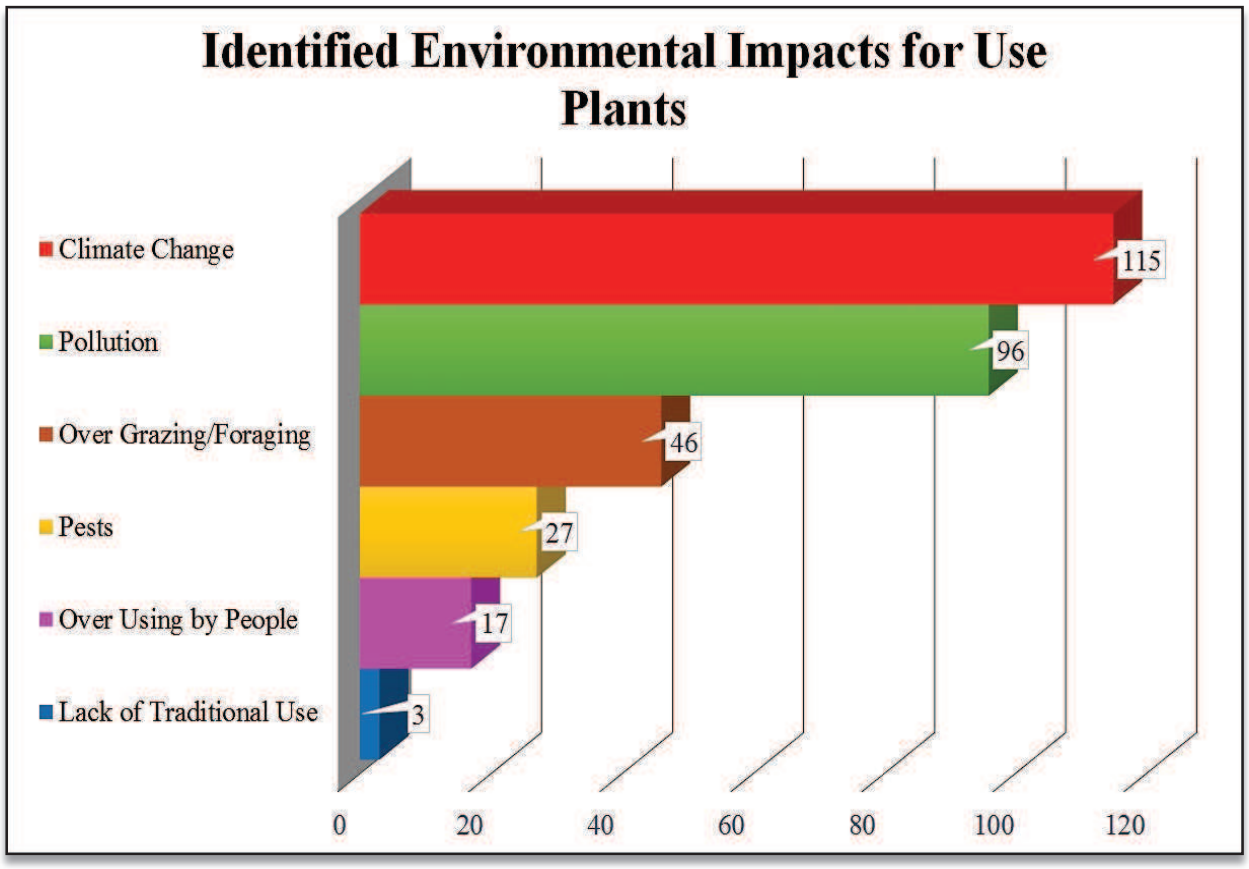


Figure 7.15 Evidence of Change in Ethnobotanical Resources

The categories noted in Figure 7.15 include climate change; pollution; over grazing or foraging; pests, such as bugs, worms, invasive species, etc.; over use by humans; and lack of traditional use. Climate Change was selected as the greatest threat to ethnobotanical resources used by Odawa people. It was thought to be affecting 55 percent of the 210 Odawa identified ethnobotanical resources growing within SLBE. A second category titled pollution, which encompasses water, air, and vehicle emissions, was selected for 96 of the 210 identified plants. Climate change and pollution appear to be having an effect on nearly half of the Odawa contemporary use plants available in SLBE. These categories are discussed in greater detail in the following sections.

7.5.1 Climate Change

Of the 210 plants thought to be displaying signs of environmental changes, 55 percent were attributed to climate change (Figure 7.15). Climate change is a topic of great concern for

Odawa representatives, regarding the availability and impact that changing weather and climate may have on important ethnobotanical resources. Odawa representatives explained the cultural significance of these contemporary use plants, and voiced their perceptions of climate change in the area.

Plants such as sweetgrass (*Hierochloe odorata*) and sweetflag (*Acorus calamus*), both wetland reliant species, were a source of concern due to a loss of wetland areas throughout Northern Michigan (Figure 7.16). Odawa representatives discussed the difficulties they have currently been experiencing in the acquisition of sweetflag, a culturally important resource.



Figure 7.16 Sweetgrass (Left) (Blackfoot Native Plants 2013); Sweetflag (Right) (University of Florida 2003)

In addition to culturally important plants like sweetgrass and sweetflag, other species were thought to be limited in availability or difficult to find due to climate change. A large number of wetland reliant plants that were observed at the Platte Plain Swales, Good Harbor Wetlands, and the Otter Creek Fens were discussed as displaying the most significant impacts of climate change because areas where these plants have previously been found are drying up.

Odawa representatives mentioned a noticeable increase in wind over the past decade. The windier conditions coming off Lake Michigan may contribute to the blowing sands on the beaches and dune bluffs. Blowing and shifting sands make it difficult for trees and new plants to stay rooted, explained one Odawa representative.

7.5.2 Pollution

Pollution was the second most prominent impact thought to be affecting Odawa ethnobotanical resources. The effects of pollution were visible on the health and availability of

46 percent of Odawa use plants, or 96 of the 210 Odawa identified ethnobotanical resources at SLBE (Figure 7.15). Odawa representatives explained that much of the pollution affecting plants throughout Northern Michigan is thought to have been caused by car exhaust and boat fuel.

Plants that are going to be used for medicinal purposes need to be healthy and in good condition. A plant in poor health does not have the power to help humans get better because it is sick too, explained one Odawa consultant. Gathering medicinal, food, and culturally significant plants in an area with heavy traffic, high amounts of vehicle exhaust, and possible spills of oil, antifreeze, and other car related products leaves noticeable damages on plant resources. Odawa representatives explained that when gathering plants the best place to go is somewhere far away from other people, in a pristine area, because the negative impacts are smaller in places like SLBE or even on private land.

7.5.3 Over Grazing and Foraging by Animals

Twenty-two percent or 46 of the 210 Odawa identified ethnobotanical resources, displayed environmental impacts due to over-grazing and foraging by animals (Figure 7.15). This category was open to the effects of both domesticated and wild animals.

Deer and elk were noted as responsible for the diminished volume of several Odawa ethnobotanical resources. One Odawa representative explained, hungry deer and other small animals, like porcupines, eat new growth on trees and sometimes flowers, leaving a plant with no buds, flowers, or fruits, and in some instances the deer even strip the bark off the trees (Figure 7.17). The healthy Northern Michigan deer populations and the loss of habitat due to development displace the deer, forcing a large number of them into an area without enough resources to support large populations (Michigan Department of Natural Resources 2014: Deer Hunting Prospects).



Figure 7.17 Deer at Platte Plain Swales (L) and Porcupine Eating Flowers (R) (Getty Images/Stock Photo)

The overgrazing of areas in the park by large quadrupeds like elk, was mentioned as a concern relating to plant resources. As the elk roam across marshy areas, they trample plants that grow there. One Odawa representative explained that bogs, marshes, swamps, even the swales, are places where rare medicinal plants often grow. Big animals come to these places to get drinks, and they accidently stomp on the plants.

7.5.4 Pests

Noticeable influences that were directly related to pest's amount to 13 percent or 27 of the 210 total plants that exhibited changes related to environmental influences (Figure 7.15). Over the past few decades, Michigan has experienced a series of attacks from invasive species and other pests. The most recent concern began in the 1990's with the arrival of the Emerald Ash Borer, a serious threat to the black ash (*Fraxinus nigra*) (Figure 7.18).



Figure 7.18 Odawa Representative with Black Ash Tree Scarred by Woodpeckers and Emerald Ash Borer

Odawa representatives mentioned other pests, like Tent Worms, Zebra Mussels, and several non-Native plant species, as points of concern for the ethnobotanical resources that they rely on. An increase in pests in the park, like the Emerald Ash Borer, has also triggered an increase in damage to trees by woodpeckers who eat the ash borer (Figure 7.18).

7.5.5 Over-Use by Humans

The over-use of ethnobotanical resources by humans amounted to only eight percent or 17 of the 210 plants were identified as exhibiting noticeable signs of change (Figure 7.15). Logging, removing bark, or harvesting of timber were all concerns presented by Odawa representatives. The results of clear cutting in the early 20th century are still visible in many areas of the park.

Evidence of harvesting bark during the wrong season was documented on several occasions as representatives visited the sites around SLBE. Reflecting on these poor harvesting methods, Odawa representatives reiterated the need to bring in an education component to the park that would explain traditional methods of resource use and the contemporary management of resources in a sustainable way.

7.5.6 Lack of Traditional Use and Management

Only three of the 210 Odawa identified plants, amounting to a total of one percent of the ethnobotanical resources, were thought to be adversely affected due to a lack of traditional use and management (Figure 7.15). Many of the Odawa representatives felt that the plants were managed in a way that was divergent from their own cultural values and management style. In general, Odawa representatives involved with this study attributed a great deal of the noticeable change in the plant resources in the park to poor use and management. Odawa representatives explained that if given the opportunity to make use of the ethnobotanical resources within the park the condition of the plants might improve.

7.5.7 Odawa Comments on Environmental Changes

While visiting sites within SLBE, Odawa representatives shared their perception of climate change and other evidence of environmental change occurring (Figure 7.15). During the site visits, Odawa representatives presented concerns regarding climate change and the future availability of traditional plant resources, such as the black ash (Figure 7.19). These comments are presented below.

- *We've seen a change in the black ash prior to the bug, the Emerald Ash Borer. We were losing the plant due to the loss of wetland, and now with the pest on top of it, and with the climate change coming, you know, it's bad.*

- *The wind has gotten worse over the years. There's also the drought, we have had some drought years were the plants weren't there, some of the medicines, there wasn't any out, they weren't out, and they went dormant. The weather is really crucial to what we do, picking medicine.*

- *Pesticides and pollution, that's what I think is one of the big impacts. Like, you can't pick along the side of the road. There are many medicines that I see driving, but won't pick along the road because of all the pollution, you have to go in back as far as you can get to pick things, I try to gather them clean. It almost has to be state land or federal land to gather on.*

- *We used to be able to tell the natural weather signs, you know like predict the weather, like the winter, those are way off now, you can't even go by that anymore. If there's a lot of acorns it's going to be a hard winter, if there's a lot of berries be a long winter, and some years it is, some years it isn't but it never used to be that way, it was pretty much a given.*

- *You can see the difference in the health of the plant, like if you go in a virgin area compared to out in the open where there's a lot of people, or traffic, the plants are so much healthier. They give off a better vibe not being walked on or disrespected. It's getting harder and harder to find plants, and some plant we can only pick right when we need them, you can't pick them ahead of time and if they aren't there right when we need them then that's really a crisis.*



Figure 7.19 Odawa Representatives Discussing Loss of Black Ash with UofA Researchers

Ethnobotanical resources that are of contemporary use to the Odawa people exhibited many varieties of environmental change. Odawa representatives pointed out and explained to the UofA researchers several of the most concerning changes, many of which are more visible in areas outside of SLBE. A desire to help guard the plant species found within SLBE was expressed by many of the Odawa representatives, who felt that SLBE serves as a protected zone capable of preserving otherwise limited and endangered use plants.

CHAPTER EIGHT
CLIMATE DISCUSSION

Climate change is a global issue. Although all of the world's population will be affected by climate change, people having certain histories, environmental adaptations, and cultural traditions will experience the impacts differently than others. As precipitation and temperatures increase, ecosystems will dramatically change. Similarly, more frequent and more severe extreme weather events will alter the planet further, and the ways people live on and interact with it.

American Indian cultures have complex human-nature relationships. Indigenous peoples are highly resilient to environmental change based on long and multi-generational histories of interaction with their environments that include coping with environmental uncertainty, variability, and change (Wildcat 2012: 509). However, indigenous peoples often have multitudinous connections to the earth that range from resource-based livelihoods to deep spiritual ties. Sophisticated connections and deep investments in these relationships make American Indians cultures simultaneously resilient and vulnerable to climate change. American Indian tribes' vulnerability to climate change, and the adaptation strategies they adopt are multi-faceted and deeply rooted in a complex historical context (Lynn et al. 2013: 553). Although extreme weather events and climate change have been altering environments and forcing human adaptation for thousands of years, contemporary climate change presents larger-scale threats due to the severity and frequency of the impacts and exponential global population growth.

The 2014 SLBE study focused on documenting Odawa knowledge of traditional and contemporary ethnobotanical resources, and indications of climate change. Through the use of the Native plant checklist and use recording form (Appendix B), with further questions from the site form (Appendix C) on changing climate, several findings were generated.

8.1 Habitats, Odawa Plant Resources, and Climate Change

Information found in chapter seven explained the types of environmental impacts that Odawa representatives felt were adversely impacting ethnobotanical resources found in and around SLBE. Climate change was identified as the primary cause of changes in plant health and availability. Discussions on plant resources and climate change among UofA researchers and Odawa representatives identified an overarching concern that the habitat, not just individual plant species, was experiencing impacts of warming, cooling, drying and other climate change indicative trends. Figure 8.1 displays the division by habitat of plant species threatened by climate change.

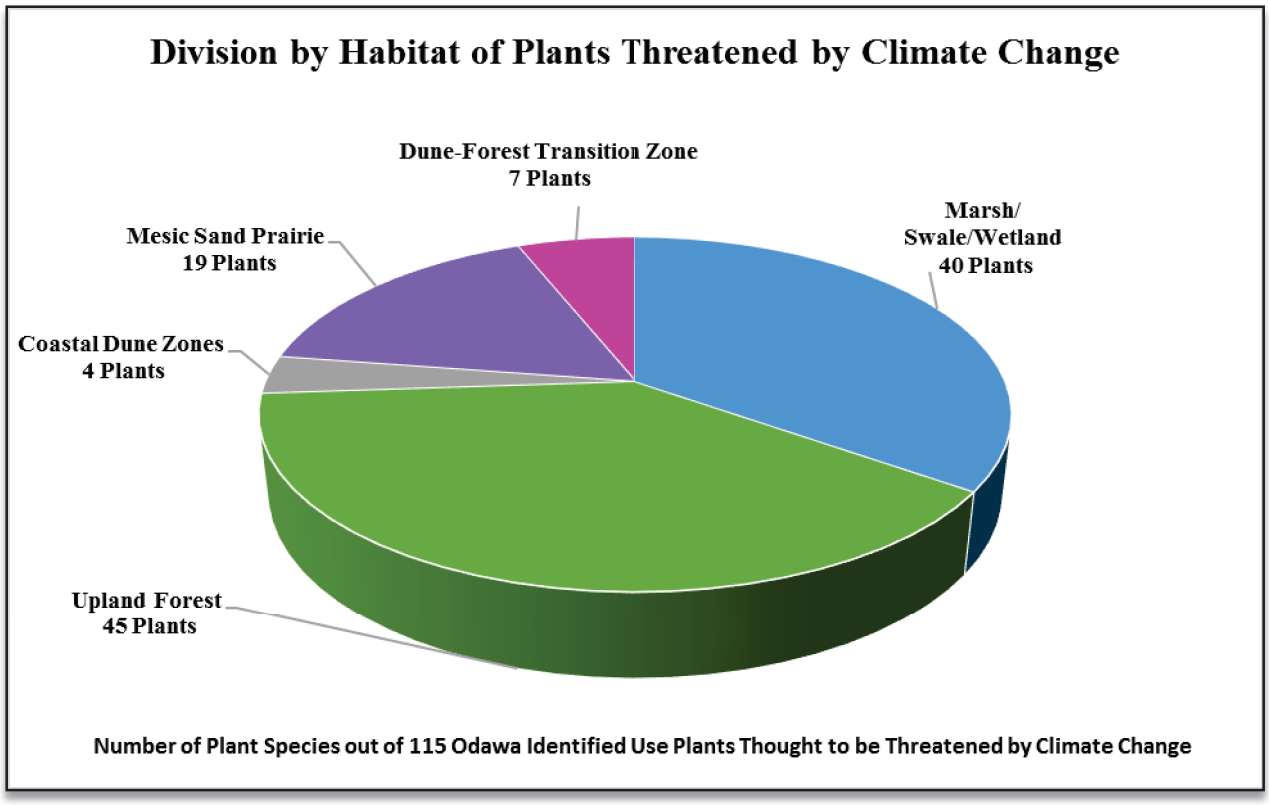


Figure 8.1 Division by Habitat of Plants Threatened by Climate Change

A total of 115 plants are thought to be demonstrating evidence of change in quantity or quality due to climate change. This includes drought, uncustomary hot and cold weather patterns, and prolonged freezing temperatures. These visible changes were most apparent in plants growing within forests and wetlands. Odawa representatives felt that the entire habitat was being effected by climate change, therefore prompting UofA researchers to look more closely at these habitats and plant species. Figure 8.1 was created to provide a visual aide in illustrating the observations by Odawa representatives of climate change and threatened habitats and ethnobotanical resources.

The natural vegetation of the Upper Great Lakes region is composed mostly of forests, with pine dominating in north-central and northwestern Michigan. The exceptions to this are minor. Other areas besides forests are marshes, bogs and swamps, and small isolated prairies to the west and southwest (Yarnell 1964: 4). Figure 8.1 divides the types of climate change threatened plants identified by Odawa representatives, based on habitat. These areas include 1) Upland Forest, 2) Marsh, Swale, and Wetland areas, 3) Mesic Sand Prairie habitats, 4) Dune-Forest Transition zones, and 5) Coastal Dune zones (Figure 8.1). Further analysis of the ethnobotanical resource types affected by climate change are present within Figure 8.2.

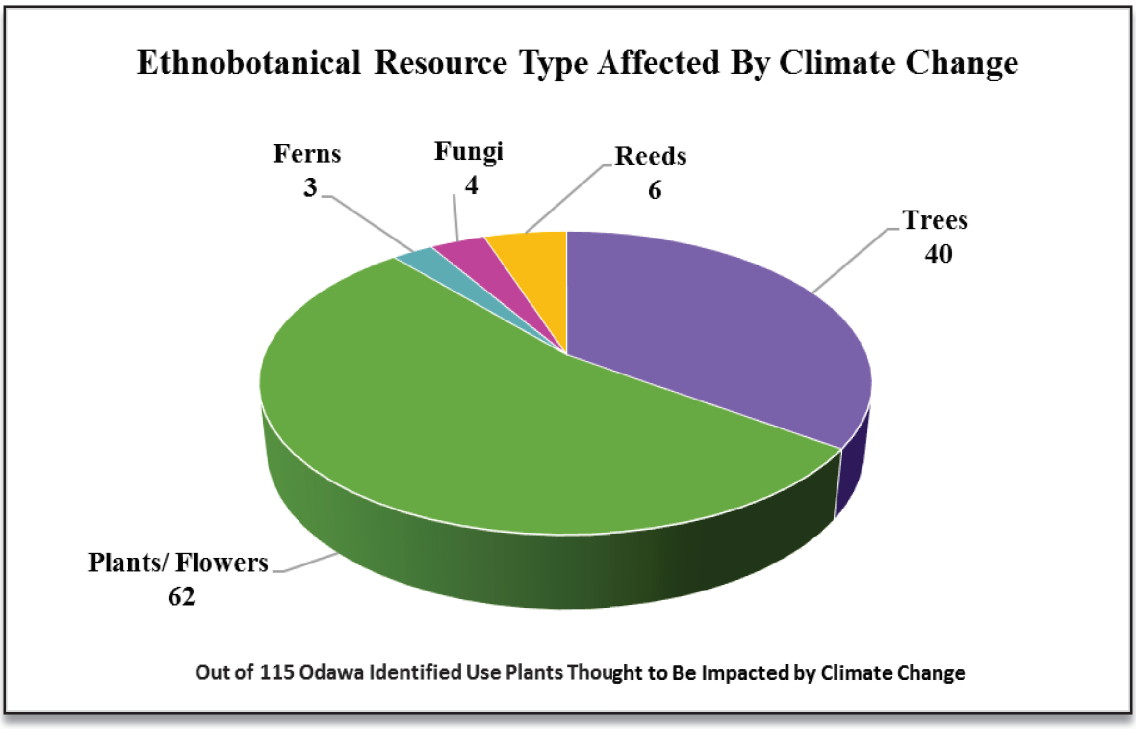


Figure 8.2 Ethnobotanical Resource Types Affected by Climate Change

This graphic represents broad categories of plants and ethnobotanical resources that Odawa representatives know are being effected by climate change. Categories include, 1) Plants/Flowers, 2) Trees, 3) Reeds, 4) Fungi, and 5) Ferns. Of the 115 species identified by Odawa representatives as threatened by climate change, 62 different types of plant and flowers were discussed. The second category of resources with noticeable changes encompasses 40 different species of trees. Six different types of reeds were thought to display evidence of climate change impacts, and four types of culturally significant fungi were mentioned. Three types of ferns that serve as medicine, food, and other purposes were thought to exhibit evidence of climate change impacts.

The following sections examine the division of plant types and habitats thought to be experiencing climate change. Odawa comments on climate change are included with each discussion of habitats. These comments serve to further illustrate the visible changes occurring throughout SLBE and northern Michigan in relation to changing climate and unusual weather shifts.

8.1.1 Upland Forests Experiencing Climate Change

The ecozone or habitat with the largest number of species thought to be experiencing threats due to changing climate, falls under the category of upland forest. Upland forests include a variety of hardwoods, shrubs, mosses, fungi, and flowers. The soil allows trees to attach their roots deep for stability, and is also rich in nutrients, which promotes plant growth. The majority of the upland forests at SLBE are comprised of extensive stands of mature beech and sugar

maple hardwoods. This forest type also has a good representation of hemlock, white pine, basswood, and white ash. There are also red oak, ironwood, and black cherry species (Sleeping Bear Dunes National Lakeshore 2015: Forests). Odawa representatives identified 45 upland forest plant types as threatened by climate change (Figure 8.1). Places like Pyramid Point, Glen Lake Sugarbush, and Platte River Point provide evidence of many upland forest types.

Maple (*Acer* ssp.), birch (*Betula* ssp.), and ash (*Fraxinus* ssp.) trees are some of the key forest resources that Odawa representatives identified as experiencing signs of decline, poor health, and other disruptions in seasonal availability, based on climate change. The maple tree holds a vital cultural role for Odawa people, who make use of the sap from the tree in the spring in many different ways, including food, medicine, and other purposes. Likewise, the wood from the tree serves as a resource for crafts and construction (Figure 8.3). Changes within Michigan climate will grow considerably warmer and probably drier during this century, and by the end of the 21st century, temperatures are projected to rise six-to-ten degrees fahrenheit in winter and seven-to-thirteen degrees fahrenheit in summer (Kling et al. 2003: Findings from Confronting Climate Change). What does this mean for maple trees?

Anishinaabemowin Word	Plant	Part Used	Use
ininaatig wiishkobaaboo	Sugar Maple	Sap	sugar, syrup, candy
zhiishiigimiiwanzh waboo	Red Maple	Sap	sugar, syrup, candy
Aninantig	Sugar Maple	Inner Bark	medicine, cough syrup
wiigwaas makak	Paper Birch	Bark	containers, scoops, baskets

Table 8.1 Examples of Spring Anishinaabeg Resources Threatened by Climate Change (GLIFWC 2001)

The process of harvesting maple sap, also known as sugaring, requires freezing temperatures at night with warming temperatures during the day. If the temperatures in Michigan and the Upper Great Lakes warm six-to-ten degrees fahrenheit in winter negative impacts are possible (Kling et al. 2003: Findings from Confronting Climate Change). The cultural distinction of March as the sugaring month may no longer be true. The Little Traverse Bay Bands Native Plant Initiative notes the *Anishnaabemowin* name for maple syrup is *ziinsiibaakwad* and the month of March is known as the Maple Syrup Gathering Moon, or *Ziisiibaakade Giizis* (Pilette 2009: 24). Odawa cultural traditions may shift based on the seasonal ability to hold sugaring camps. With the cooling and warming trends needed to get sap flowing possibly taking place in February or later, in April as opposed to March when sap was traditionally gathered, the cultural and ceremonial cycle that many Odawa people follow may shift.

Wiigwaas or paper birch, plays a vital role in Odawa culture as well as maple. Birch bark serves in the production of crafts, construction, and serves other multiple uses (Figure 8.4). Much like maple sap, a birch tree can be tapped, with sap used for candies, syrup, and sugar, explains the Great Lakes Indian Fish and Wildlife Commission (2001). Likewise, birch trees serve as a complimentary plant for maple sugaring, with storage containers and baskets made from birch bark used to store sugar, sap, and syrup. Climate change predictions for Michigan foresee

drought and drying, which poses a serious threat to birch trees and maples (Kling et al. 2003: Findings from Confronting Climate Change).



Figure 8.3 Paper Birch Growing at Pyramid Point SLBE

Trees and forests are sensitive to a range of environmental conditions, including permanent shifts and changes in climate. Other factors to which forests respond include human activities and management, biological relationships, and invasive pests. All of these things are affecting forest resources. This creates a dynamic within which forests grow and change in multiple ways.

Odawa Comments on Climate Change

This section has highlighted one of the key resources that Odawa people still rely on in the 21st century, which is maple sugar. The process of harvesting sap from maple trees each spring requires the overnight temperatures to drop below freezing, and daytime temperatures to swiftly rise to about 50 degrees Fahrenheit. Climate change and shifting seasonal patterns pose potential threats to the process of sugaring maples, and possibly to the trees themselves. Comments from Odawa representatives provide their views on the significance of the site and the possible impact of climate change on ethnobotanical resources, especially sugar maple and black ash trees.

- *They used to sugar at the end of February, March. I think this year* [2014] *they didn't do it until April, but we had a harder winter, a longer winter, and we had the*

longest snow, and even our Great Lakes froze over for the first time in a long time. We're talking about the big waters, not the little lakes around here. So it got frigid here. That has had an impact on some of the plants and the trees, so with a longer colder winter we weren't able to start doing maple sugar until April, in fact I think it just got done and we're in mid-May now. I think it was like April. Where before it was the end of February, March. So I do think, yeah, obviously the climate does have an impact on our medicines and our trees, and things like that.

- *I've noticed a decline in a lot of the resources, the available trees, and even areas, because a lot of its private property now. Aside from that fact, the places where we do go, I don't know why the trees are dying, but they're dying. Then this new thing with the Emerald Ash Borer for ash, we use the ash trees a lot for a lot of our baskets and, so, that's diminishing.*

- *If we had maintained the low temperatures that we were having this year for a longer duration, it would really have knocked out the Emerald Ash Borer that would have been great. Since we don't maintain or can't maintain those cold temperatures for long periods anymore though they're* [Emerald Ash Borer] *able to hang on, but I don't know, they're probably many other invasive species that we aren't aware of yet. The Emerald Ash Borer showed up in the early 1990's but we didn't know the extent of the damage until 1997 or 1998. Now it's too late, they devastated the black ash stands across the state. In response to the devastation of the black ash we've started collecting seeds, and put them in a seed bank. Maybe we can restart once this passes.*

- *It's not like it was in the old days, I think the nights and days aren't as cold as they used to be. That's what brings that sap up into the trees. It draws it and pushes that sap up. I used to hear those trees snap up there in the woods because, those maple trees, that sap would freeze and crack the trees. I used to have to wait for the bus and hear the trees out there. It used to be cold. I remember days when you go outside and breath and your breathe would freeze.*

- *It's getting hotter! They* [spring and summer months] *are getting hotter. Well this year, the* [maple] *sapping wasn't as good as it was last year because of less snow. We had snow but it went quicker than it usually does. Usually it goes down to where it helps the sap in the maple trees, to get that sap, but this year, it wasn't better. The people that I know making maple syrups said that it wasn't too good this year.*

- *And we don't know if the climate shift, getting warmer, with emerald ash borer, a semi-exotic bug, if the warm weather is letting it breed more. But we did hear from the DNR* [Department of Natural Resources] *from this past winter, that the severe cold really put the hurting on the bugs. With so many days below zero it*

increased their chance of fatality. So that's a good thing, that we had a really cold winter for that.

Decreased availability and abundance of traditional plants will have serious cultural implications for American Indians. Indigenous cultures utilize hundreds of plants contemporarily as food or medicine, as well as for ceremony, crafts, or construction. Along with the way traditional plants are used, the processes in which plants can be collected and stored can also be impacted by changes in access or resource availability due to climate change (Lynn et al. 2013: 546).

8.1.2 Marshes and Wetlands Experiencing Climate Change

Wetland ecosystems have nutrient rich soil that are generally saturated by freshwater. These features allow for abundant plant growth of plants like reeds, shrubs, flowers, and aquatic plants. Many of the plants identified by Odawa representatives as threatened by climate change often grow in slow-moving or still waters characteristic of swamps, swales, and wetland areas. This section examines some of the key Odawa ethnobotanical resources facing serious threats in health and availability, in relation to climate change.

One key wetland resource, although not available within SLBE presently, is wild rice (*Zizania* ssp.)(Figure 8.5). A wetland habitat is a requirement for wild rice to grow, but recently the temperatures and availability of water has impacted its availability in the Great Lakes region. Warming winters and changes in water level are crippling the ability of wild rice to grow and thrive in its traditional range. Wild rice is a pillar of cultural health for the Anishinaabeg people, and any decline in wild rice negatively affects their well-being (Vennum 1988: 58).



Figure 8.4 Freshly Harvested Wild Rice
(Gikinoo'wizhiwe Onji Waaban (Guiding for Tomorrow) "G-WOW" Changing Climate, Changing Culture)

For the people of the Great Lakes, *manoomin* [Wild Rice] is culturally significant. Industry and climate change have effected and continue to threaten the resource. The loss of this resource would not only have environmental, but also cultural, consequences.

> Were wild rice merely a staple in the Ojibwe diet, one might ask why it might not be replaced with foodstuffs easier to harvest and process. Traditional Ojibway life elevates rice above being food simply for consumption or barter. Stories and legends, reinforced by the ceremonial use of manoomin and taboos and proscriptions against eating it at certain times, show the centrality of wild rice to Ojibway culture" (Vennum 1988: 58).

The act of harvesting plants "encompasses the holistic aspects of wellness and includes physical, emotional, psychological, and spiritual realms of the individual and community" (Lynn et al. 2013: 548). Manoomin, is such a sacred resource that sharing the legends associated with the plant are reserved for powerful people during special times of year (Vennum 1988: 59). The threat that climate change presents to wild rice may harm cultural knowledge and values. Since the 1900s, the loss of wild rice acreage to mining, dams, and other activities has been substantial. Warmer temperatures could cause further losses by reducing water levels, reducing seed dormancy, favoring invasive and outcompeting plants, and create an environment more conducive to brown spot disease (Cozzetto et al. 2013: 71).

Livelihoods and cultures of American Indians are dependent on the presence of plant resources, and climate change is currently threatening the integrity of these practices learned over thousands of years. The effects of climate change will not only impact the variety and amounts of available plant resources, but "it will also affect tribal sovereignty and the treaties, federal policies, and federal trust responsibilities that support tribal access to cultural resources" (Voggesser et al 2012: 622). Climate change is not only threatening plant species, but also human cultures. Along with the physical impacts of climate change, dramatic changes to the access and availability of natural resources is causing the "erosion of traditional practices and knowledge" (Lynn et al. 2013: 548).

Odawa Comments on Climate Change

During site visits to Platte River Point and Platte Plain Swales, Odawa representatives agreed that the area appeared healthy and presented diversity of plant life, especially medicinal plants that are difficult to find elsewhere in the state. During discussions about the project, a number of concerns were presented by Odawa representatives with regard to climate change and the future availability of traditional plant resources. These comments are presented below.

- *This will speak to climate change in Peshawbestown. In 1997 or 1998, at that time we went out in Peshawbestown to gather some Sweet Flag, it is the root that we use, but the plant is a tall grass and it's a certain shape, anyways there's this patch where we used to get that Sweet Flag. So, my sister and I tried to gather that last August, which is about the time when you want to collect it, August, late July, but it was all dried up, that spot where we always got the Sweet Flag. It reminds me because the ground was kind of like this* [at Platte River Point]*, it was wet and*

moist, but that ground was just, it reminded me of desert sand because it was all dried up, it was really thriving back in 1998.

- *I would call it loss. I mean, from being a kid 20 years ago and going to these areas and running around, it would be like this in spring, and kind of the fun part when you're 10 is trying to navigate through the marsh, trying not to get wet, but then, going back 20 years later it's kind of like a field now, it's dry.*

- *I've watched the lake level here at Lake Michigan drop. Maybe now there are spots where water used to meet, say, within 5 or 6 feet of the road, M-22, and up until this year you could see for 200 yards a dry, stony shoreline before you get to the water. I have noticed a lot hotter summers up until right now too. I remember last year being in the 80's, mid 80's right now, about the end of May. I mean, that's the kind of the stuff that really comes to the forefront for me, immediately recognizable as the winters and the summers are changing.*

- *I've noticed a decline in a lot of the resources, the available trees, and even areas, because a lot of its private property now. Aside from that fact, the places where we do go, I don't know why the trees are dying, but they're dying. Then this new thing with the Emerald Ash Borer for Ash, we use the ash trees a lot for a lot of our baskets and, so, that's diminishing.*

- *Our fresh water is declining, and the lakes and streams, I'm starting to actually see streams dry up, where there used to be nice little streams or rivers. So yeah, I am definitely seeing changes, and like I mentioned with the wee-can, the sweet flag, there was a great big area where we would always go and get that, and this was in 1998, the late 90's, and now that patch is all dried up. But nothing's happening around there so that's definitely from the climate, it's not because of people and there wasn't development or anything there, it's still just all natural like it was, but you would think the soil was like desert soil, it's hard and cracked, where before in the late 90's it was all marshy and wet. So, there is something going on.*

- *I would say it's dryer there than it used to be, that's what I think. Last winter and this summer have been very different than the last 15 years. The temperatures has changed, it's jumping all over, unpredictable. That has to have an effect on the plants that grow here, plus the acid rains that bombard them.*

- *I think we're getting less water and because of heat, if you look the lakes are starting to go down. And the rain and the snow are not bringing water into the lakes. You can see that the lakes…even the big lakes have gone down.*

- *Climate change is drying up the wetlands. These plants really need a high amount of moisture and water, like mesquiguish and wiikehn.*

8.1.3 Mesic Sand Prairies and Climate Change

Mesic Sand Prairies have rich and moist soils, and are host to a diversity of wildflowers, grasses and low growing shrubs, like blueberry bushes. Odawa representatives identified 19 plants in grass meadow habitats that they felt were being impacted by climate change in SLBE. Of these 19 identified plants, several types of berry bushes, mushrooms, and many medicinal flower resources were noted as threatened by changing climate. Drought, cooling temperatures, and prolonged periods of freezing temperatures were described as some of the main climate related changes affecting the mesic sand prairie areas within SLBE and other parts of northern Michigan.

Post-logging regrowth has not occurred in meadows at the same rate as upland forests. Therefore, there are few trees and many grasses, shrubs, reeds, and flowers included in mesic sand prairie/meadow habitats. These clearings around SLBE, that are now open mesic sand prairie, came to be this way through agricultural and logging endeavors in the early 20th century. The mesic sand prairie near the base of Pyramid Point, and near the Glen Lake Sugarbush exemplify the post-logging habitat.

Odawa Comments on Climate Change

- *We've been having dryer spring seasons, because we haven't had that snow packed up until this past winter [2013-2014]. And… you need kind of that moist, wet spring to get a good bounty of the morel mushroom, because if it's really dry you're just not going to get it like you had before.*

- *Wow, that is a spring morel* [mushroom]*! Finding it here, in September is insane.*

- *Plants used to come up fuller and healthier in nice open areas like this* [walking up to Pyramid Point]. *We only see that if it rains hard. There is less water overall. The plants as a whole are not growing as well as they used to.*

8.1.4 Dune-Forest Transition Zones Experiencing Climate Change

Seven plants, identified by Odawa representatives as threatened by climate change, were found growing within areas considered Dune-Forest Transition Zones (Figure 8.1). The ecozone or habitat considered Dune-Forest transition zone is defined as an open dune area that is typically nestled within a forested landscape, with the dune sands supporting a variety of forest types (Michigan State University Extension 2014: Michigan's Natural Communities).

Open dunes are a grass-and shrub-dominated multi-seral community located on wind-deposited sand formations near the shorelines of the Great Lakes. Dune formation and the patterning of vegetation are strongly affected by lake-driven winds. The greatest concentration of open dunes occurs along the eastern and northern shorelines of Lake Michigan. As the dunes

stabilize farther from the foredune, forests begin to develop. Typically pines, including Jack pine (*Pinus banksiana*), white pine (*Pinus strobus*), and red pine (*Pinus resinosa*), are among the first tree species to establish, forming a scattered over story canopy (Albert 1999: 3).

Areas that were visited with Anishinaabeg representatives as part of the 1998-2001, and 2014 study that fit the dune-forest transition zone habitat description include Pyramid Point and areas near Platte River Point (Figure 8.6).



Figure 8.5 Odawa Representative Talking about Plant Resources at Pyramid Point

Odawa Comments on Climate Change

- *A lot of trees are coming down because of wind, look at these* [trees] *up here on the bluff, falling over now with roots hanging out. We actually had droughts. For the last couple of the years for the summer we don't have any rain, so we've seen less precipitation. Less water is bad for tree roots, they aren't holding on well, so they just blow over.*

- *My mom said it's gotten a lot windier in the past ten years. More severe wind, especially along the lakeshore.*

- *Summers have changed a bit,* [they are] *slow to come. It's pretty obvious that there are climate changes happening. It influences a lot relating to plants, like where and when you can find them, and also what types of plants start crowding and taking over where Native plants were previously. If it warms up we have new plants that move up here, you know, stuff that didn't used to grow here.*

8.1.5 Coastal Dune Zones Experiencing Climate Change

Coastal Dune beaches have soil that is low in nutrients, and is comprised of granular silica. Sand from these beaches blows easily, and is constantly shifting either by wind or water. These habitats experience the direct impacts of inclement weather more harshly than other places due to the fact that no large trees provide a canopy to shelter them from the elements. The plants that grow in dune-beach habitats have deep roots, so they are better able to endure the harsh environmental conditions.

Dune systems are well suited for the study of succession and ecological change because of the rapid changes which occur. For example, when drops in lake levels expose sand spits, sand bars, or create new foredunes, these features are rapidly colonized by beach grass. Convergence points of streams often experience sand build up, choking off or blocking the stream flow due to blowing sands. This is exemplified at the Otter Creek Mouth site in SLBE during multiple seasons (Figure 8.5). Within one or two human generations the vegetation can change from beach grass, to shrubs and trees. Storms and high lake levels can cause even more rapid changes in plant communities (Michigan State University Extension 2014: Michigan's Natural Communities).



Figure 8.6 Convergence of Lake Michigan and Otter Creek Mouth, SLBE at Multiple Seasons

Odawa representatives noted the medicinal value of many plant resources growing within the beach area at Otter Creek Mouth, and also at Good Harbor Beach. These two sites presented four key ethnobotanical resources that Odawa representatives felt were greatly threatened by climate change (Figure 8.1). Some of these beach plants include beach pea, honeysuckle, and pitcher's thistle.

Odawa Comments on Climate Change

- *A lot of the plants we need grow on these dune areas, around here* [Otter Creek Mouth]. *It's getting harder and harder to find them* [plants], *and some plants we can only pick right when we need them, you can't pick them ahead of time and if they aren't there right when we need them, then that's really a crisis.*

- *One* [plant] *that I'm looking for and not seeing that should grow on the banks is called bearberry. It's a dune plant. They like sand blowouts where the wind hit them.*

- *The plant that comes to mind as really limited and hard to find anymore is Pitcher's Thistle* [*Cirisium pitcheri*]*, if you're going to find it, then it should be around here, this type of duney* [dune sic.] *area* [Otter Creek Mouth].

- *Honeysuckle, is kind of an exotic plant. It grows in North America, down south usually, so I don't know if that's a climate change thing or what* [but it's new around here].

- *We had some brutal storms this summer, things I've never seen before and the older people had never seen before in their lifetime. I live in Harbor Springs, MI and we had a giant wave come off Lake Michigan, nothing like this has ever happened before. It was huge, and powerful, it wiped out the city dock and overturned the big boats, like fishing boats and people's big yachts, just flipped them over. It left debris, and dirt, and all sorts of sandy kind of stuff around the harbor. I don't know what's causing that strange type of event out on the water, but it has to have something to do with big winds.*

8.2 Long-Term Environmental Knowledge

Environmental knowledge develops to different degrees over time. The most basic understanding of an environment is *local knowledge*. This level of understanding develops within the first generation of settlement. This population becomes familiar with their surroundings, learn where resources are located, and develop some understanding of how to utilize different resources. Individuals may learn new survival skills, but that knowledge is not yet spread among the community (Stoffle et al. 2003: 101).

A more advanced environmental understanding is termed *Traditional Ecological Knowledge* (TEK). This level of knowledge is generally associated with cultures who has built an extensive knowledge domain regarding their environment through experiential learning over an extended period of time. Thus, contributed to the awareness and understanding of natural resources and weather. Fikret Berkes is one of many scientists and Indigenous people who defined this knowledge domain as Traditional Ecological Knowledge (TEK), which "represents experience acquired over thousands of years of direct human contact with the environment" (1993: 1). The environmental knowledge domain is built from a year-by-year system of implementing previous knowledge and new adaptations in order for both the humans and the environment they live in to be sustained. The longer a population lives in a single region, the stronger the connection they will have to the environment and the more complex the TEK they practice will be. It is not until a population has worked with and learned from their environment for five generations (about 125 years) that, "they have a firm information base about the environment and how to use the land without hurting it" (Stoffle et al. 2003: 104). TEK develops over an extended period of time, with the continuity of people living in the same place through time. It includes an in-depth understanding that multiple natural resources or events are "an understanding of relationships between specific biological entities (plants, mammals, birds, insects, fish) and among biological and physical entities (rocks, bodies of water), landforms (mountains, isolated hills, unusual rock formations), and meteorological phenomena" (Pierotti 2001: 9). This knowledge domain is shared and utilized through the community, and incorporates secular and sacred explanation.

Indigenous Knowledge (IK) is the most advanced level of environmental knowledge, and requires 16 generations (about 400 years) of humans learning from and adapting to environmental events in the same ecosystem annually (Stoffle et al. 2003: 106). It also requires a commitment to the methods that have been learned by the previous generations, "if you follow 'our ways' you will always have food, shelter, and health, and the environment will be in balance" (Stoffle et al. 2003: 106). In IK, there is no distinction between the secular and the sacred, "there is a confluence between science and religion, as the scientific findings of past generations have been recognized as essential to life and moved into the realm of the sacred and thus beyond human control" (Stoffle et al. 2003: 107). This knowledge is spread among all communities of a shared culture. Odawa people demonstrate IK.

IK is knowledge of natural resources and ecosystem that is time-tested through continuous adaptations to changing environments, "Native peoples use this knowledge to maintain and cultivate biodiversity, valued resources, and ecological health in their homelands. Simultaneously, people adapt their knowledge base to changes in the environment" (Voggesser et al. 2012: 616). What makes this level of environmental understanding so complex is that, "indigenous knowledge evolves all the time and involves constant learning-by-doing, experimenting, and knowledge building" over hundreds or even thousands of years (Berkes 2009: 154). While the knowledge itself is significant, the process through which TEK or IK are developed, practiced, and adapted over time and change is very important in understanding climate change and how to mitigate its effects. TEK and IK are intricate domains of experience, information, and adaption. TEK and IK are not only specific knowledge, but also encompasses general ways of developing, thinking about, and sharing environmental knowledge.

Generational learning has created a set of protocols that support communities, regardless of shifts in temperature and precipitation. TEK/IK as knowledge systems have made American Indian cultures resilient to climate change because of the past experiences that can be drawn from regarding their TEK/IK surrounding adaptation to natural perturbations. TEK/IK are fundamental aspects of American Indian cultures. It not only sustains a working relationship between people and their environment, but "many aboriginal people regard TEK as unique to their culture and locality, and as a positive and empowering attribute of their aboriginal identity" (Usher 2000: 191). TEK/IK practices facilitate environmental, social, familial, and spiritual relationships; as well as provide a means for addressing internal and external forces that threaten the balance of these relationships.

TEK/IK have been applied since time immemorial in order to maintain a balance within this delicate relationship. Political, social, cultural, and ecological factors over time have impacted traditional livelihoods and disrupted some of the ways in which American Indian populations interact with the environment. Just as historical events have disturbed TEK/IK practices, climate change will also have significant impacts on American Indian cultures. Overtime, TEK/IK practices have enabled American Indians to adjust and adapt to environmental changes. However, the current rate at which the climate is changing and the severity of the environmental and social impacts that have been predicted, pose new threats to the systems. If a powerful and culturally central plant has not grown abundantly enough to harvest, TEK/IK, traditional practices, and aspects of traditional life cannot be taught by the elders to younger generations (Lynn et al. 2013: 548). Because IK does not separate sacred and secular interpretations of nature, the threats of climate change will have an extraordinary effect on Indigenous cultures.

8.3 Odawa Comments on Environmental Changes

While visiting sites within SLBE, Odawa representatives shared their perception of climate change and other visible evidence of environmental change occurring in the region. Concerns were presented regarding the future availability of traditional plant resources based on cooling, warming, drying, and other unusual weather shifts. Some of the comments presented by Odawa representatives on general climate change are included here.

- *There is drought. We have had some drought years were the plants weren't there, some of the medicines, there wasn't any, they weren't out, you know, they went dormant. The weather is really crucial to what we do, picking medicine.*

- *We used to be able to tell the natural weather signs, you know like predict the weather, like the winter, if there's a lot of acorns it's going to be a hard winter, if there's a lot of berries be a long winter, and some years it is, some years it isn't but it never used to be that way, it was pretty much a given.*

- *If we have another winter like we did last year that will be a real test of adaptability and survival for plants and trees in the area. We had really easy, warm winters for about 10 years, but last year it was a true winter, it started snowing in October and never stopped until the end of May. It was crazy. An old time winter.*

- *We have summers, you know, it's just dry, very hot, and then the winters are very mild, very little snow. Two winters ago, it was March; just the tail end of winter, and it was 80 degrees. Then everything bloomed, and then it got cold again and killed all the cherries, apples, all the fruit died across the state. It was a disaster for farmers. We never had weather that extreme. It was literally 80 degrees in early March, like first week, and then it got cold like 30 degrees, 25 degrees, and everything died. But this year, you know, we went back to what we call a normal winter. Lots of snow, very cold, but we haven't had a winter like this in 20 years* (Figure 8.6 displays snowfall at SLBE in April 2014).

- *We have been hearing reports about people getting swimmers itch from the great lakes, which is unusual, it never started happening until recently. You hear about people getting it from the inland lakes because they are shallower, and warm more quickly causing the bacteria to grow faster, you know? But the fact that people are getting the swimmers itch from Lake Michigan now, wow that is concerning, the water is usually really cold, but maybe it's getting warmer. There like little worms that get under your skin.*



Figure 8.7 Spring 2014 near Good Harbor, SLBE

The perceptions of climate change noted by Odawa people were very poignant, reflecting noticeable changes and concerns on small and large-scale issues. These Odawa representatives voiced many of the same concerns as climatologists and biologists. Comments from Odawa representatives focused on the impact that climate change has had on maple sugaring, changing lake levels, and different types of weather patterns in the 21st century.

During a discussion about climate change impacts, one representative described the chain of events that ensue. A changing climate will influence plant growth. Fluctuations in plant resources will in turn impact animal populations. Many Odawa people depend on regional animals, like the porcupine, for craft production and livelihood.

- *From a cloud with a little bit of rain, to a tree, then a porcupine, then a person, then a hungry kid. Nobody can make a basket, or make a quill box without these* [natural resources].

This representative suggested that climate change already has a broad impact. This concept has been reinterpreted as a visual diagram (Figure 8.7).

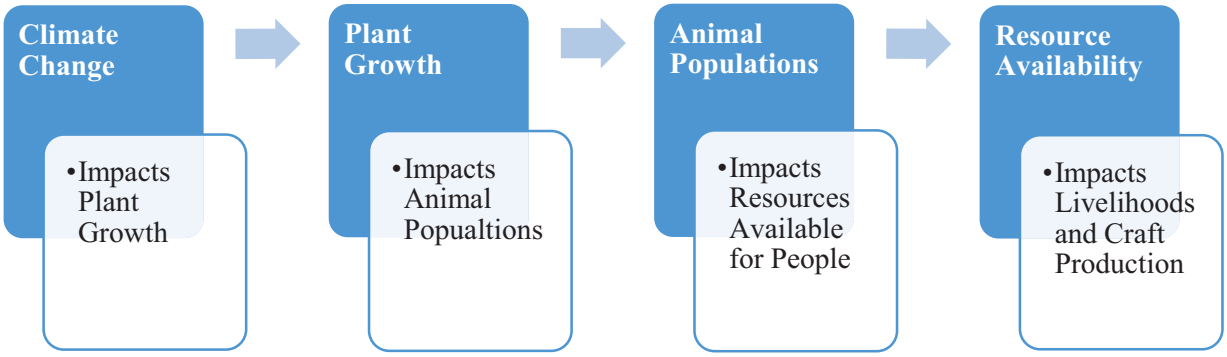


Figure 8.8 Climate Change Impact Diagram

The impacts of climate change may be subtle, but they are significant. Without access to ethnobotanical resources Odawa culture will be negatively impacted. The Odawa people depend on plants for many purposes that are key in the continuation of their traditional and contemporary livelihoods.

8.4 Chapter Summary

These comments from Odawa representatives illustrate the small and large-scale impacts of changing climate and shifting weather in Northern Michigan. Odawa people with traditional knowledge of plant and animal resources in SLBE and the surrounding region noticed increasing amounts of change over the last fifty years. Activities like maple sugaring that are set to occur at a certain time annually no longer occur at the culturally prescribed time. These major changes are of concern to the Odawa people, who rely on these ethnobotanical resources.

Bibliography

Albert, D.A.
1999 Natural Community Abstract for Open Dunes. Michigan Natural Features Inventory, Lansing, MI. http://mnfi.anr.msu.edu/abstracts/ecology/open_dunes.pdf, accessed Feb. 22, 2015

Anderson, R. Scott, Jim Hasbargen, Peter A. Koehler, and Eric J. Feiler
1999 Late Wisconsin and Holocene Subalpine Forests of the Markagunt Plateau of Utah, Southwestern Colorado Plateau. U.S.A. Arctic, Antarctic, and Alpine Research 31(4): 366-378.

Austin, Diane E.
2004 Partnerships, Not Projects! Improving the Environment through Collaborative Research and Action. Human Organization 63(4): 419-430.

Bak, Richard
2010 Michigan's Killer Heat Wave. http://www.hourdetroit.com/Hour-Detroit/July-2010/Too-Hot-to-Handle, accessed Nov. 18, 2013.

Barras, C.
2014 AD 536: The Year that Winter Never Ended. New Scientist 221(2952): 34-38.

Beaudry, Fredric
2014 El Niño, La Niña and Climate Change: How is Global Warming Affecting These Natural Climate Cycles? http://environment.about.com/od/globalwarming/a /elninolanina.htm, accessed on Feb. 20, 2014.

Beck, Lillian A.
1987 History of Aral and Otter Creek. Unpublished manuscript. On file, SLBE Library, Empire, Michigan.

Berkes, Fikret
2009 Sacred Ecology. New York, NY: Routledge.

Blumer, Stephen P., Fred V. Nurnberger, David A. Hamiton, and Richard C. Sorrell
1991 National Water Summary 1988-89: Michigan Floods and Droughts. U.S. Geological Survey Water-Supply Paper 2375: 335-344.

Bocinsky, R. Kyle, and Timothy A. Kohler
2014 A 2,000-year Reconstruction of the Rain-fed Maize Agricultural Niche in the US Southwest. Nature Communications 5618 (5): 1-12.

Booth R. K, Jackson S. T, and Thompson T. A.
2002 Paleoecology of a Northern Michigan lake and the Relationship Among Climate, Vegetation, and Great Lakes Water Levels. Quaternary Research 57: 120–130.

Booth, R.K., M. Notaro, S.T. Jackson, and J.E. Kutzbach
2006 Widespread Drought Episodes in the Western Great Lakes Region During the Past 2000 Years: Geographic Extent and Potential Mechanisms. Earth and Planetary Science Letters 242: 415–427.

Bradley, R. S., and P. D. Jones
1993 Little Ice Age' Summer Temperature Variations: Their Nature and Relevance to Recent Global Warming Trends. The Holocene 3 (4): 367-376.

Briffa, K. R., P. D. Jones, F. H. Schweingruber, and T. J. Osborn
1998 Influence of Volcanic Eruptions on Northern Hemisphere Summer Temperature Over the Past 600 Years. Nature-London (6684): 450-454.

Calver, James Lewis
1947 The Glacial and Post Glacial History of the Platte Lake and Crystal Lake Depressions of Benzie County, Michigan Publication 45, Geological Series 38, Part II, Michigan Department of Conservation. Lansing, Michigan: Franklin DeKleine Printing Company.

Cardinal, Jane and Connie Cobb
2012 The Place Where the Crooked Tree Stood. Good Hart, MI: Crooked Tree Book Co, LLC.

Cavanaugh, K. C., J. R. Kellner, A. J. Forde, D. S. Gruner, J. D. Parker, W. Rodriguez, and I. C. Feller
2013 Poleward Expansion of Mangroves is a Threshold Response to Decreased Frequency of Extreme Cold Events. Proceedings of the National Academy of Sciences.

Clifton, James A., George Cornell, James M McClurken
1986 People of the Three Fires: The Ottawa, Potawatomi, and Ojibway of Michigan. Grand Rapids: Michigan Indian Press, Grand Rapids Inter-Tribal Council.

Cozzetto K., Karletta Chief, K. Dittmer, M. Brubaker, R. Gough, K. Souza, F. Ettawageshik, S. Wotkyns, S. Opitz-Stapleton, S. Duren, and P. Chavan
2013 Climate Change Impacts on Water Resources of American Indians and Alaskan Natives in the U.S. Climatic Change 120(3): 569–584.

Diedrich, Mark
1990 Ojibway Oratory: Great Moments in the Recorded Speech of the Chippewa, 1695-1889. Rochester, MN: Coyote Books.

Eisenberg, Amy
2013 Aymara Indian Perspectives on Development in the Andes. Tuscaloosa, AL: University of Alabama Press.

Ευρωπαίοι Νέοι Συζητούν για την Αειφόρο Ανάπτυξη (ENSAA)
2011 Defining Climate Change. http://www.ensaa.eu/index.php/climate-change/97-defining-climate-change.html, accessed on Jan. 14, 2014.

Evans, Donald L., Scott B. Gudes, and John J. Kelly, Jr.
2001 Northern Idaho and Western Montana Summer 2000 Wildfires. NOAA Service Assessment. http://www.ncdc.noaa.gov/extremeevents/specialreports/July-2000-Western-US-Wildfires.pdf, accessed Nov. 3, 2014.

Free, Melissa, and Alan Robock
1999 Global warming in the context of the Little Ice Age. Journal of Geophysical Research: Atmospheres. 104 (D16): 19057-19070.

Gabric, Larry, Harold J. Keeney, and Erik S. Pytlak
2012 Climatological Effects of the El Nino Southern Oscillation in the Lower Great Lakes and Ohio Valley, http://www.erh.noaa.gov/cle/localinterest/enso.html, accessed on Dec. 13, 2013.

Gräslund, Bo and Neil Price
2012 Twilight of the Gods? The 'Dust Veil Event' of AD 536 in Critical Perspective. Antiquity 86 (332): 428-443.

Great Lakes Indians Fish and Wildlife Commission
2010 Climate Change. http://www.glifwc.org/environmental.html, accessed Feb.17, 2014.

Green, D., and G. Raygorodetsky
2010 Indigenous Knowledge of a Changing Climate. Climatic Change 100 (2): 239-242.

Greenough, Gregg, Michael McGeehin, Susan M. Bernard, Juli Trtanj, Jasmin Riad, and David Engelberg
2001 The Potential Impacts of Climate Variability and Change on Health Impacts of Extreme Weather Events in the United States. Environmental Health Perspectives. 109.

Gross, Paul
2010 Extreme Michigan Weather: The Wild World of the Great Lakes State. Ann Arbor: University of Michigan Press.

Gunn, Joel
2000 The Years Without summer: Tracing A.D. 536 and its Aftermath. Vol. 872. Oxford, England: Archaeopress.

Handy, A.H., and J.R. Stark
1984 Water Resources of Sleeping Bear Dunes National Lakeshore, Michigan, U.S. Geological Survey Water-Resources Investigations Report 83-4253.

Harris-Mann Climatology
2013 Weather History and Climate. http://www.longrangeweather.com/Weather-Forecasts.htm, accessed Feb. 20, 2014.

Hazlett, B.T.
1991 The Flora of Sleeping Bear Dunes National Lakeshore, Benzie and Leelanau Counties, Michigan. The Michigan Botanist 30:139-202.
1988 Factors Influencing Island Floras in Northern Lake Michigan. Dissertation, University of Michigan.

Hirst, Kris
ND "Dust Veil of AD 536 - 6th Century Environmental Disaster in Europe: Cometary Impact, Volcanic Eruption or Near Miss?" About Education. http://archaeology.about.com/od/medieval/qt/Dust-Veil-of-AD-536.htm, accessed March 2, 2015.

Huizinga, Andrew
2010 Michigan Severe Weather Events. http://web2.geo.msu.edu/geogmich/sig_weath_events.html, accessed Nov. 8, 2013.

Johnston, Basil
1995 The Manitous: The Supernatural World of the Ojibway. New York: Harper Collins.

Jones, P. D. K. R. Briffa, T. P. Barnett and S. F. B. Tett
1998 High-resolution Paleoclimatic Records for the Last Millennium: Interpretation, Integration and Comparison with General Circulation Model Control-run Temperatures. The Holocene 8: 455-471.

Kelly, Kerry
2011 Glen Haven Village. Sleeping Bear Dunes National Lakeshore NPS: Friends of Sleeping Bear Dunes.

Kling, George W., Katharine Hayhoe, Lucinda B. Johnson, John J. Magnuson, Stephen Polasky, Scott K. Robinson, Brian J. Shuter, Michelle M. Wander, Donald J. Wuebbles, and Donald R. Zak
2003 Confronting Climate Change in the Great Lakes Region: Impact on Our Communities and Ecosystems. Union of Concerned Scientists, Cambridge, Massachusetts, and Ecological Society of America, Washington, D.C.

Kushnir, Yochanan
2000 The Climate System: General Circulation and Climate Zones. http://eesc.columbia.edu/courses/ees/climate/lectures/gen_circ/, accessed January 23, 2014.

Lockeretz, William
1978 The Lessons of the Dust Bowl: Several Decades Before the Current Concern with Environmental Problems, Dust Storms Ravaged the Great Plains, and the Threat of More Dust Storms Still Hangs Over Us. American Scientist 66 (5): 560-569.

Lovis, William A., Alan F. Arbogast, and G. William Managhan
2012 The Geoarchaeology of the Lake Michigan Coastal Dunes. East Lansing: Michigan State University Press.

Lynn, Kathy, John Daigle, Jennie Hoffman, Frank Lake, Natalie Michelle, Darren Ranco, Carson Viles, Garrit Voggesser, Paul Williams
2013 The Impact of Climate Change on Tribal Traditional Foods. Climatic Change 120(3): 545-556.

Mattox, Steve R., Albreacht, A., R. Barnes, J. Culbert, D. Dakan, P. Gerardini, S. Hawkins, K. King, R. Mengel, C. O'Boyle, W. Packard, R. Ruel, B. Shelson, T. Vanderlan, and S. DeVries
2004 New Perspectives on the 1904 Flood in Grand Rapids, Michigan. http://www.gvsu.edu/geology/1904-flood-in-grand-rapids-44.htm, accessed on Oct. 17, 2013.

McClurken, James
2009 Our People, Our Journey: The Little River Band of Ottawa Indians. East Lansing: Michigan State University Press.
1991 The Way it Happened: Gah-Baeh-Jhagwah-Buk. East Lansing: Michigan State University Press.

Michigan's Extreme and Significant Weather Events
2014 The Forgotten Summer of 1816. http://geo.msu.edu/extra/geogmich/sig_weath_events.html, accessed Oct. 11, 2013.

Michigan State Climatologist's Office
2009 Michigan Normal's and Statistics, 1951-2010. http://climate.geo.msu.edu /mi-map.html, accessed Sept. 19, 2013.

Michigan State University Extension
2014 Michigan's Natural Communities. http://mnfi.anr.msu.edu/communities/index.cfm, accessed Feb. 19, 2015.

Michigan Water Science Center
2013 Annual Water Data Reports. http://wdr.water.usgs.gov/, accessed Nov. 6, 2013.

Muhs, Daniel R., and Josh M. Been
N.d Reactivation of Stabilized Sand Dunes on the Colorado Plateau. "Impact of Climate Change and Land Use in the Southwestern United States. http://http:geochange.er.usgs.gov/sw /impacts/geology/sand/, accessed Aug. 6, 2014.

National Aeronautics and Space Administration
2011 Glossary. http://earthobservatory.nasa.gov/Glossary/?mode=alpha&seg=l&segend=n, accessed Feb 1, 2014.

National Climatic Data Center
2008 U.S. Climate Normal's 1971-2000. http://www.ncdc.noaa.gov/oa/climate/normals/ usnormalsprods.html, accessed Feb. 2, 2014.

National Oceanic and Atmospheric Administration (NOAA)
2010 Remembering the Armistice Day Blizzard of 1940. http://www.crh.noaa.gov/ dvn/?n=armistice_ day_blizzard, accessed Nov 18, 2013.
N.d. "The Great Flood of 1993." National Weather Service Weather Forecast Office. http://www.crh.noaa.gov/lsx/?n=1993_flood.

National Oceanic and Atmospheric Administration Public Affairs
1998 Answers to La Niña Frequently Asked Questions. http://www.elnino.noaa.gov/lanina_ new_faq.html, accessed Dec 10, 2013.

National Park Service
N.d. Aral. http://www.nps.gov/slbe/historyculture/aral.htm, accessed June 27, 2014.

National Weather Service Climate Prediction Center
2005 El Nino-Southern Oscillation (ENSO). http://www.cpc.ncep.noaa.gov/products/ precip/CWlink/MJO/enso.shtml, accessed Oct. 28, 2013.

Null, Jan
2013 El Niño and La Niña Years and Intensities Based on Oceanic Niño Index (ONI). http://ggweather.com/enso/oni.htm, accessed Jan 22, 2014.

Nurnberger, F.V.
1980 Meteorological Drought in Michigan: A Review of the Past 50 Years in Michigan State University Institute of Water Research. Conference on Supplemental Irrigation--Advantages and disadvantages: Lansing, March 18, 1980. Climate of Michigan: Lansing, Michigan Department of Agriculture, 4.

Passic, Frank
1997 Remembering the Great Flood of 1908. http://www.albionmich.com/history/histor _ notebook/R970317.shtml, accessed Oct 17, 2013.

Pierotti, Raymond
2011 Indigenous Knowledge, Ecology and Evolutionary Biology. New York, New York: Routledge.

Pilette, Jacqueline
2009 Little Traverse Bay Bands of Odawa Indians Native Plants Initiative. Little Traverse Bay Bands of Odawa Indians Environmental Services Department for Conservation Resource Alliance.

Quimby, George Irving
1967 Indian Life in the Upper Great Lakes 11,000 B.C. to A.D. 1800. Chicago: University of Chicago Press.

Quinn F.H., and Sellinger C.E.
2006 A Reconstruction of Lake Michigan-Huron Water Levels Derived from Tree Ring Chronologies for the Period 1600–1961. Journal of Great Lakes Research 32: 29–39.

Rader, Robert Dwight
1977 Beautiful Glen Arbor Township: Facts, Fantasy, and Photos. Leelanau County, Michigan: Village Press.

Rappaport, Joanne
2008 Beyond Participant Observation: Collaborative Ethnography as Theoretical Innovation. Collaborative Anthropologies 1: 1-31.

Richardson, Bonham C.
1997 Economy and Environment in the Caribbean: Barbados and the Windwards in the Late 1800's. Gainesville, FL: University of Florida Press.

Richner, Jeffrey J.
1991 Archeological Excavations at the Platte River Campground Site (20BZ16), Sleeping Bear Dunes National Lakeshore, Technical Report #10. Washington, D.C: National Park Service.

Riebeek, Holli
2010 Global Warming. http://earthobservatory.nasa.gov/Features/ GlobalWarming/page1.php, accessed Feb. 11, 2014

Rosenzweig, C., A. Iglesias, X. B. Yang, P. R. Epstein, and E. Chivian
2001 Climate Change and Extreme Weather Events: Implications for Food Production, Plant Diseases, and Pests. Global change and Human Health 2(2): 90-104.

Schneider, Stephen Henry, Terry Louise Root, and Michael D. Mastrandrea
2011 Encyclopedia of Climate and Weather. New York: Oxford University Press.

Science News Administration
2009 Science Past from the Issue of May 9, 1959. https://www.sciencenews.org/article/science-past-issue-may-9-1959, accessed Dec. 14, 2013.

Seites, Heather, Mark Tonello, and Todd Kalish
2010 Glen Lake Chain: Glen, Little Glen, Big Fisher, Little Fisher, and Tucker Lakes Leelanau County. Fishery Resource Report. Michigan Department of Natural Resources and Environment.

Sillitoe, Paul, Peter Dixon, and Julian Barr
2006 Indigenous Knowledge Inquiries: A Methodologies Manual for Development. Warwickshire, England: Practical Action Publishing, Intermediate Technology Publications.

Smith, Beverly A., and Kathryn C. Egan
1990 Middle and Late Archaic Faunal and Floral Exploitation at the Weber Site (20SA581), Michigan. Journal of Ontario Archaeology 50: 39-54.

Stephenson, D. B., B. Casati, C. A. Ferro, and C. A. Wilson
2008 The Extreme Dependency Score: A Non-Vanishing Measure for Forecasts of Rare Events. Meteorological Applications 15 (1): 41-50.

Stoffle R. W., R. Toupal, and N. Zedeño
2003 Landscape, Nature, and Culture: A Diachronic Model of Human-Nature Adaptations. In Nature Across Cultures: Views of Nature and the Environment in Non-Western Cultures. Pp. 97-114. Helaine Selin, editor. Dordrecht, The Netherlands: Kluwer Academic Publishers.

Thorp, James H., Martin C. Thoms, and Michael D. Long
2008 The Riverine Ecosystem Synthesis: Toward Conceptual Cohesiveness in River Science. San Diego, CA: Academic Press.

Union of Concerned Scientists
2013 Climate Change in Michigan. http://www.ucsusa.org/, accessed Sept. 29, 2013.

United States Geological Survey
2013 Droughts: National Water Summary of Floods and Droughts: Michigan. http://mi.water.usgs.gov/fddroughts.php, accessed Oct. 22, 2013.
2005 Floods: National Water Summary 1988-89 —Floods and Droughts: Michigan. http://mi.water.usgs.gov/fdfloods.php, accessed Oct. 23, 2013.

University Corporation for Atmospheric Research with NOAA
1994 El Niño and Climate Prediction: Reports to the Nation on Our Changing Climate. http://www.pmel.noaa.gov//tao/elnino/impacts.html, accessed Dec. 10, 2013

University of Rhode Island
2010 Hurricanes: Science and Society: The Great Hurricane of 1780. http://www.hurricanescience.org/history/storms/pre1900s/1780/, accessed Nov. 4, 2013.

Usher, Peter J.
2000 Traditional Ecological Knowledge in Environmental Assessment and Management. Arctic 53(2): 183–193.

Vennum, Thomas
1988 Wild Rice and the Ojibway People. St. Paul, MN: Minnesota Historical Society Press.

Vira, Bhaskar, and Roger Jeffery
2001 Analytical Issues in Participatory Natural Resource Management. New York, NY: Palgrave Publishers, St. Martin Press.

Vogesser, Garrit, Kathy Lynn, John Daigle, Frank K. Lake, Darren Ranco
2013 Cultural impacts to tribes from climate change influences on forests. Climatic Change 120(3): 615-626.

Voss, Hans
1997 Dune and Swale Wetlands in the Sleeping Bear Dunes National Lakeshore. http://www.mlui.org/mlui/news-views/articles-from-1995-to 201212.html?archiveid=1547#.VDRkkhbG-b8, accessed Oct. 7, 2014.

Waterman, W.G.
1927 Ecology of Glen Lake and Sleeping Bear Region. Papers of the Michigan Academy of Science, Arts, and Letters 5: 351-375.

Weeks, George
1990 Sleeping Bear: Yesterday and Today. Franklin, Michigan: Altwerger and Mandel Publishing Company.

Weems, John Edward
N.d. Galveston Hurricane of 1900. Handbook of Texas Online http://www.tshaonline.org/handbook/online/articles/ydg02), accessed February 20, 2014. Uploaded on June 15, 2010. Published by the Texas State Historical Association.

Weir, Donald J.
1986 Cultural Resource Assessment of Proposed Rehabilitation of the Platte River Campground and Limited Testing at Site 20BZ16, Benzie County, Michigan.

Westerling, AL, H.G. Hidalgo, D.R. Cayan, and T.W. Swetnam
2006 Warming and earlier spring increase western US forest wildfire activity. Science 313 (5789): 940-943.

White, Stephen Jr., and Karen C. Danielsen
2002 Threats to Wild Plants in Ceded Territories. Great Lakes Indians Fish and Wildlife Commission Publication.

Wildcat, Daniel R.
2013. Introduction: Climate Change and Indigenous Peoples of the USA. Climatic Change 120 (3): 509-515.

Witze, Alexandra, and Jeff Kanipe
2015 Island on Fire: The Extraordinary Story of a Forgotten Volcano that Changed the World. New York: Pegasus Books.

Yarnell, Richard A.
1964 Aboriginal Relationships Between Culture and Plant Life in the Upper Great Lakes Region. Anthropological Papers 23. Ann Arbor: University of Michigan.

Yock, Louis
2011 Lost Benzie County. Charleston, SC: Arcadia Publishing.

Zedeño, M. Nieves, Richard W. Stoffle, Fabio Pittaluga, Genevieve Dewey-Hefley, R. Christopher Basaldú, and María Porter
2001 Traditional Ojibway Resources in the Western Great Lakes: An Ethnographic Inventory in the States of Michigan, Minnesota, and Wisconsin. Prepared for Michael J. Evans, National Parks Service, Midwest Region. Bureau of Applied Research in Anthropology: The University of Arizona in Tucson.

Zedeño, M. Nieves, Samrat Miller, and Kacy Hollenback
2011 Sleeping Bear Dunes National Lakeshore and the Inland Consent Decree of 2007: Ethnographic Resource Management and Tribal Access Considerations. Prepared for National Park Service Midwest Regional Office and Sleeping Bear Dunes National Lakeshore, MI Contract Agreement H1200050003J6068080030 (DSCESU). Bureau of Applied Research in Anthropology: The University of Arizona in Tucson.

APPENDIX A
INVENTORY OF CONTEMPORARY ODAWA USE PLANTS AT SLEEPING BEAR DUNES NATIONAL LAKESHORE

This appendix is a compilation of data for the 210 identified Odawa contemporary use plants. The purpose of this appendix is to provide a comprehensive and easily accessible plant guide for Odawa use plants growing in SLBE. This appendix is arranged alphabetically by scientific name. For each plant, the following information is provided:

- Scientific Name
- Common Name
- Odawa Name
- Ecosystem
- Status in the Park
- Contemporary Use Category
- Description of Uses
- Evidence of Change to Plant in the Area
- Seasons When the Plant is Collected
- Amount Collected at One Time
- Photograph of the Plant

The majority of the data presented in this appendix was provided by Odawa representatives during the study, however, some of the information was supplemented by the USDA Plant Database and SLBE Native Plant Use Checklist (Appendix B).

Scientific Name	*Abies balsamea*
Common Name	Balsam Fir Tree
Odawa Name	A'niinaandak' (Densmore 1974) Aniinaandag, -oog, Ininaandag – 'fir tree, spruce', Bigiwaandag, Zhingob, -iig, Zhingobaandag, -oog, Zhingob bigiwaandag (GLIFWC 1993)
Ecosystem	Boreal Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *Balsam boughs and needles are bound tightly together used in construction of sweat lodge and starting ceremonial fire.*
- *Balsam, we use all the pines. We call balsam, big-gew, those little blisters we pop them and pitch comes out, so we call balsam big-gew and it means gum. It's a medicine and other.*
- *We use probably 40 lbs a year of pitch.*

LTBB Native Plants Initiative (2009)

- Medicine; crafting; utility- aromatic balsam pillows made from the leaves.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Acer negundo*
Common Name	Box Elder; Ash-leaf maple; Three-leaf maple
Odawa Name	Adjagobi'muk (Meeker et al. 1993)
Ecosystem	Floodplain Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

- *We use box elder as a medicine.*

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Acer penylvanicum*
Common Name	Striped Maple; Moosewood
Odawa Name	Moozomizh (Meeker et al. 1993)
Ecosystem	Boreal Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *We use maple as a medicine and food.*
- *It can be used in construction and in crafts.*
- *People always tap on the south side of the maple tree because this side gets more sun and is the side with more sap.*

LTBB Native Plant Initiative (2009)

- Utilitarian; medicine.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☒Overusing by People
☒Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Acer rubrum*
Common Name	Red Maple
Odawa Name	Zhiishiigimiiwanzh, -iig (Meeker et al. 1993)
Ecosystem	Aspen Birch Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *We use maple as a medicine and food.*

LTBB Native Plant Initiative (2009)

- Food (syrup, less preferred than Sugar Maple, which has a higher sugar content); medicine; firewood; utility (e.g. lodge frames); artwork.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☒Overusing by People
☒Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Acer saccharinum*
Common Name	Silver Maple
Odawa Name	Zhiishiigimiiwanzh, -iig (Meeker et al.1993)
Ecosystem	Floodplain Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *We use maple as a medicine and food.*

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☒Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Acer saccharum*
Common Name	Sugar Maple
Odawa Name	Odawa name not provided.
Ecosystem	Boreal Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☒Overusing by People
☒Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Acer spicatum*
Common Name	Mountain Maple
Odawa Name	Zhaashaagobiimag (Meeker et al. 1993)
Ecosystem	Boreal Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Achillea fanutosa; Achillea tomentosa*
Common Name	Wooly Yarrow; Golden Flowered Yarrow; Golden Fleece
Odawa Name	Odawa name not provided.
Ecosystem	Meadows; Pastures
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Achillea millefolium*
Common Name	Yarrow
Odawa Name	Adjidamoowaanow; Waabigwan (Meeker et al. 1993)
Ecosystem	Meadow
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

- *Yarrow, this is such good medicine Yarrow. Looks like a squirrel tail. We use a lot of that.*

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Acorus americanus*
Common Name	Sweetflag
Odawa Name	Wiikenh (Densmore 1974) 'wiken' (GLIFWC 1993; Herron 2002; Osawamik 2008), Nabagashk -oon (GLIFWC 1993) Na‟buguck‟ something flat‟ or Muckosija‟bosigun – „hay purgative‟ (Densmore 1974)
Ecosystem	Wetland
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☐Construction
☒Other

Description of Uses:

- *Sweetflag is used for the throat, it's a medicine. You chew it or you can also make tea for your stomach.*
- *We make a tea out of Sweetflag, it is called singers root because the tea we make out of it helps the vocal chords.*

LTBB Native Plant Initiative (2009)

- Medicine; ceremonial use; charm.

Evidence of Change to This Plant in This Area:

☒Climate Change
☒Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☒Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Actaea alba; Actaea pachypoda*
Common Name	White Baneberry
Odawa Name	Wapkadak; Weekizigun (Meeker et al.1993)
Ecosystem	Northern Mesic Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Actaea rubra*
Common Name	Red Baneberry; Doll's Eye; Chinaberry
Odawa Name	Ojiibikens; Wi'cosidji'bik; Wiishkbobijiibik; Waashkobijiibikak (Meeker et al.1993)
Ecosystem	Boreal Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Allium cernuum*
Common Name	Nodding Wild Onion
Odawa Name	Zhi/agaagawanzh, -iig; Bagwaji-zhi/agaagawinzh, -iig (Meeker et al. 1993)
Ecosystem	Prairie
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Allium stellatum*
Common Name	Wild Onion
Odawa Name	Mashkode-zhi/agaagawanzh, -iig; Bagwaji-zhi/agaagawinzh (Meeker et al. 1993)
Ecosystem	Dunes
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

- *We use leeks and wild onions as food, for seasoning soups and stuff. You can smell them growing before you even see them.*

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Allium tricoccum; Allium burdickii*
Common Name	Wild Leek; Ramps
Odawa Name	Bagwaji-zhi/agaagawinzh, -iig; Zhi/agaagawanzhiins (Meeker et al. 1993)
Ecosystem	Northern Mesic Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Food- bulbs (similar to and onion or scallion); medicine.

Evidence of Change to This Plant in This Area:

☒Climate Change
☒Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Alnus glutinosa*
Common Name	Alder; Black Alder; European Alder
Odawa Name	Odawa name not provided.
Ecosystem	Alkaline, moist Soils
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

- ☒Medicine
- ☐Food
- ☐Craft
- ☒Construction
- ☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

- ☒Climate Change
- ☐Lack of Traditional Use
- ☐Overusing by People
- ☐Over-Grazing or Over-Foraging
- ☐Pests
- ☐Pollution
- ☐No Influence
- ☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Alnus rugosa; Alnus incana*
Common Name	Speckled Alder
Odawa Name	Wadoop, -iin (Meeker et al. 1993)
Ecosystem	Riparian; Wetland
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Medicine

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Alnus serrulata*
Common Name	Tag Alder
Odawa Name	Odawa name not provided.
Ecosystem	Riparian; Wetland
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Ammophila*
Common Name	Beachgrass
Odawa Name	Odawa name not provided.
Ecosystem	Coastal Dunes
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Andromeda glaucophylla; Andromeda polifolia*
Common Name	Bog Rosemary
Odawa Name	Bine'mikci (Meeker et al. 1993)
Ecosystem	Sphagnum Bog
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative (2009)
- Medicine

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Andropogon gerardii*
Common Name	Big Bluestem
Odawa Name	Odawa name not provided.
Ecosystem	Wetland
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Anemone sp.*
Common Name	Anemone
Odawa Name	Wiisagibag (Meeker et al. 1993)
Ecosystem	Dry Soils
Status in Park	Various species present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☐Summer ☐Fall ☐Winter	☒Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Angelica L.*
Common Name	Angelica
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

- *Angelica is a medicine, and other. Not for tea.*

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☒Summer ☐Fall ☐Winter	☐Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Apocynum sp.*
Common Name	Dogbane
Odawa Name	Odawa name not provided.
Ecosystem	Dry Thickets; Forest Borders; Uplands,
Status in Park	Two species present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Apocynum androsaemifolia*
Common Name	Spreading Dogbane; Fly-trap Dogbane
Odawa Name	Sasa'bikwan; Wesawuskwun; Midewijiibik; Makonagizh-ojibik; Makonagizhiijiibik; Mi/agoosing ezhinaagwak; Baebaumukwodjeebikissing (Meeker et al. 1993)
Ecosystem	Meadows
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Apocynum cannabinum*
Common Name	Indian Hemp; Amy Root; Hemp Dogbane; Prairie Dogbane; Rheumatism Root; Wild Cotton
Odawa Name	Zesabiins (Meeker et al. 1993)
Ecosystem	Prairies
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Aquilegia canadensis*
Common Name	Wild Columbine
Odawa Name	Odawa name not provided.
Ecosystem	Wetland
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Aralia nudicaulis*
Common Name	Wild Sarsaparilla; False Sarsaparilla; Shot bush; Small Spikenard; Wild Licorice; Rabbit Root
Odawa Name	Odawa name not provided.
Ecosystem	Aspen Birch Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Arctium minus*
Common Name	Common Burdock; Lesser Burdock
Odawa Name	Wiisagijiibik; (Gi)chi-mazaan (Meeker et al. 1993)
Ecosystem	Meadows
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Arctium L.*
Common Name	Burdock
Odawa Name	Odawa name not provided.
Ecosystem	Woodlands; Disturbed Areas
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Arctostaphylos alpina*
Common Name	Alpine Bearberry
Odawa Name	Sah-gah-go-me-nah-gah-shen ; Bagwaji-miskwaabiimag; Miskwaabiimag (Meeker et al. 1993)
Ecosystem	Dunes
Status in Park	Present



USDA Plant Database

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Arctostaphylos uva-ursi*
Common Name	Bearberry; Pinemat Manzanita
Odawa Name	Saga'kominagunj'; Miskwaabiimag (Meeker et al. 1993)
Ecosystem	Bracken Grassland
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

- *We use bearberry as a medicine. We also use it as one of the plants we make kinnickinick, that's a smoking blend, instead of tobacco. We are trying to get away from commercial tobacco in our program with all those contaminants. Bearberry is a plant in that mixture.*

LTBB Native Plant Initiative (2009)

- The leaves are an ingredient in 'kinnickinick,' and traditional smoking mixture; berries are used for food, flavoring meat dishes; medicine; utility; charm.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Arisaema triphyllum*
Common Name	Jack-in-the-Pulpit; Indian Turnip; Bog Onion; Brown Dragon; American Wake Robin; Wild Turnip
Odawa Name	Zhaashaagomin (Meeker et al. 1993)
Ecosystem	Northern Mesic Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Medicine

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Artemisia campestris*
Common Name	Field Sagewort; Field Wormwood; Beach Wormwood; Field Mugwort
Odawa Name	Moosewijiibik (Meeker et al. 1993)
Ecosystem	Dunes
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative

- Medicine; Smudge (though not as aromatic as the western sage).

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Ascelpias incarnata*
Common Name	Swamp Milkweed; Swamp Silkweed
Odawa Name	Bagizowin; Zesab (Meeker et al. 1993)
Ecosystem	Sedge Meadow
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☒Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Medicine; utility.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☐Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Ascelpias syriaca*
Common Name	Common Milkweed; Silkweed; Butterfly Flower
Odawa Name	Ininiwa/inzh; Zhaabozigan (Meeker et al. 1993)
Ecosystem	Meadows
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☒Construction
☒Other

Description of Uses:

- *Milkweed is used as a medicine used by those having problems breastfeeding, to induce/provoke milk.*

LTBB Native Plant Initiative (2009)

- Food- young flower buds are edible and may be eaten as greens; medicine; utility- latex, fiber, crafting, pillow stuffing, and life-preservers.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☒Bushel Basket ☒More

Scientific Name	*Aster sp.*
Common Name	Aster
Odawa Name	Odawa name not provided.
Ecosystem	Boreal Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Avena sativa*
Common Name	Oats
Odawa Name	Odawa name not provided.
Ecosystem	Dry areas; Cultivated Ground; Meadows
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☐Summer ☐Fall ☐Winter	☐Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Betula alleghaniensis*
Common Name	Yellow Birch
Odawa Name	Wiinizik (Meeker et al. 1993)
Ecosystem	Northern Mesic Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- White Birch, Yellow Birch, we use the bark.

LTBB Native Plant Initiative (2009)

- The close-grained wood is used for furniture and veneer; utility; medicine.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☒More

Scientific Name	*Betula nigra*
Common Name	Black Birch; River Birch; Water Birch
Odawa Name	Goko'cgunda mineskwe'min (Meeker et al. 1993)
Ecosystem	Floodplain Forests
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☒More

Scientific Name	*Betula papyrifera*
Common Name	Paper Birch; White Birch; Canoe Birch
Odawa Name	Wiigwaas, -an, -ag; Wiigwaasaatig; Wiigwaasi-mitig (Meeker et al. 1993)
Ecosystem	Aspen Birch Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *Birch bark containers hold Maple syrup and sap.*
- *Crafts, quill boxes.*
- *We used to bury people in birch bark.*
- *If harvested wrong, you can kill the tree. It is one of the best fire-starters. The signal to harvest is the blooming Wild Rose.*
- *Birch Bark is useful in spiritual protection.*

LTBB Native Plant Initiative (2009)

- LTBB historians have identified of 21 different traditional uses for birch including birch bark canoes, baskets, porcupine quill boxes and other storage containers, covering for lodges and shelters, crafting and artwork; wood; firewood and fire starting material; medicine; food-sap for syrup; traditional stories; food and cover for wildlife.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Betula pumila*
Common Name	Low Birch; Bog Birch
Odawa Name	Binemizhiins; Binemizh (Meeker et al. 1993)
Ecosystem	Sphagnum Bog
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☒More

Scientific Name	*Botrychium virginianum*
Common Name	Virginia Grape Fern; Rattlesnake Fern
Odawa Name	Gickensine' namukuk (Meeker et al. 1993)
Ecosystem	Aspen Birch Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Bouteloua dactyloides*
Common Name	Buffalo Grass
Odawa Name	Odawa name not provided.
Ecosystem	Coastal Dunes; Shoreline; Wetlands
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Bromus sp.*
Common Name	Brome
Odawa Name	Odawa name not provided.
Ecosystem	Grassland
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Bromus inermis*
Common Name	Smooth Brome
Odawa Name	Odawa name not provided.
Ecosystem	Grassland
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Bryophyta*
Common Name	Moss
Odawa Name	Odawa name not provided.
Ecosystem	Forest; Wetlands
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Calluna vulgaris*
Common Name	Heather
Odawa Name	Odawa name not provided.
Ecosystem	Wetland
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Unknown
☒Other
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Caltha palustris*
Common Name	Marsh Marigold
Odawa Name	Mi gde-beguk; Ogitebag (Meeker et al. 1993)
Ecosystem	Sedge Meadows
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

- *Marsh Marigold has some, I guess, spiritual or other uses. It could be used as a medicine.*

LTBB Native Plant Initiative (2009)

- Medicine; food (requires careful preparation to remove toxins)

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Calvatia craniformis*
Common Name	Giant Puffball; Brain Puffball; Skull-shaped Puffball
Odawa Name	Odawa name not provided.
Ecosystem	Open Oak Forests
Status in Park	Unknown



Wikipedia. http://en.wikipedia.org/wiki/Calvatia_craniiformis#mediaviewer/File:Calvatia_craniiformis.JPG

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

- *We used to eat these Giant Puffballs when times were tough, some of our folks still eat them.*

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☒Bushel Basket ☒More

Scientific Name	*Capsella bursa-pastoris*
Common Name	Shepards Purse
Odawa Name	Ishkodewijiibik (Meeker et al. 1993)
Ecosystem	Meadow
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

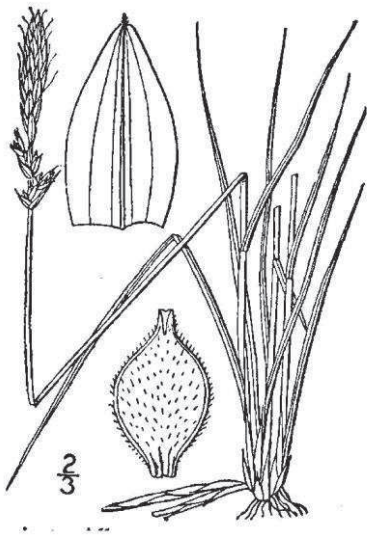
No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☐Summer ☐Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Carex pensylvanica Lam.*
Common Name	Pennsylvania Sedge
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands; Cedar Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

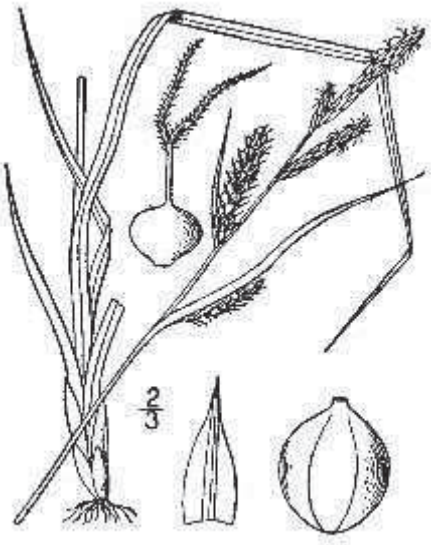
No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Carex stricta*
Common Name	Hummock Sedge
Odawa Name	Odawa name not provided.
Ecosystem	Wetland
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Caulophyllum thalictroides*
Common Name	Blue Cohosh; Squaw Root; Papoose root
Odawa Name	Be'cigodji'biguk – 'one root' (Densmore 1974), Oci'gimic, or Zheegimaewibug (Plants Used by Great Lakes Ojibwa, GLIFWC, 1993)
Ecosystem	Hardwood Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Medicine

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Celastrus scandens*
Common Name	American Bittersweet
Odawa Name	Odawa name not provided.
Ecosystem	Rich, well-drained soils of Wetlands
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Chamaecyparis thyoides*
Common Name	Atlantic White Cedar; White cedar Falsecypress
Odawa Name	Odawa name not provided.
Ecosystem	Wet sites on Coastal Plains
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *It is used as a tea for medicinal purposes and for nutrients (has a lot of Vitamin C).*
- *White Cedar is one of the four sacred medicines. It represents the southern direction. It is a powerful medicine. It is possibly used for dreaming.*

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☒More

Scientific Name	*Chimaphila umbellata*
Common Name	Prince's Pine; Pipsissewa
Odawa Name	Yaskopteg; Gaagigebag (Meeker et al. 1993)
Ecosystem	Pine Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *Prince's Pine is used as a medicinal plant. It is good for treating upper respiratory ailments. They used this to treat tuberculosis in the past.*

LTBB Native Plant Initiative (2009)

- Medicine

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Cirsium pitcheri*
Common Name	Pitcher's Thistle; Sand Dune Thistle
Odawa Name	Odawa name not provided.
Ecosystem	Sand Dunes
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Cirsium vulgare*
Common Name	Common Thistle; Bull Thistle; Spear Thistle
Odawa Name	(Gi)chi-mazaanashk (Meeker et al. 1993)
Ecosystem	Meadow
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Cladonia rangifernia*
Common Name	Reindeer Lichen/ Moss
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands; Cedar Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

- *Moss is used, we use it in baby beds, cradleboards, they'd put the moss in there.*

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Comptonia peregrina*
Common Name	Sweet Fern
Odawa Name	Odawa name not provided.
Ecosystem	Boreal Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Convallaria majalis*
Common Name	Lily of the Valley
Odawa Name	Odawa name not provided.
Ecosystem	Northern Mesic Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Coptis aspleniifolia; Coptis trifolia*
Common Name	Goldthread; Fernleaf Goldthread; Spleenwort-Leaf Goldthread
Odawa Name	Sau-tiskan; Ozaawijiibik; Ozaawijiibik; Wesa Wadji'bikwe'ak; We'sawadji'bikwe'ak; Wesa wa'nikwe'ak (Meeker et al. 1993)
Ecosystem	Northern Mesic Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☐Construction
☒Other

Description of Uses:

- *Goldthread is an east root, it is used for ceremonial or spiritual purposes.*

LTBB Native Plant Initiative (2009)

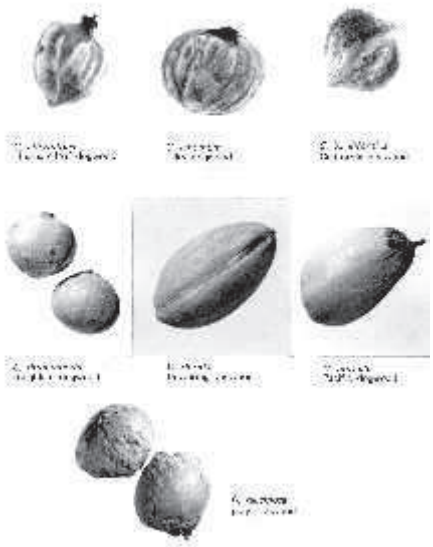
- Utility- dye; medicine.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Cornus sp.*
Common Name	Dogwood
Odawa Name	Odawa name not provided.
Ecosystem	Shorelines, meadows, floodplains, marshes, bogs, swamps, fens, forests, woodlands, shrub thickets, and sand dunes
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Cornus racemosa*
Common Name	Gray Dogwood
Odawa Name	Odawa name not provided.
Ecosystem	Shoreline
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Cornus sericea (C. stolonifera)*
Common Name	Red-osier Dogwood
Odawa Name	Misʻkwabiʻmic (Densmore 1974), Miskoobimizh, Miskwaabiimizh (Plants Used by Great Lakes Ojibwa, GLIFWC, 1993)
Ecosystem	Shorelines, meadows, floodplains, marshes, bogs, swamps, fens, forests, woodlands, shrub thickets, and sand dunes
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Crafting; utility; medicine; an ingredient in traditional kinnickinick (bark).

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Corylus americana*
Common Name	American Hazelnut
Odawa Name	Odawa name not provided.
Ecosystem	Wetland
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Cyperus esculentus*
Common Name	Yellow Nutsedge
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Daucus carota*
Common Name	Queen Ann's Lace
Odawa Name	Odawa name not provided.
Ecosystem	Wetland
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Dicentra canadensis*
Common Name	Squirrel Corn
Odawa Name	Odawa name not provided.
Ecosystem	Maple Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☐Summer ☐Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Dicentra cucullaria*
Common Name	Dutchman's Breeches
Odawa Name	Odawa name not provided.
Ecosystem	Maple Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☐Summer ☐Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Dietes grandiflora*
Common Name	Wild Iris
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands, cedar forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Echinacea purpurea*
Common Name	Purple Coneflower
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands; Cedar Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Eleocharis palustris*
Common Name	Spikerush Sedge
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands; Cedar Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Epigaea repens*
Common Name	Trailing Arbutus; Mayflower
Odawa Name	Misodjidamo'anuk (Meeker et al. 1993)
Ecosystem	Pine Forests
Status in Park	Pine Forests



USDA Plant Database.

Contemporary Use Category:

☐Medicine
☐Food
☒Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☐Summer ☐Fall ☐Winter	☒Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Epilobium angustifolium; Chamerion angustifolium*
Common Name	Great Willow Herb; Fireweed
Odawa Name	Ozhaashijiibik; Ozhaashijiibikens (Meeker et al. 1993)
Ecosystem	Meadow
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Unknown
☐Other
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☐Summer ☐Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Equisetum arvense*
Common Name	Field Horsetail; Mare's Tail
Odawa Name	Gezibnusk; Aiankosing; Jasibonskok; Giji'binusk (Meeker et al. 1993)
Ecosystem	Meadow
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Medicine; utility- fine sanding

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☒Bucket ☒Bushel Basket ☒More

Scientific Name	*Equisetum hyemale*
Common Name	Scouring Rush; Rough Horsetail
Odawa Name	Giji'binusk; Gijib'inuskon' (Meeker et al. 1993)
Ecosystem	Dunes
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Utility- scouring pad; medicine.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☒Bushel Basket ☒More

Scientific Name	*Erythronium*
Common Name	Adder's Tongue; Fawn Lily; Trout Lily; Dog's-tooth Violet
Odawa Name	Numaegbugoneen (Zichmanis and Hodgins 1982)
Ecosystem	Mesic and Dry Woods
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☐Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- No use specified; neighboring tribes used it for medicine.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☐Summer ☐Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Eupatorium perfoliatum*
Common Name	Boneset
Odawa Name	Niya'wibukuk (Densmore 1974); Siabuksing, Sasabwaksing, Piskagamisag (GLIFWC 1993)
Ecosystem	Sedge Meadows
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☐Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Medicine; hunting aid.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Eupatorium purpureum*
Common Name	Joe Pye Weed
Odawa Name	Bu'gisowe; Biaskagemesek (Meeker et al. 1993)
Ecosystem	Alpin Birch Forests
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Fagus grandifolia*
Common Name	Beech
Odawa Name	Gawe'mic, or Sewe'mins (GLIFWC 1993), Aw-shaw-way-nish (Otto 1996)
Ecosystem	Upland Forests (Mesic or temperate hardwood forest)
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *It is used as a hook to get animals out of places (ex: getting a rabbit out of a tree).*
- *We used to use Beech leaves as medicine, lots of beech here. We don't use a lot, and you don't gather til late, late fall.*

LTBB Native Plant Initiative (2009)

- Food- nut; medicine; wood; important hard-mast food for wildlife.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☒Overusing by People
☒Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☒Bushel Basket ☒More

Scientific Name	*Fistulina hepatica*
Common Name	Beefsteak Mushroom; Ox Tongue
Odawa Name	Odawa name not provided.
Ecosystem	Forest; Wetlands
Status in Park	Present



Wikipedia.
http://plants.usda.gov/gallery.html

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☐Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Fragaria vesca*
Common Name	Woodland Strawberry
Odawa Name	Ode'imin, (Meeker et al. 1993)
Ecosystem	Woodlands
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

- *The strawberry is used in kinniknick sometimes.*
- *Strawberry, we use a lot of that. Not just the berry but we use the whole plant as medicine, its made into a tea, and we also use it in our Kinnikinick recipe.*
- *Wild strawberry, it's a medicine, food, some families are named after strawberry.*

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☒Summer ☐Fall ☐Winter	☐Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Fragaria virginiana*
Common Name	Wild Strawberry
Odawa Name	Berry: Ode'imin, -an, (Meeker et al. 1993) Root: ode'iminijiibik, (Meeker et al. 1993)
Ecosystem	Woodlands, Fields,
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

- *Strawberry, we use a lot of that. Not just the berry but we use the whole plant as medicine, it's made into a tea.*
- *Wild strawberry, it's a medicine, food, some families are named after strawberry.*
- *We also use strawberry in our Kinikinick recipe.*
- *We use Strawberry in crafts as well.*

LTBB Native Plant Initiative (2009)

- Food; medicine.
- The month of June is known as Strawberry Moon, or 'Ode'min Giizis' in Anishnaabemowin.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Phragmites sp.*
Common Name	Reeds
Odawa Name	Aaboojigan (Meeker et al. 1993)
Ecosystem	Marshes and bogs
Status in Park	Present


USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Utility- many uses including weaving, woven frames were used for drying berries.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Fraxinus americana*
Common Name	White Ash
Odawa Name	Aagimak, or Baapaagimaak – 'snowshoe wood' (GLIFWC 1993)
Ecosystem	Upland Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *White Ash is used in crafts, mainly the handles for baskets and containers*.

LTBB Native Plant Initiative (2009)

- The sting wood was traditionally used to make snowshoes, toboggans, and sleds; utility; crafting; medicine.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☒Overusing by People
☒Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Fraxinus nigra*
Common Name	Black Ash
Odawa Name	Aagimaak and wiisagaak (Meeker et al. 1993)
Ecosystem	Swamp Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *Long pieces (pieces about 10 ft. long) of it are good for baskets.*

LTBB Native Plant Initiative (2009)

- Black Ash baskets are highly utilized for a variety of purposes and are made by pounding the wood into long, thin strips that are made into splints and woven together. Also used for dye, medicine, and utility.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☒Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Fraxinus pennsylvanica*
Common Name	Red Ash, Green Ash
Odawa Name	Aagimaak (Meeker et al. 1993)
Ecosystem	Boreal Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☒Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Gaultheria hispidula*
Common Name	Creeping Snowberry
Odawa Name	Wabos'obugons (Densmore 1974), Waaboosobagoons, Waaboozobanzh (GLIFWC 1993)
Ecosystem	Wet Forests and Bog Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Food- berries, leaves for tea; medicine.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☐Summer ☐Fall ☐Winter	☐Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Gaultheria procumbens*
Common Name	Wintergreen
Odawa Name	Winisibugons – 'dirty leaf' (Densmore 1974), Winiisiibag, Winiisiibugad, or Winiisiibugoons (GLIFWC 1993; Herron 2002)
Ecosystem	Pine and Hardwood Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

- *Eat leaves to settle stomach or freshen breath.*
- *Wintergreen is used as a food resource for flavoring things*

LTBB Native Plant Initiative (2009)

- Medicine; tonic, teas/beverages, food, and flavoring for cooking.
- Wintergreen was the original source for aspirin, and all parts of the plant contain methyl salicylate, which was the original active ingredient in aspirin.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Gaylussacia baccata*
Common Name	Huckleberry, Black Huckleberry
Odawa Name	Minnan (GLIFWC 1993; Herron 2002).
Ecosystem	Sandy and Rocky Woods
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Food

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Hamamelis virginiana*
Common Name	Witch Hazel
Odawa Name	Nsakemizins (GLIFWC 1993)
Ecosystem	Maples Woods and Dry Woods
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Medicine

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Heliopsis hellanthoides*
Common Name	Oxeye Daisy, False Sunflower
Odawa Name	Giizisobagoons (Meeker et al. 1993)
Ecosystem	Dry and Wet Open Habitats
Status in Park	Unknown



Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kemperode=g520

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

- *Oxeye Daisy serves as a medicinal plant and also has other types of spiritual uses.*

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Heracleum lanatum* and *Heracleum maximum*
Common Name	Cow Parsnip
Odawa Name	Bibigwewanashk (Meeker et al. 1993)
Ecosystem	Damp Soil and Stream Banks
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Hierochloe odorata*
Common Name	Sweetgrass
Odawa Name	Wiingashk, or Wiishkobi-mashkosi (GLIFWC 1993), Wicko'bimucko'si (Densmore 1974)
Ecosystem	Wet Woods and Wet Meadows
Status in Park	Unknown (Northern Sweetgrass present)



USDA Plant Database.

Contemporary Use Category:

☒Medicine ☐Construction
☒Food ☒Other
☒Craft

Description of Uses:

- *Four sacred plants are sweetgrass, sage, cedar, and tobacco.*
- *Sweetgrass is used as decorations for porcupine quill boxes.*
- *Medicinal plant, and serves as an important ceremonial resource.*
- *Sweetgrass is also used as a cleansing product, a hygiene product like soap or shampoo.*

LTBB Native Plant Initiative (2009)

- Ceremonial plant; smudge; medicine; utility; crafting. Sweetgrass is one of the four medicines associated with the medicine wheel, where it is represented in the north. Harvesting is done during the summer after the seeds have dropped, and is done by cutting the stems above the base of the plant (not pulling). After it is cut, it is bundled and woven into long braids. Sweetgrass is considered a sacred plant that it said to be the hair of mother earth by Anishinaabek people.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring	☐Handful
☒Summer	☐Bucket
☒Fall	☒Bushel Basket
☐Winter	☒More

Scientific Name	*Impatiens sp.*
Common Name	Wild Impatiens; Jewelweed
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands; Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Juglans nigra*
Common Name	Black Walnut
Odawa Name	Bagaanaak (Meeker et al. 1993)
Ecosystem	Riparian Zones
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Juniperus sp.*
Common Name	Cedar
Odawa Name	Giizhik, -ag; Gizhikens, -ag; Giizhikenh (Meeker et al.1993) Kiizhik or Giizhikaandagoons (Odawa Consultant 2014)
Ecosystem	Bog Forests; Swamp Forests; Stream banks
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *Cedar is one of the four sacred medicines. Used as a tea for medicinal purposes and for nutrients (Vitamin C).*
- *It represents the southern direction and is a powerful medicine.*
- *Cedar is good for getting rid of varicose veins. Dip a piece of cloth in and rub it on your legs or wherever needed for a few weeks.*
- *Cedar needles are bound tightly together used in construction of sweat lodge and starting ceremonial fire.*
- *Kinnikinnick is a sacred or ceremonial mixture that often includes cedar, red willow, and tobacco.*
- *Trees used as rods for structures and used for crafts. In summer (usually June) the bark is collected. When it splits, it is ready to pick.*
- *Cedar root is used as a decoration for porcupine quill boxes.*
- *Cedar is the only plant that you can harvest in the winter.*

Evidence of Change to This Plant in This Area:

☒Climate Change
☒Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Juniperus communis*
Common Name	Shrub Juniper
Odawa Name	Giizhigaandagizi (Meeker et al. 1993) Ogaawa/inzh (Meeker et al. 1993)
Ecosystem	Sandy Shores and Dunes
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Juniperus virginiana*
Common Name	Red Cedar
Odawa Name	Miskwaawaak, -oog (Meeker et al. 1993)
Ecosystem	Meadow
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

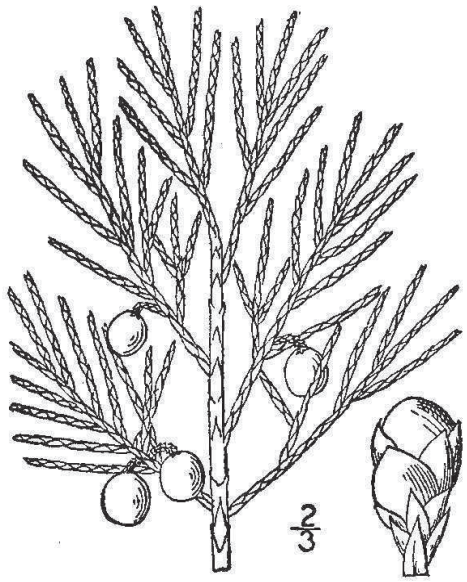
- *Used as a tea for medicinal purposes and for nutrients (has a lot of Vitamin C).*
- *Cedar is one of the four sacred medicines. It represents the southern direction.*
- *It is a powerful medicine. It is possibly used for dreaming.*

Evidence of Change to This Plant in This Area:

☒Climate Change
☒Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Juniperus horizontalis*
Common Name	Creeping Juniper
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Laetiporus sp.*
Common Name	Shelf Mushroom
Odawa Name	Odawa name not provided.
Ecosystem	Forest
Status in Park	Present



http://horsefarmdiaries.com/wp-content/uploads/2009/08/shelf.jpg

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Laetiporus sulphureus*
Common Name	Chicken of the Forest/ Woods
Odawa Name	Odawa name not provided.
Ecosystem	Forest
Status in Park	Present



http://www.sierrapotomac.org/W_Needham/SulphurShelf_110819_files/image002.jpg

Contemporary Use Category:

☐Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☐Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Larix laricina*
Common Name	Tamarack
Odawa Name	Mashkiigwaatig (Meeker et al.1993)
Ecosystem	Bog Mats; Cedar Swamps
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Strong wood used for ricing push poles and lodges; Roots for are used for weaving; utility; medicine; traditional stories.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Lathyrus japonicas*
Common Name	Beach Pea; Sea Pea; Circumpolar Pea; Sea Vetchling
Odawa Name	Odawa name not provided.
Ecosystem	Sandy or Stoney Seashores
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

- *It is a medicinal plant. We make it into a tea, we use whole plant.*
- *Beach Pea (Lathyrus japonicas), that's what we call it. It's like a wild pea, it grows in the sand. We use that one. Medicinal, more like, well some of the plants we use, there like for protection, spiritual use*

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Ledum groenlandicum; Rhododendron groenlandicum*
Common Name	Labrador Tea
Odawa Name	Muckig'obug – 'swamp leaf' (Densmore 1974), Maskiigobag, Mashkiikaang niibiish, Waabashkikibag, or Waboskiki'bug – ('rabbit leaf') (GLIFWC 1993)
Ecosystem	Swamp Forests and Bog Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Food- tea; Medicine.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Lilium philadelphiam*
Common Name	Woodlily
Odawa Name	Odawa name not provided.
Ecosystem	Shoreline; Forest
Status in Park	Present



http://2.bp.blogspot.com/-R2yA5TIpQbI/Ue1FpInMiyI/AAAAAAAACS0/zcdOcuEA3vo/s1600/Wood+lily.jpg

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Lonicera sp.*
Common Name	Honeysuckle
Odawa Name	Odawa name not provided.
Ecosystem	Boreal Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Lycopodium complanatum*
Common Name	Ground Cedar
Odawa Name	Giizhikaandag (Meeker et al. 1993)
Ecosystem	Moist shaded Woods
Status in Park	Unknown



Borealforest.org. http://www.borealforest.org/ferns/fern10.htm

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Lycopodium obscurum*
Common Name	Ground Pine, Crowsfoot
Odawa Name	Cinonagan (GLIFWC 1993; Herron 2002), Gagige bag (GLIFWC 1993)
Ecosystem	Moist Woods and Bogs
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Phellinus igniarius*
Common Name	Punk
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands; Forest
Status in Park	Present



http://www.leifgoodwin.co.uk/Fungi/0__DSC6756%20Phellinus%20igniarius.jpg

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Melilotus alba*
Common Name	White Sweet Clover, Bokhara Clover, Honey Clover, Tree Clover, White Melilot
Odawa Name	Odawa name not provided.
Ecosystem	Meadow, Riparian Zones
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Mentha arvensis*
Common Name	Wild Mint, Corn Mint
Odawa Name	Aandegobagoons, Namepin, Namewashkoons (Meeker et al. 1993)
Ecosystem	Wet Meadows and Stream banks
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☒Bucket ☒Bushel Basket ☒More

Scientific Name	*Mitchella repens*
Common Name	Partridge Berry
Odawa Name	Binewimin – 'grouse berry' (GLIFWC 1993; Herron 2002)
Ecosystem	Dry and Moist Woods
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☐Other

Description of Uses:

- *We use Partridge Berry as a medicinal plant.*

LTBB Native Plant Initiative (2009)

- Medicine; food- tea; ceremonial use.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☒Summer ☐Fall ☐Winter	☐Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Monarda Punctata*
Common Name	Horse Mint, Spotted Bee Balm
Odawa Name	Kah-be-sah-ne-gwa-y-yok (Reagan 1928)
Ecosystem	Prairies, Dry and Sandy Soil
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

- *Horse Mint is used as a tincture for protection during a sweat.*

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Morchella angusticeps*
Common Name	Black Morel
Odawa Name	Odawa name not provided.
Ecosystem	Coniferous Forest; Cottonwood Riparian Forest
Status in Park	Present



http://mdc.mo.gov/discover-nature/field-guide/black-morel

Contemporary Use Category:

☐Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Morchella esculenta*
Common Name	Morel Mushroom, Sponge Morel
Odawa Name	Odawa name not provided.
Ecosystem	Coniferous Forest; Cottonwood Riparian Forest
Status in Park	Present



Wikipedia. http://en.wikipedia.org/wiki/Morchella_esculenta

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

- *Morel mushrooms are a food resource, they come up in the spring with a very limited harvesting period.*

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☒Bucket ☒Bushel Basket ☒More

Scientific Name	*Morchella esculentoides*
Common Name	Gray Morel
Odawa Name	Odawa name not provided.
Ecosystem	Coniferous Forest; Cottonwood Riparian Forest
Status in Park	Present



http://www.indianamushrooms.com/morels.html

Contemporary Use Category:

☐Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Morchella rufobrunnea*
Common Name	White Morel
Odawa Name	Odawa name not provided.
Ecosystem	Coniferous Forest; Cottonwood Riparian Forest
Status in Park	Present



www.sporetradingpost.com

Contemporary Use Category:

☐Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Myosotis sp.*
Common Name	Forget-Me-Not
Odawa Name	Odawa name not provided.
Ecosystem	Boreal Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Nasturtium officinale*
Common Name	Watercress
Odawa Name	Odawa name not provided.
Ecosystem	Cool Flowing Streams and Springs
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☐Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☐Fall ☐Winter	☒Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Nepeta cataria*
Common Name	Catnip
Odawa Name	Gaazha/igensibag (Meeker et al. 1993), (Gi)chi-namewashk (Meeker et al. 1993)
Ecosystem	Meadow
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Nicotiana sp.*
Common Name	Tobacco
Odawa Name	Asemaa (Odawa Consultant 2014)
Ecosystem	Unknown
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

- *Tobacco is a very important medicinal plant.*
- *It has other spiritual and protective uses.*
- *Tobacco can be used as part of kinnikinnick blends.*

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☒Summer ☐Fall ☐Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Nymphaea odorata*
Common Name	White Waterlily
Odawa Name	Akandamoo – 'a kind of big root growing in the water' (GLIFWC 1993)
Ecosystem	Ponds and Quiet Waters
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☐Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Food; medicine.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☒Summer ☐Fall ☐Winter	☐Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Osmorhiza claytonii*
Common Name	Sweet cicely
Odawa Name	Ozagadigom (Meeker et al. 1993)
Ecosystem	Moist Woods
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Osmunda claytoniana*
Common Name	Interrupted Fern
Odawa Name	Odawa name not provided.
Ecosystem	Wetland
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Ostrya virginiana*
Common Name	Ironwood, American Hop-horn-beam
Odawa Name	Maananoons, -ag (GLIFWC 1993; Herron 2002)
Ecosystem	Upland Woods, Dry Soils
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☒Other

Description of Uses:

- Contemporarily used to make walking sticks, staffs or canes, dancing sticks/eagle sticks.
- It serves a utilitarian purpose and for handicrafts because it is a hard wood.

LTBB Native Plant Initiative (2009)

- Utility- the wood is very tough and hard, and has many uses; medicine.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Panax quinquefollum*
Common Name	Ginseng
Odawa Name	Jiisens (Meeker et al. 1993), Zhooniyaawijiibik, Zhooniyaa-ojiibik (Meeker et al. 1993)
Ecosystem	Mesic Woods
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Panax trifollum*
Common Name	Dwarf Ginseng
Odawa Name	Nesoobagak (Meeker et al. 1993)
Ecosystem	Maple and Hemlock-Maple Woods
Status in Park	Likely Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Panicum rigidulum*
Common Name	Red Top Panicgrass
Odawa Name	Odawa name not provided.
Ecosystem	Wetland
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Panicum virgatum*
Common Name	Switchgrass
Odawa Name	Odawa name not provided.
Ecosystem	Wetland
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Picea sp.*
Common Name	Spruce
Odawa Name	Odawa name not provided.
Ecosystem	Forest
Status in Park	Present



http://www.conifers.org/pi/pi/rubens07.jpg

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *Spruce we use spruce we use as medicine, for crafts, the pitch is used as medicine. They used to use the pitch on birch bark canoes, seal up the cracks.*

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Picea glauca*
Common Name	White Spruce
Odawa Name	Gaawaandag; Gaawandagwaatig; Mina'ig; Wadab; Zesegaangdag (Meeker et al. 1993)
Ecosystem	Conifer Swamps, Bogs, Mesic Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Picea mariana*
Common Name	Black Spruce
Odawa Name	Gaagaagiwanzh; Zesegaandag; Zhingob; Zhingob gaawaandag (Meeker et al. 1993)
Ecosystem	Bog Forests, Swamps, Alkaline Soil
Status in Park	Present



Wikipedia.
http://en.wikipedia.org/wiki/Picea_mariana

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *Black spruce has a ceremonial/spiritual use, associated with the north route.*
- *Spruce is used as medicine, for crafts, the pitch is used as medicine. They used to use the pitch on birch bark canoes, seal up the cracks.*

LTBB Native Plant Initiative (2009)

- Utility- roots are used for cordage and crafting, and resin is used for pitch (binding); medicine.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Pinus sp.*
Common Name	Pine
Odawa Name	Odawa name not provided.
Ecosystem	Forest
Status in Park	Present


USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☒Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☒Bushel Basket ☒More

Scientific Name	*Pinus banksiana*
Common Name	Jack Pine
Odawa Name	Okikaandag (Meeker et al. 1993)
Ecosystem	Dry, Sandy, Alkalineic Soil
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Pinus resinosa*
Common Name	Red Pine
Odawa Name	Apakwanagemag; Bapakwanagemag; Zhingobiins; Zhingwaak (Meeker et al. 1993)
Ecosystem	Dry, Sandy, Alkalineic Soil
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☒Other

Description of Uses:

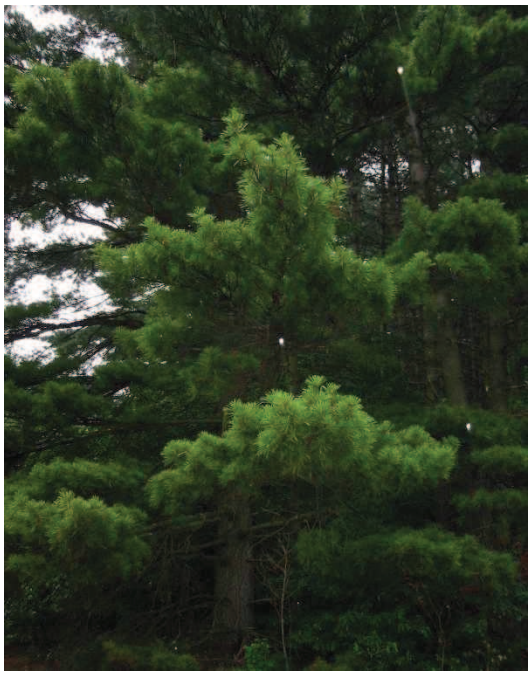
No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Pinus strobus*
Common Name	White Pine, Weymouth Pine, Tree of Peace
Odawa Name	Zhingwaak (Meeker et al. 1993)
Ecosystem	Sandy Soils
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *White Pine is used as a medicine. It is used as a spring tonic.*
- *The elders used it for tea.*

LTBB Native Plant Initiative (2009)

- Medicine; smudge; traditional stories; ceremonial use; traditionally regarded as a great tree of peace and prayer; wood; sap was used for pitch; utility; food- young staminate catkins were reportedly gathered and boiled for food by Ojibwe from Wisconsin.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☒Overusing by People
☒Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Pleurotus ostresatus*
Common Name	Oyster Mushroom
Odawa Name	Odawa name not provided.
Ecosystem	Forest
Status in Park	Present



www.wildmanstevebrill.com

Contemporary Use Category:

☐Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☐Summer ☐Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Polygonatum sp.*
Common Name	Solomon's Seal
Odawa Name	Odawa name not provided.
Ecosystem	Boreal Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Populus sp.*
Common Name	Poplar; Cottonwood
Odawa Name	Odawa name not provided.
Ecosystem	Cottonwood Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Populus balsamifera*
Common Name	Balsam Poplar
Odawa Name	Azaadi(i); Maanazaadi(i) (Meeker et al. 1993)
Ecosystem	Wet, Lowland Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *Balsam Poplar saplings used as structures.*
- *Balsam Poplar is also used as a medicine for stress relief, if you skin the soft inner bark and set it to steep on the stove.*

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Populus gileadensis*
Common Name	Balm of Gilead
Odawa Name	Odawa name not provided.
Ecosystem	Lakeshores
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Populus grandidentata*
Common Name	Large Tooth Aspen; Big Tooth Aspen
Odawa Name	Azaadi(i) (Meeker et al.1993)
Ecosystem	Sandy Soils; Clearings; Dry Cutover Areas; Burned Areas
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Medicine; food and cover for wildlife; ceremonial uses; starvation food (inner bark).

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☒Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Populus tremuloides*
Common Name	Quaking Aspen; Trembling Aspen
Odawa Name	Zaad (Osawamik and Trudeau ND), Asadi (Densmore 1974; Herron 2002), Azaadii, or Azaadiins (GLIFWC 1993)
Ecosystem	Upland Forests, Coastal Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Potamogeton sp.*
Common Name	Pondweed
Odawa Name	Odawa name not provided.
Ecosystem	Wetland
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Prunus emarginata*
Common Name	Wild Cherry; Bitter Cherry
Odawa Name	Odawa name not provided.
Ecosystem	Open Woods
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Prunus pensylvanica*
Common Name	Fire Cherry; Pin Cherry; Red Cherry; Bird Cherry
Odawa Name	Bawa'iminaan; Gozigwaakomin (Meeker et al.1993)
Ecosystem	Boreal and Other Forests
Status in Park	Present



Newenglandwild.org. https://gobotany.newenglandwild.org/species/prunus/pensylvanic

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Prunus pumila*
Common Name	Sand Cherry
Odawa Name	Odawa name not provided.
Ecosystem	Shoreline; Coastal Dunes
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Prunus serotina*
Common Name	Black Cherry
Odawa Name	Odawa name not provided.
Ecosystem	Wetland; Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☒Overusing by People
☒Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Prunus virginiana*
Common Name	Chokecherry
Odawa Name	Asa/isaweminagaawanzh (GLIFWC 1993), Sawemin (Herron 2002)
Ecosystem	Sandy Soils
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Pteridium sp.*
Common Name	Fiddlehead Fern; Bracken
Odawa Name	Odawa name not provided.
Ecosystem	Moist Soil
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Pyrus coronaria*
Common Name	Wild Crab Apple
Odawa Name	Mishiiminaatig; Mishiiminagaawanzh (Meeker et al. 1993)
Ecosystem	Meadow, Woodland Borders
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☒Bushel Basket ☒More

Scientific Name	*Quercus sp.*
Common Name	Oak
Odawa Name	Odawa name not provided.
Ecosystem	Forest
Status in Park	Present



www.ibiblio.org

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Quercus alba*
Common Name	White Oak
Odawa Name	Mitigomizh; Miizhimizh (Meeker et al.1993)
Ecosystem	Ridges, Valleys, Dry and Moist Forests, Meadow
Status in Park	Present


USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *We use the acorns for cooking, as a food source.*
- *White Oak we like use the bark, it's really a good plant.*

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Quercus macrocarpa*
Common Name	Burr Oak; Mossycup oak
Odawa Name	Mitigomizh (Meeker et al. 1993)
Ecosystem	Prairies; Meadow
Status in Park	Likely Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

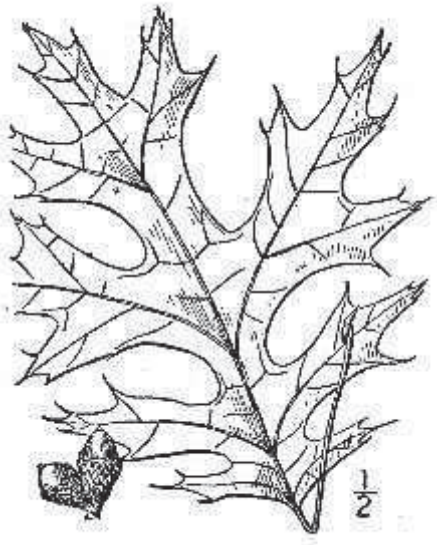
No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Quercus pasustris*
Common Name	Pin Oak
Odawa Name	Odawa name not provided.
Ecosystem	Moist Forests and Meadow
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Quercus rubra*
Common Name	Red Oak; Northern Red Oak
Odawa Name	Mashkode-miizhimizh; Mitigomizh; Wiisagi-mitigomizh (Meeker et al.1993)
Ecosystem	Well-drained Soils
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

- *We use the acorns for cooking, as a food source.*

LTBB Native Plant Initiative (2009)

- Firewood; medicine; natural dye; utility; lumber; food- the acorns were used as starch/flour after tannins were removed; important food for wildlife.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☒Overusing by People
☒Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Quercus velutina*
Common Name	Black Oak
Odawa Name	Tree: Mitigomizh Acorn: Mitigomin (Meeker et al.1993)
Ecosystem	Dry, Upland Forests
Status in Park	Present



Plants for a Future . http://www.pfaf.org/user/Plant.aspx?LatinName=Quercus+velutina

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *We use the acorns for cooking, as a food source.*

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Ranunculus acris*
Common Name	Buttercup
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands; Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Rhus sp.*
Common Name	Sumac
Odawa Name	Name for Staghorn Sumac: Baakwaanaatig, Baakwaanimizh (GLIFWC 1993)
Ecosystem	Dry, calcareous oak savannas
Status in Park	Various species present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *We use the sumac root and the branch is used for pipe stems.*

LTBB Native Plant Initiative (2009)

- Food- tea; utility; dye; crafting; medicine.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☒Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Rosa acicularis*
Common Name	Prickly Wild Rose
Odawa Name	Oginiiminagaawanzh (Meeker et al.1993)
Ecosystem	Meadows; Upland Forests
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

- *We use rose root as medicine.*

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Rosa virginiana*
Common Name	Wild Rose
Odawa Name	Oginiiminagaawanzh (Meeker et al.1993)
Ecosystem	Moist and Dry Areas
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☐Construction
☒Other

Description of Uses:

- We use rose root it grows in sandy soil. It's a medicine.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Rudbeckia hirta*
Common Name	Black eyed Susan
Odawa Name	Wezawab-gonik (Gilmore 1933)
Ecosystem	Meadows and Forests
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☐Fall ☐Winter	☐Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Rubus idaeus*
Common Name	Red Raspberry; European Raspberry
Odawa Name	Plant: Miskominagaawanzh; Miskwiminagaawanzh (Meeker et al.1993) Berry: Miskomin, -ag; Miskwimin, -ag (Meeker et al.1993)
Ecosystem	Meadows
Status in Park	Present



Wikipedia. http://en.wikipedia.org/wiki/Rubus_idaeus

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☒More

Scientific Name	*Rubus pensylvanicus*
Common Name	Blackberry
Odawa Name	Odatagaagominagaawanzh (Meeker et al.1993)
Ecosystem	Meadows
Status in Park	Present



Wikipedia. http://en.wikipedia.org/wiki/Rubus_pensilvanicus

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☐Construction
☒Other

Description of Uses:

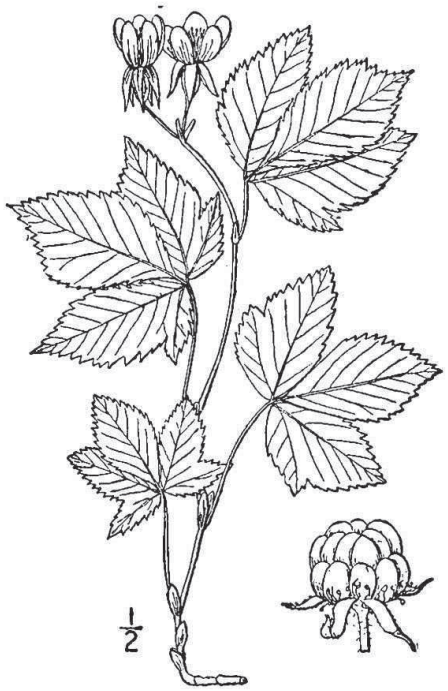
No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☒Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Rubus pubescens*
Common Name	Ground Raspberry; Dwarf Red Black Berry
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands; Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

- ☒Medicine
- ☒Food
- ☐Craft
- ☐Construction
- ☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

- ☐Climate Change
- ☐Lack of Traditional Use
- ☐Overusing by People
- ☐Over-Grazing or Over-Foraging
- ☐Pests
- ☐Pollution
- ☐No Influence
- ☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Salix sp.*
Common Name	Willow
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☒Overusing by People
☒Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☒More

Scientific Name	*Salix alba*
Common Name	White Willow
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Salix discolor*
Common Name	Pussy Willow
Odawa Name	Oziisigobimizh (Meeker et al.1993)
Ecosystem	Bogs, Swamps, Fields
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Salix interior*
Common Name	Sandbar Willow
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Salix laevigata*
Common Name	Red Willow
Odawa Name	miskwaabiimizh, miskwaabiimag, miskwaabiimagoons (http://ojibwe.lib.umn.edu/english/search/red%20willow?x=0)
Ecosystem	Bogs, Swamps, Fields
Status in Park	Unknown



Personal Photo, Otter Creek, Stoffle 2014

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *Shavings of bark are used as a tobacco for powagans (pipes). This is used to communicate with Creator (without inhaling tobacco), carrying prayers up and telling the truth.*
- *We use the red willow too, for medicine. I know the red willow, we peel off the outer edge of the bark, and just under the bark, we use that part. We use it for aspirin. When we need any aspirin type things we'll use that red willow. Or for crafts, we use it, we even use it today for crafts.*
- *Located at the lakeshore. It is used as a tool and medicine. Always have bark around simmering.*

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☒More

Scientific Name	*Sambucus canadensis*
Common Name	Common Elderberry
Odawa Name	Bibigwemin, -an; Bibigwewanashk (Meeker et al.1993)
Ecosystem	Swamps; Dry Forests; Bottomlands
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Sambucus racemosa*
Common Name	Red Elderberry
Odawa Name	Papashkisiganak, -on (Baraga 1878) Papaskatciksi'gana tig (Smith 1923)
Ecosystem	Stream banks; Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

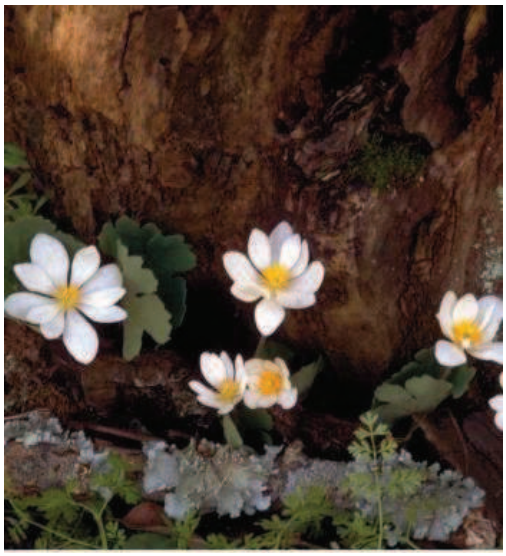
No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Sanguinaria canadensis*
Common Name	Bloodroot; Bloodwort; Redroot; Red Puccoon; Pauson
Odawa Name	Meskojiibikak; Meskwijiibikak; Miskojiibik; Miskwijiibik (Meeker et al.1993)
Ecosystem	Moist and Dry Forests; Dunes
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☒Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Sanicula marilandica*
Common Name	Black Snakeroot; Maryland Black Snakeroot
Odawa Name	Ginebigojiibik; Mazaan (Meeker et al.1993)
Ecosystem	Thickets; Open Woods
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Schizachyrium scoparium*
Common Name	Little Bluestem
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Schoenoplectus acutus*
Common Name	Hardstem Bulrush
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Scirpus americanus*
Common Name	Bulrush
Odawa Name	Odawa name not provided.
Ecosystem	Wetlands
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *Bulrushes are used as a craft resource for making those mats and bags.*

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Solidago sp.*
Common Name	Goldenrod
Odawa Name	Odawa name not provided.
Ecosystem	Beaches, sand dunes, marshes
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Solidago graminifolia; Euthamia graminifolia*
Common Name	Fragrant Golden Rod; Flat-top Golden Rod; Grass Leaf Golden Rod
Odawa Name	Wezaawaaskoneg (Meeker et al.1993)
Ecosystem	Sandy Shores; Meadows; Bog Edges
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Sorbus americana*
Common Name	American Mountain Ash
Odawa Name	Ah-o-je-mahg (Reagan 1928)
Ecosystem	Swamps; Bogs; Stream edges
Status in Park	Likely Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☒Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Stachys palustris*
Common Name	Hedge Nettle; Marsh Woundwort; Marsh Hedge-nettle
Odawa Name	Andegobag (Meeker et al.1993)
Ecosystem	Low, wet areas
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

- ☒Medicine
- ☐Food
- ☐Craft
- ☐Construction
- ☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

- ☐Climate Change
- ☐Lack of Traditional Use
- ☐Overusing by People
- ☐Over-Grazing or Over-Foraging
- ☐Pests
- ☐Pollution
- ☐No Influence
- ☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☐Summer ☐Fall ☐Winter	☐Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Symplocarpus foetidus*
Common Name	Skunk Cabbage; Western Skunk Cabbage; Wild Cabbage; Swamp Lantern
Odawa Name	Odawa name not provided.
Ecosystem	Wet Forests; Swamps
Status in Park	Unknown



USDA Plant Database.

Contemporary Use Category:

- ☒Medicine
- ☒Food
- ☐Craft
- ☐Construction
- ☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☒Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Taraxacum officinale*
Common Name	Dandelion
Odawa Name	Doodooshaabojiibik (Meeker et al.1993)
Ecosystem	Meadows
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Taxus canadensis*
Common Name	Ground Hemlock; American Yew; Canadian Yew
Odawa Name	Ne'bagandag (Densmore 1928); Pebamabid-singup (Gilmore 1933)
Ecosystem	Swamp Forests; Riverbanks; Coniferous Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *Ground Hemlock is medicinal, if you have a stressful job you can boil the hemlock and rinse yourself off with it and it acts as stress relief, soothing.*
- *You can make a tea from Ground Hemlock, and it is good for joint pain, arthritis, it's good in general.*

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Thuja occidentalis*
Common Name	White Cedar; Northern White Cedar
Odawa Name	Giizhik, -ag; Gizhikens, -ag; Giizhikenh (Meeker et al.1993) Kiizhik or Giizhikaandagoons (Odawa Consultant 2014)
Ecosystem	Bog Forests; Swamp Forests; Streambanks
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *Cedar is good for getting rid of varicose veins. Dip a piece of cloth in and rub it on your legs or wherever needed for a few weeks.*
- *Cedar needles are bound tightly together used in construction of sweat lodge and starting ceremonial fire.*

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☒Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Tilia americana*
Common Name	Basswood; Linden
Odawa Name	Wiigob; Wiigobaatig, -oog; Wiigobimizh, -igg; Wiigibiish; Wiigobiishaatig (Meeker et al.1993)
Ecosystem	Moist Deciduous Woods
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *Basswood can be made into rope using the inner bark by braiding pieces.*

LTBB Native Plant Initiative (2009)

- Utility- the inner bark is used for cordage; wood; medicine.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Toxicodendron radicans*
Common Name	Poison Ivy
Odawa Name	Animikiibag (Meeker et al.1993)
Ecosystem	Moist Forests; Sandy Soils; Swampy Thickets
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Trifolium*
Common Name	Wild/ Native Clover
Odawa Name	Odawa name not provided.
Ecosystem	Forest; Meadow
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☐Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Trillium grandiflorum*
Common Name	Wake-Robin; White Trillium; Common Trillium
Odawa Name	Ininiwin dibigegun (Densmore 1974; GLIFWC 1993)
Ecosystem	Rich, mixed Forests; Thickets; Swamps
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☐Other

Description of Uses:

- *Trillium, we use the roots as a medicine.*

LTBB Native Plant Initiative (2009)

- Medicine

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☐Summer ☐Fall ☐Winter	☐Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Tsuga canadensis*
Common Name	Eastern Hemlock
Odawa Name	Odawa name not provided.
Ecosystem	Forest
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

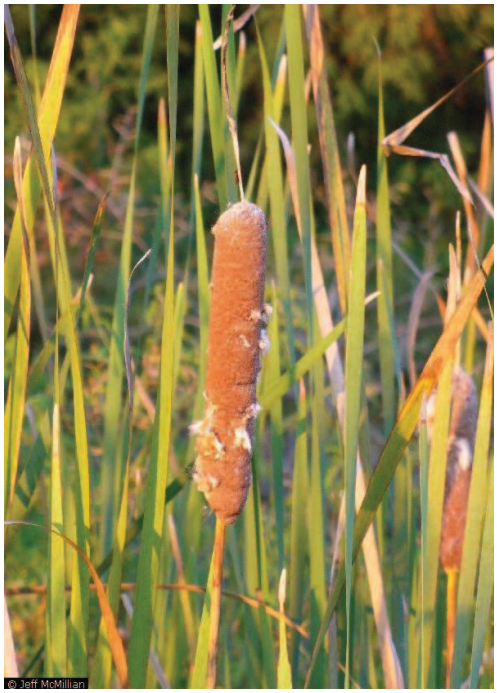
No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☒More

Scientific Name	*Typha latifolia*
Common Name	Cattail
Odawa Name	Apuk'we (Densmore 1974), Apakway, Apakwesh, Apakweshkway, Nabagashk (GLIFWC 1993)
Ecosystem	Shallow water; Ditches
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *Cattails would be woven into mats.*
- *All kinds of stuff, yellow pancakes, Cattail is used for all sorts of stuff, diaper material, the fluff from that is used to absorb waste. Collected all seasons.*

LTBB Native Plant Initiative (2009)

- Food-rhizome/root, new shoots; utility- leaves weaved for thatching, coverings, and floor mats.

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☒More

Scientific Name	*Ulmus americana*
Common Name	American Elm
Odawa Name	Aniib (GLIFWC 1993; Herron 2002), Aw-nib (Otto 1996)
Ecosystem	Hardwood Forests; Floodplains; Swamp edges
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- The thick bark was used for toboggans and lodge coverings; medicine.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Ulmus rubra*
Common Name	Slippery Elm
Odawa Name	Gawa'komic (Densmore 1974); Gaawaakomizh; Ozhaashigob; Zhiishiigimewanzh (Meeker et al.1993)
Ecosystem	Floodplains; Mesic Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Medicine; utility.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Urtica dioica*
Common Name	Stinging Nettle
Odawa Name	Mazaan; Mazaanaatig (Meeker et al.1993)
Ecosystem	Floodplains; Thickets; Wet Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Vaccinium angustifolium*
Common Name	Blueberry; Low Sweet Blueberry
Odawa Name	Min'aga'wunj (Densmore 1974), Miinagaawanzh' Miin – an' – 'berry', Minan, Minun (GLIFWC 1993), Minun (Herron 2002)
Ecosystem	Open Woods; Sandy Soil; Sphagnum Bogs
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

LTBB Native Plant Initiative (2009)

- Food; medicine; utility- dye; important food for wildlife.

Evidence of Change to This Plant in This Area:

☒Climate Change
☒Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☒Bucket ☒Bushel Basket ☒More

Scientific Name	*Vaccinium macrocarpon*
Common Name	Cranberry
Odawa Name	Aniibimin (Meeker et al.1993)
Ecosystem	Swamps; Open bogs; Wet Shores
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

LTBB Native Plants Initiative (2009)

- Food; medicine- cranberries are well-known for their medicinal properties in treating urinary tract infections and as an internal cleaner.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☒More

Scientific Name	*Vaccinium oxycoccos*
Common Name	Small Cranberry
Odawa Name	Plant: Mashkiigiminagaawanzh (Meeker et al.1993) Berry: Mashkiigimin (Meeker et al.1993)
Ecosystem	Bogs; Wet, peaty Soils
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Verbascum thapsus*
Common Name	Mullein
Odawa Name	Odawa name not provided.
Ecosystem	Dry, sandy, and gravel Soils
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☐Craft
☐Construction
☒Other

Description of Uses:

- *Mullein is a good medicine; we smoke it for upper respiratory ailments.*

Evidence of Change to This Plant in This Area:

☒Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☐More

Scientific Name	*Verbena hastata*
Common Name	Blue Vervain
Odawa Name	Zhawaseshkoohnse (Zichmanis and Hodgins 1982)
Ecosystem	Meadow; Stream banks; Meadows
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☒Bucket ☐Bushel Basket ☐More

Scientific Name	*Viburnum rafinesqueanum*
Common Name	Arrowwood
Odawa Name	Odawa name not provided.
Ecosystem	Successional shrubland, Successional old field, Red maple-hardwood swamp
Status in Park	Present



Lady Bird Johnson Wildflower Center 2014

Contemporary Use Category:

☒Medicine
☐Food
☒Craft
☒Construction
☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Viburnum lentago*
Common Name	Nannyberry
Odawa Name	Plant: Aditeminagaanwanzh; Atiteminagaawanzh (Meeker et al.1993) Berry: Aditemin; Atitemin, -an (Meeker et al.1993)
Ecosystem	Borders of Forests
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

- ☒Medicine
- ☐Food
- ☐Craft
- ☐Construction
- ☐Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

- ☐Climate Change
- ☐Lack of Traditional Use
- ☐Overusing by People
- ☐Over-Grazing or Over-Foraging
- ☐Pests
- ☐Pollution
- ☐No Influence
- ☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☒Summer ☐Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Viburnum opulus*
Common Name	Highbush Cranberry; American Cranberrybush; Mooseberry; Guelder Rose
Odawa Name	Plant: Aniibiminagaawashk (Meeker et al.1993) Berry: Aniibimin, -an (Meeker et al.1993)
Ecosystem	Stream banks; Swamps
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☐Construction
☒Other

Description of Uses:

- *Cranberry is used for food and medicine (diuretic).*

LTBB Native Plant Initiative (2009)

- Medicine; food.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☐Winter	☐Handful ☒Bucket ☒Bushel Basket ☐More

Scientific Name	*Viola sp.*
Common Name	Violet
Odawa Name	Various names for different species
Ecosystem	Fields; Meadows
Status in Park	Various species present



USDA Plant Database.

Contemporary Use Category:

☐Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

No specific descriptions of use(s) documented in this study.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☐Summer ☐Fall ☐Winter	☒Handful ☐Bucket ☐Bushel Basket ☐More

Scientific Name	*Vitis labrusca*
Common Name	Wild Grape; Fox Grape
Odawa Name	Odawa name not provided.
Ecosystem	Mesic Thickets; Borders of Sandy Forests; Riverbanks; Moist Sandy Prairies
Status in Park	Unknown



wisplants.uwsp.edu
http://wisplants.uwsp.edu/scripts/detail.asp?SpCode=vitlab

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *Contemporary people make baskets out of the vines.*
- *I see a lot of grape vine, we use that, the root. Food or medicine, the roots. Roots we get in the spring and fall, because all the power is in the root in the Spring before it goes all the way up into the vine and flowers. That's when it's at its strongest for medicine. Of course the grapes are ready about July, August.*

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☒More

Scientific Name	*Vitis riparia*
Common Name	River Bank Grape
Odawa Name	Jo'minaga'wunj (Densmore 1974), Zhoominagaawanzh, Zhoomin, Zha/iwimagaawanzh (GLIFWC 1993), Zhomindak (Herron 2002)
Ecosystem	Floodplains
Status in Park	Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☒Construction
☒Other

Description of Uses:

- *We use the vines to lash things together, crafts, lodge, whatever, they are pretty strong.*

LTBB Native Plant Initiative (2009)

- Food; utility; craft; medicine

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☒No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☒Spring ☒Summer ☒Fall ☒Winter	☐Handful ☐Bucket ☒Bushel Basket ☒More

Scientific Name	*Zanthoxylum americanum*
Common Name	Common Prickly Ash
Odawa Name	Gaawaakomizh (Meeker et al.1993)
Ecosystem	Meadow; Edges of Pastures
Status in Park	Likely Present



Wikipedia. http://en.wikipedia.org/wiki/Zanthoxylum_americanum

Contemporary Use Category:

☒Medicine
☐Food
☐Craft
☐Construction
☒Other

Description of Uses:

- *We use the thorns the bark and the wood for many things, medicinal and other.*

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☐Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☐Summer ☐Fall ☐Winter	☐Handful ☐Bucket ☐Bushel Basket ☒More

Scientific Name	*Zizania aquatic; Zizania palustris*
Common Name	Wild Rice; Northern Wild Rice
Odawa Name	Manoomin (Meeker et al.1993)
Ecosystem	Rivers; Streams; Lakes; Ponds
Status in Park	Likely Present



USDA Plant Database.

Contemporary Use Category:

☒Medicine
☒Food
☒Craft
☐Construction
☒Other

Description of Uses:

- *Wild Rice is more than food, it is ceremonial, it's a part of our culture and who we are. I really would like to see it growing here again.*

LTBB Native Plant Initiative (2009)

- Wild rice, known as 'maahnoomin' in Anishnaabemowin, is a very important staple food for the Great Lakes tribes. It is harvested in September during the 'Maahnoomin Giizis,' or 'wild rice moon.' Important food for wildlife.

Evidence of Change to This Plant in This Area:

☐Climate Change
☐Lack of Traditional Use
☐Overusing by People
☐Over-Grazing or Over-Foraging
☐Pests
☐Pollution
☐No Influence
☒Combination

Seasons When this Plant is Collected:	**Amount Collected at One Time:**
☐Spring ☐Summer ☒Fall ☐Winter	☐Handful ☐Bucket ☒Bushel Basket ☒More

APPENDIX B
NATIVE PLANT USE
RECORDING FORM

SLBE Native Plant Use and Resource Availability Checklist

Site:_____ Tape#:_____

Interviewer Initials:_____ Date:_____

Tribal Member Name: _____ Age:_____

Tribe:_____ Gender:_____

	Indentified Plant Resources at SLBE		Contemporary Use					Season Collected				Amnt. /visit	Who Coll.	Evidence of Change
	Common Name	***Genus Species***	**Med.**	**Food**	**Craft**	**Const.**	**Other**	**SPR**	**SUM**	**FALL**	**WNTR**			
1	Balsam Fir Tree	*Abies balsamea*												
2	Box Elder	*Acer negundo*												
3	Striped Maple	*Acer pensylvanicum*												
4	Red Maple	*Acer rubrum*												
5	Silver Maple	*Acer saccharinum*												
6	Sugar Maple	*Acer saccharum*												
7	Mountain Maple	*Acer spicatum*												
8	Wooly Yarrow	*Achillea fanutosa*												
9	Yarrow	*Achillea millefolium*												
10	Sweet Flag	*Acorus calamus*												
11	White Baneberry	*Actaea alba*												
12	Red Baneberry	*Actaea rubra*												
13	Agrimony	*Agrimonia gryposepala*												
14	Nodding Wild Onion	*Allium cernuum*												
15	Wild Onion	*Allium stellatum*												
16	Wild Leek	*Allium tricoccum*												
17	Alder	*Alnus glutinosa*												
18	Speckled Alder	*Alnus rugosa*												
19	Tag Alder	*Alnus serrulata*												
20	Death Angel Mushroom	*Amanita bisporigera*												
21	Red Top Mushroom	*Amanita muscaria*												
22	Vomit Mushroom	*Amanita verna*												
23	White Skull Mushroom	*Amanita virosa*												
24	Duneberry	*Amelanchier sp.*												
25	Shadbush Duneberry	*Amelanchier canadensis*												
26	Smooth Duneberry	*Amelanchier laevis*												

	Indentified Plant Resources at SLBE		Contemporary Use					Season Collected				Amnt. /visit	Who Coll.	Evidence of Change
	Common Name	***Genus Species***	**Med.**	**Food**	**Craft**	**Const.**	**Other**	**SPR**	**SUM**	**FALL**	**WNTR**			
27	Beachgrass	*Ammophila*												
28	Pearly Everlasting	*Anaphalis margaritacea*												
29	Bog Rosemary	*Andromeda glaucophylla*												
30	Big Bluestem	*Andropogon gerardii*												
31	Anemone	*Anemone sp.*												
32	Canada Anemone	*Anemone canadaensis*												
33	Thimbleweed	*Anemone cylindrica*												
34	Tall Anemone	*Anemone virginiana*												
35	Angelica	*Angelica L.*												
36	Lesser Pussytoes	*Antennaria neglecta*												
37	Pussytoes	*Antennaria plantaginifolia*												
38	Dogbane	*Apocynum sp.*												
39	Spreading Dogbane	*Apocynum androsaemifollia*												
40	Indian Hemp	*Apocynum cannabinum*												
41	Wild Columbine	*Aquilegia canadensis*												
42	Tower Mustard	*Arabis glabra*												
43	Wild Sasparilla	*Aralia nudicaulis*												
44	Spikenard	*Aralia racemosa*												
45	Common Burdock	*Arctium minus*												
46	Burdock	*Arctium L*												
47	Alpine Bearberry	*Arctostaphylos alpina*												
48	Bearberry	*Arctostaphylos uva-ursi*												
49	Jack in the Pulpit	*Arisaema triphyllum*												
50	Dead Man's Moccassin	*Armillaria mellea*												
51	European Wormwood	*Artemisia absithium*												
52	Field Sagewort	*Artemisia campestris*												
53	Mugwort	*Artemisia dracunuclus*												
54	White Mugwort	*Artemisisa ludovicana*												
55	Swamp Milkweed	*Ascelpias incarnata*												
56	Common Milkweed	*Ascelpias syriaca*												
57	Blue Wood Aster	*Aster cordifolius*												
58	Large Leafed Aster	*Aster macrophyllus*												
59	Purple Stemmed Aster	*Aster puniceus*												

	Indentified Plant Resources at SLBE		Contemporary Use					Season Collected				Amnt. /visit	Who Coll.	Evidence of Change
	Common Name	***Genus Species***	**Med.**	**Food**	**Craft**	**Const.**	**Other**	**SPR**	**SUM**	**FALL**	**WNTR**			
60	Oats	*Avena sativa*												
61	Yellow Birch	*Betula alleghaniensis*												
62	Black Birch	*Betula nigra*												
63	White/Paper Birch	*Betula papyrifera*												
64	Low Birch	*Betula pumila*												
65	Moonwort	*Botrychium lunaria*												
66	Virginia Grape Fern	*Botrychium virginianum*												
67	Buffalo Grass	*Bouteloua dactyloides*												
68	Field Mustard	*Brassica rapa*												
69	Moss	*Bryophyta*												
70	Marsh Marigold	*Caltha palustris*												
71	Giant Puffball	*Calvatia craniformis*												
72	Bluebell	*Campanula americana*												
73	Marsh Bellflower	*Campanula aparinoides*												
74	Shepards Purse	*Capsella bursa-pastoris*												
75	Cut Leaf Toothwart	*Caradmine concatenata*												
76	Large toothwart	*Cardamine X Maxima*												
77	Pennsylvania Sedge	*Carex prensylvanica*												
78	American Hornbeam	*Carpinus caroliniana*												
79	Blue Cohosh	*Caulophyllum thalictroides*												
80	American Bittersweet	*Celastrus scandens*												
81	Atlantic White Cedar	*Chamaecyparis thyoides*												
82	Leather Leaf	*Chamaedaphne calyculata*												
83	Prince's Pine	*Chimaphila umbellata*												
84	Pitcher's Thistle	*Cirsium pitcheri*												
85	Common Thistle	*Cirsium vulgare*												
86	Reindeer lichen/moss	*Cladonia rangifernia*												
87	Goldthread	*Coptis aspleniifolia*												
88	Bunchberry	*Cornus canadensis*												
89	Gray Dogwood	*Cornus racemosa*												
90	Red Osier Dogwood	*Cornus sericea*												
91	Squirrel Corn	*Dicentra canadensis*												
92	Dutchman's Breeches	*Dicentra cucullaria*												

	Indentified Plant Resources at SLBE		Contemporary Use					Season Collected				Amnt. /visit	Who Coll.	Evidence of Change
	Common Name	***Genus Species***	**Med.**	**Food**	**Craft**	**Const.**	**Other**	**SPR**	**SUM**	**FALL**	**WNTR**			
93	Purple Coneflower	*Echinacea purpurea*												
94	Spikerush Sedge	*Eleocharis palustris*												
95	Beech Drops	*Epifagus virginiana*												
96	Trailing Arbutus	*Epigaea repens*												
97	Great Willow Herb	*Epilobium angustifolium*												
98	Field Horsetail	*Equisetum arvense*												
99	Scouring Rush	*Equisetum hymale*												
100	Adder's Tongue/Trout Lilly	*Erythronium*												
101	Spotted Joe Rye Weed	*Eupatorium maculatum*												
102	Boneset	*Eupatorium perfoliatum*												
103	Joe Rye Weed	*Eupatorium purpureum*												
104	Beech	*Fagus grandifolia*												
105	Beefsteak Mushroom	*Fistulina hepatica*												
106	Woodland Strawberry	*Fragaria vesca*												
107	Wild Strawberry	*Fragaria virginiana*												
108	Reeds	*Fragmites sp.*												
109	White Ash	*Fraxinus americana*												
110	Black Ash	*Fraxinus nigra*												
111	Red/Green Ash	*Fraxinus pennsylvanica*												
112	Goose grass	*Galium aparine*												
113	Small Bedstraw	*Galium tinctorium*												
114	Creeping Snowberry	*Gaultheria hispadula*												
115	Wintergreen	*Gaultheria procumbens*												
116	Huckleberry	*Gaylussacia baccata*												
117	Wild Geranium	*Geranium maculatum*												
118	Rattlesnake Grass	*Glyceria canadensis*												
119	Witch Hazel	*Hamamelis virginiana*												
120	Oxeye Daisy	*Heliopsis hellanthoides*												
121	Sharp Lobed Hepatica	*Hepatica acutiloba*												
122	Cow Parsnip	*Heracleum lanatum*												
123	Sweetgrass	*Hierochloe odorata*												
124	Hop	*Humulus lupulus*												
125	Jewelweed	*Impatiens sp.*												

	Indentified Plant Resources at SLBE		Contemporary Use					Season Collected				Amnt. /visit	Who Coll.	Evidence of Change
	Common Name	***Genus Species***	**Med.**	**Food**	**Craft**	**Const.**	**Other**	**SPR**	**SUM**	**FALL**	**WNTR**			
126	Spotted Touch Me Not	*Impatiens capensis*												
127	Wild Iris	*Iris sp.*												
128	Black Walnut	*Juglans nigra*												
129	Cedar	*Juniperus sp.*												
130	Shrub Juniper	*Juniperus communis*												
131	Red Cedar	*Juniperus virginiana*												
132	Creeping Juniper	*Juniperus horizontalis*												
133	Chicken of the Forest/Woods	*Laetiporus sulphureus*												
134	Shelf mushroom	*Laetiporus sp.*												
135	Tamarack	*Larix laricina*												
136	Beah Pea	*Lathyrus japonicas*												
137	Labrador Tea	*Ledum groenlandicum*												
138	Duckweed	*Lemna minor*												
139	Woodlily	*Lilium philadelphiam*												
140	Butter and Eggs	*Linaria vulgaris*												
141	Twin Flower	*Linnaea borealis*												
142	Ground Cedar	*Lycopodium complanatum*												
143	Ground Pine	*Lycopodium obscurum*												
144	Bugleweed	*Lycopus asper*												
145	Fiddlehead Fern	*Matteuccia struthiopteris*												
146	Punk	*Melaleuca quinquenervia*												
147	Cow Wheat	*Melampyrum lineare*												
148	White Sweet Clover	*Melilotus alba*												
149	Wild Mint	*Mentha arvensis*												
150	Partridge Berry	*Mitchella repens*												
151	Wild Bergamot	*Monarda fistulosa*												
152	Horse Mint	*Monarda Punctata*												
153	Black Morel	*Morchella angusticeps*												
154	Morel Mushroom	*Morchella esculenta*												
155	Gray Morel	*Morchella esculentoides*												
156	White Morel	*Morchella rufobrunnea*												
157	Watercress	*Nasturtium officinale*												
158	Catnip	*Nepeta cataria*												

	Indentified Plant Resources at SLBE		Contemporary Use					Season Collected				Amnt. /visit	Who Coll.	Evidence of Change
	Common Name	***Genus Species***	**Med.**	**Food**	**Craft**	**Const.**	**Other**	**SPR**	**SUM**	**FALL**	**WNTR**			
159	Tobacco	*Nicotiana sp.*												
160	White Waterlily	*Nymphaea odorata*												
161	Sweet Cicley	*Osmorhiza claytonii*												
162	Ironwood	*Ostrya virginiana*												
163	Ginseng	*Panax quinquefollum*												
164	Dwarf Ginseng	*Panax trifollum*												
165	Wild Parsnip	*Pastinaca sativa*												
166	Wood betony	*Pedicularis canadensis*												
167	Spruce	*Picea sp.*												
168	White Spruce	*Picea glauca*												
169	Black Spruce	*Picea mariana*												
170	Pine	*Pinus sp.*												
171	Jack Pine	*Pinus banksiana*												
172	Red Pine	*Pinus resinosa*												
173	White Pine	*Pinus strombus*												
174	Oyster Mushroom	*Pleurotus Ostreatus*												
175	Fringed Polygala	*Polygala paucifolia*												
176	Solomon's Seal	*Polygonatum sp.*												
177	Poplar	*Populus sp.*												
178	Balsam Poplar	*Populus balsamifera*												
179	Balm of Gilead	*Populus gileadensis*												
180	Large Tooth Aspen	*Populus grandidentata*												
181	Quaking Aspen	*Populus tremuloides*												
182	Heal All	*Prunella vulgaris*												
183	Wild Cherry	*Prunus emarginata*												
184	Fire Cherry	*Prunus pensylvanica*												
185	Sand Cherry	*Prunus pumila*												
186	Black Cherry	*Prunus serotina*												
187	Chokecherry	*Prunus virginiana*												
188	Wild Crab Apple	*Pyrus coronaria*												
189	Oak	*Quercus sp.*												
190	White Oak	*Quercus alba*												
191	Burr Oak	*Quercus macrocarpa*												

	Indentified Plant Resources at SLBE		Contemporary Use					Season Collected				Amnt. /visit	Who Coll.	Evidence of Change
	Common Name	***Genus Species***	**Med.**	**Food**	**Craft**	**Const.**	**Other**	**SPR**	**SUM**	**FALL**	**WNTR**			
192	Red Oak	*Quercus rubra*												
193	Black Oak	*Quercus velutina*												
194	Buttercup	*Ranunculus acris*												
195	Sumac	*Rhus sp.*												
196	Red Currant	*Ribes sp.*												
197	Wild Black Currant	*Ribes americanum*												
198	Prickly Gooseberry	*Ribes cynsobati*												
199	Smooth Goosberry	*Ribes hirtellum*												
200	Prickly Wild Rose	*Rosa acicularis*												
201	Wild Rose	*Rose virginiana*												
202	Black eyed Susan	*Rubeckia hirta*												
203	Tall Coneflower	*Rubeckia laciniata*												
204	Red Raspberry	*Rubus idaeus*												
205	Blackberry	*Rubus pennsylvanicus*												
206	Ground Raspberry	*Rubus pubescens*												
207	Curled Dock	*Rumex crispus*												
208	Willow	*Salix sp.*												
209	White Willow	*Salix alba*												
210	Pussy Willow	*Salix discolor*												
211	Red Willow	*Salix laevigata*												
212	Common Elderberry	*Sambucus canadensis*												
213	Red Elderberry	Sambucus racemosa												
214	Bloodroot	*Sanguinaria canadensis*												
215	Black Snakeroot	*Sanicula marilandica*												
216	Soapwort	*Saponaria officinalis*												
217	Pitcher Plant	*Sarracenia purpurea*												
218	Bulrush	*Scirpus americanus*												
219	False Solomon's Seal	*Smilacina racemosa*												
220	Black Nightshade	*Solanum nigrum*												
221	Fragrant Goldenrod	*Solidago graminifolia*												
222	American Mountain Ash	*Sorbus americana*												
223	Meadow Sweet	*Spiraea alba*												
224	Hedge Nettle	*Stachys palustris*												

	Indentified Plant Resources at SLBE		Contemporary Use					Season Collected				Amnt. /visit	Who Coll.	Evidence of Change
	Common Name	***Genus Species***	**Med.**	**Food**	**Craft**	**Const.**	**Other**	**SPR**	**SUM**	**FALL**	**WNTR**			
225	Chickweed	*Stellaria media*												
226	Snowberry	*Symphoricarpos albus*												
227	Skunk Cabbage	*Symplocarpus foetidus*												
228	Tansy	*Tanacetum vulgare*												
229	Dandelion	*Taraxacum officinate*												
230	Ground Hemlock	*Taxus canadensis*												
231	White Cedar	*Thuja occidentalis*												
232	Basswood	*Tililia americana*												
233	Poison Ivy	*Toxicodendron radicans*												
234	Poison Sumac	*Toxicodendron vernix*												
235	Starflower	*Trientalis borealis*												
236	Wild/Native Clover	*Trifolium*												
237	Wake-Robin	*Trillium grandiflorum*												
238	Eastern Hemlock	*Tsuga canadensis*												
239	Cattail	*Typha latifolia*												
240	American Elm	*Ulmus americana*												
241	Slippery Elm	*Ulmus rubra*												
242	Stinging Nettle	*Urtica dioica*												
243	Blueberry	*Vaccinium angustifolium*												
244	Cranberry	*Vaccinium oxycoccos*												
245	Small Cranberry	*Vaccinium thapsus*												
246	Mullein	*Verbascum thapsus*												
247	Blue Vervain	*Verbena hastata*												
248	Arrowwood	*Viburnum acerifolium*												
249	Nannyberry	*Viburnum lentago*												
250	Highbush Cranberry	*Viburnum opulus*												
251	Violet	*Viola sp.*												
252	Wild Grape	*Vitis labrusca*												
253	River Bank Grape	*Vitis riparia*												
254	Common Prickly-Ash	*Zanthoxylum americanum*												
255	White Camas	*Zigadenus elegans*												
256	Wild Rice	*Zizania aquatica*												

APPENDIX C
SITE FORM

Odawa Traditional Plants and Climate Change
Sleeping Bear Dunes National Lakeshore

University of Arizona Indian Site Form

Interview Number: _____

1. Date:_____

2. Respondent's Name: _____

3. Tribe/Organization: _____ 3a. Ethnic Group: _____

4. Gender: Male Female

5. Date of Birth: ___/___/___ 5a. Age _____

6. Place of Birth (Town, Reservation): _____ 6a. U.S. State of Birth _____

7. Study Area Site Number (ethnographer fill this in): _____

8.What is the name of this place in English? 8a. What is the name of this place in your native language?

_____ _____

9. Please describe the geography of this area or natural elements which stand out in your opinion.

10. Would Indian people have used this area? 1= YES 2= NO 8= Don't Know 9= No Response

10a. (IF YES) Why or for what purpose would Indian people have used this area?

1= [permanent] LIVING 2= HUNTING 3= [seasonal] CAMPING 4= CEREMONY/POWER 5= GATHERING FOOD 6= OTHER

8= Don't Know 9= No Response

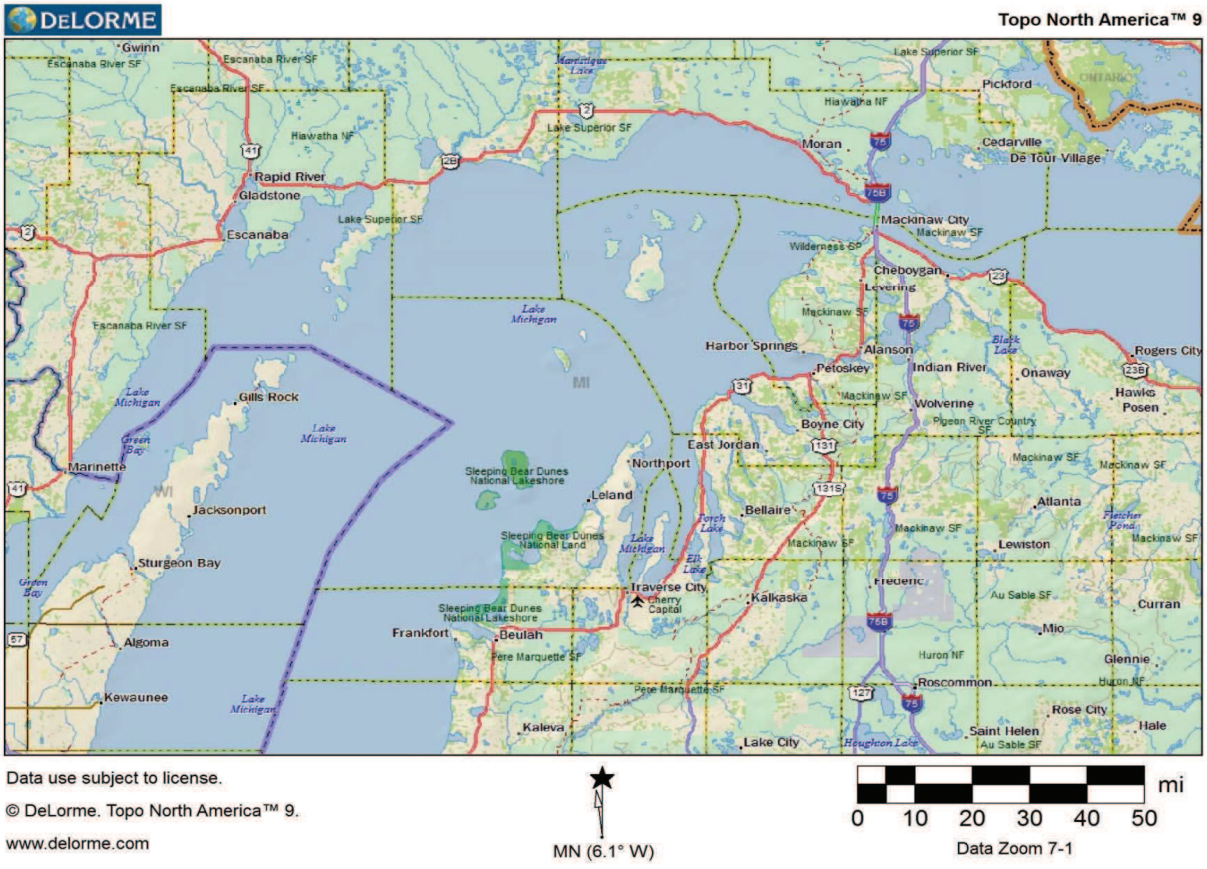
10b. Comments on 10a:

11. Is this place part of a group of connected places (Is this place connected to others?) 1=YES 2= NO 8= Don't Know 9= No Response

11a. (IF YES) What kinds of other places might this place be connected with and where are they? 1= Comment given 8=Don't Know 9= No Response

11b. (IF COMMENT GIVEN) How is this place connected to the others you mentioned? 1= Comment given 8= Don't Know 9= No Response

11bb. (IF ANSWERED 1 TO 11b) Comments given:


DeLORME
Topo North America™ 9
Gwinn
Escanaba River SF
Hiawatha NF
Rapid River
Gladstone
Escanaba
Lake Superior SF
Marquette
Pickford
Moran
Cedarville
De Tour Village
Mackinaw City
Mackinaw SF
Wilderness SP
Cheboygan
Levering
Harbor Springs
Alanson
Petoskey
Indian River
Onaway
Rogers City
Hawks
Posen
Wolverine
Boyne City
Pigeon River Country SF
East Jordan
Northport
Leland
Sleeping Bear Dunes National Lakeshore
Gills Rock
Marinette
Jacksonport
Sturgeon Bay
Bellaire
Atlanta
Lewiston
Fletcher Pond
Traverse City
Cherry Capital
Kalkaska
Frederic
Au Sable SF
Curran
Mio
Glennie
Huron NF
Roscommon
Rose City
Hale
Saint Helen
Lake City
Houghton Lake
Algoma
Kewaunee
Frankfort
Beulah
Pere Marquette SF
Kaleva
Elk Lake
Porch Lake
Green Bay
Lake Michigan
MI
WI
Data use subject to license.
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www.delorme.com
MN (6.1° W)
0 10 20 30 40 50 mi
Data Zoom 7-1

PLACE FEATURES

Which, if any, of the following features is an important part of why this place is significant to Indian people?

Feature Type	YES	NO	List and Describe each specific feature, like modified tree, spring, etc.
12a. Source for Water			12aa.
12b. Source for Plants			12bb.
12c. Source for Animals			12cc.
12d. Evidence of Previous Indian Use			12dd.
12e. Geological Features			12ee.

Seasonal or Annual Weather Changes:

13. In your lifetime (or that of your parents) have you seen seasonal or annual weather changes?

Yes_____ No _____Not Sure _____

13b. If yes have seen changes what have you (or your parents) observed?

14. Have these changes influenced the ecology of a place, such as where we are right now?

Yes _____ No _____ Not Sure _____

14a. If yes, then how has the ecology of this place changed?

15. Are the plants that have been traditionally gathered located in the same general places as they were in the past?

16. Do you see any, or can you think of, any traditional use plants that grow inside the park, but no longer grow outside of the park?

17. Do you think season, annual, or climatic changes have affected the abundance of plants and where they are growing?

APPENDIX D
BUREAU OF APPLIED RESEARCH IN ANTHROPOLOGY (BARA) METHODOLOGY

The Bureau of Applied Research in Anthropology (BARA), currently a division of the School of Anthropology (SofA) at the University of Arizona (UofA), was founded in 1952 as the Bureau of Ethnic Research (BER). Initially, the BER was charged with the responsibility of monitoring the socio-economic welfare of Native American communities in Arizona. In 1982, BER changed its name to BARA and vastly expanded its research and training mission. Currently, the BARA faculty is comprised of 16 state-funded and project-funded academic professionals organized around six different programs. For each program, there exists a set of research activities consistent with the BARA mission, as well as corresponding academic courses and student participation that contribute in an integrated fashion to BARA's commitment to applied training (Figure D.1).



Figure D.1 UofA Researchers and Odawa Representatives during the May 2014 Field Visit

The BARA ethnographic team involved with this study directs a program called Native American Cultural Resource Revitalization. Consistent with BARA's founding mission to monitor the welfare and well-being of Native American groups in Arizona, this program focuses on the national need to assure the preservation of Native American cultures and languages. A long history of misguided policy-making and disregard for native cultures in this country has created marginalized and dependent peoples with severe economic disadvantages and little control over their own destiny. Recent legislation, such as AIRFA (1978) and NAGPRA (1990), has attempted to redress the situation and establish new policy paths that emphasize tribal empowerment and cultural respect. BARA has contributed to these new directions by developing standard procedures that assure the full participation of Native American tribes in the process of identifying and controlling their comprehensive cultural resource inventories. In this program, BARA researchers facilitate the interaction of tribes with government agencies and private organizations. Through the use of ethnography, BARA professionals have assisted communities in the reconstruction of their cultural histories, made Geographic Information Systems (GIS) technologies available to tribes wanting to identify and maintain their cultural landscapes, and

worked to address language shifts through the development of dictionaries and the promotion of language literacy on reservations.

This program also has contributed to the development of cultural resource theory within applied anthropology and has generated genuine, mutually respectful, and productive partnerships between the University and Native American tribes. One of BARA's most consistently supported research programs, the Native American Cultural Resource Revitalization, has received long-term funding from tribes, the National Park Service, the Department of Energy, the Department of Defense, the Bureau of Reclamation, National Science Foundation, and other entities.

SLBE 2014 Field Activities

To date, four field sessions have occurred as part of this study. The first two field sessions involved important meetings between our research team, NPS representatives, and tribal officials. The third and fourth field session involved visits to SLBE with tribal representatives.

4.5.1 September 2013

In September, Dr. Stoffle traveled to Michigan to meet with Michael Evans, Chief of the Ethnography Program and Senior Cultural Anthropologist for the Midwest Region for the NPS, Dusty Shultz, SBLE Superintendent and SLBE Deputy Superintendent, Tom Ulrich. This meeting served as the kick off meeting for the study. During this time, Dr. Stoffle and the NPS officials discussed tribal involvement, project timelines, and park expectations and expected outcomes.

4.5.2 April 12-17, 2014

In April 2014, Stoffle and graduate research associate, Katherine Brooks traveled to Michigan for a series of project related meetings with the three involved tribes and SLBE staff. During these meetings, protocols for fieldwork were established and a foundation was laid for future field trips.

During this trip, Stoffle and Brooks scoped out possible locations for the upcoming field visits with the tribal representatives. It was important during this time to find places that were unique ecological areas which could offer the most diversity in terms of traditionally and contemporarily used plant resources. Some of the areas scoped during this trip had be the focus of site interviews areas during the 2001 study.

4.5.3 May 13- 23, 2014

In May 2014, the UofA research team returned to SLBE to take tribal representatives to seven unique sites in and around the park. Some of the sites visited were selected based on the April scoping trip and others were selected based on recommendations made by tribal representatives.

4.5.4 September 11-18, 2014

During the September 2014 field session, Odawa representatives from the Grand Traverse Band and Little Traverse Bay Bands joined the UofA researchers on site visits within SLBE. This autumn visit presented a very different landscape and ethnobotanical resource availability. By visiting SLBE with some of the same Odawa representatives who participated in the May 2014 field session, more information about previously discussed plant resources was shared. Likewise, the change of seasons enabled the Odawa representatives and UofA research team to document different plants than previously available in the spring.

In addition to the site visits and identification of ethnobotanical resources within the park, the September 2014 field session gave Odawa representatives a chance to talk about sustainable management recommendations for gathering plants within SLBE. Discussions regarding sustainable management practices for collecting various types of ethnobotanical resources in the park was useful in understanding the amounts, frequency, and general Odawa gathering requirements. Some of these recommendations are presented in Appendix A.

The 2014 UofA Researchers

Richard Stoffle, PhD

Richard Stoffle is an ethnographer and professor in the School of Anthropology at the University of Arizona in Tucson, Arizona. He has worked on applied Native American heritage management issues since 1976 when he participated in the first official Native American Indian impact assessment in the United States. This environmental impact study (EIS) involved more than a dozen tribes and the first ever EIS interviews with Southern Paiute people regarding potential project impacts to their heritage resources. Since this first EIS study, he has worked with over a hundred Native American tribes in projects designed to represent their heritage concerns on US Federal lands. His co-edited books entitled *Native American Cultural Resource Studies at Yucca Mountain, Nevada* (1990) and *American Indians and the Nevada Test Site: A Model of Research and Consultation* (2001) have become standard references for the design and implementation of long-term research and consultation.

Katherine Brooks, PhD

Katherine Brooks earned her doctorate in American Indian Studies at the University of Arizona in 2014, and has worked with Native communities in the Southwest for the past eight years. Dr. Brooks specializes in American Indian material culture, ethnography, and applied anthropology. Previous degrees include an M.A. in Anthropology from New Mexico State University and a B.A. in History from the University of Missouri-Kansas City. Currently, Dr. Brooks works as a Post-Doctoral Research Associate at the Bureau of Applied Research in Anthropology, and is an Associate Professor of Anthropology at Cochise College, Sierra Vista, Arizona.

Evelyn Pickering, MA

Evelyn Pickering finished her M.A in Anthropology at the University of Arizona in 2014. In this program, she focused on sociocultural and applied anthropology in the Caribbean. Ms. Pickering has been doing team-based ethnographic research for the Bureau of Applied Research in Anthropology for nearly three years. Before entering the graduate program, Ms. Pickering completed her B.A. in Anthropology at the University of Arizona. Ms. Pickering also focused on sociocultural anthropology during her undergraduate studies, and spent time in Rwanda researching various primate species, with a focus on Mountain Gorillas.

Christopher E. Sittler, BA

Christopher E. Sittler is a research assistant for the Bureau of Applied Research in Anthropology. For the past two years he has worked with Dr. Richard Stoffle and his research team doing ethnographic fieldwork with American Indians across the United States. Initially a Psychology student, Christopher shifted his field of study towards sociocultural anthropology, earning his B.A. in Anthropology and Psychology 2014.

Kathleen Van Vlack, PhD

Dr. Van Vlack recently received her PhD in the American Indian Studies at the University of Arizona. She has a B.A. in Anthropology and a Master's Degree in American Indian Studies, both from the UofA. Her Master's thesis focused on the traditional leadership system of the Southern Paiute Nation. She has worked with members of BARA since 2002 on a number of Native American environmental impact assessments. To date, she has worked with over 20 tribes in the western United States. Her dissertation is focused on cultural resource management and Southern Paiute pilgrimage trails. When not working in Indian Country, Dr. Van Vlack has worked with traditional communities in the Bahamas on environmental conservation issues.