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thesis entitled

UNDERSTANDING NATIVE AMERICAN PERCEPTIONS OF SUSTAINABLE FOREST MANAGEMENT

presented by

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has been accepted towards fulfillment
of the requirements for the

Master of Science degree in Forestry

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4/9/09
Date

UNDERSTANDING NATIVE AMERICAN PERCEPTIONS OF SUSTAINABLE FOREST MANAGEMENT

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A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE

Forestry

2009

ABSTRACT

UNDERSTANDING NATIVE AMERICAN PERCEPTIONS OF SUSTAINABLE FOREST MANAGEMENT

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Sustainable forest management (SFM) has become a prominent goal of current forest management approaches within the Unites States. A growing body of literature offers support for incorporating traditional and local knowledge (TEK) with current SFM methods in an effort to improve management planning and policies (Gadgil et al., 1993; DeWalt, 1994; Kimmerer, 2000). By seeking Native American perspectives and incorporating traditional knowledge into current forest management methods, U.S. forest managers have the potential to increase their understanding of relationships between human, non-human, and the physical environment, thereby increasing their ability to manage our nation's forests more effectively for all stakeholders involved (Berkes, 1993; DeWalt, 1994; Kloppenburg, 1991; Murdoch and Clark, 1994; Emery, 2001).

Using the qualitative data obtained from in-depth interviews and focus groups conducted with two Native American communities, this study examines the absent perspectives of Native American voices in the dialogue on sustainable forest management. This study argues that bringing Native American viewpoints into sustainable forest management will add key missing perspectives to the national and global discussions. Results suggest that the abilities to maintain and manage natural resources are central to the survival of Native American communities, their spiritual beliefs, and their cultural practices, and that the human element in ecosystem functions is an essential factor in sustainable forest management from a Native American perspective.

This thesis is dedicated to: my family, my friends, and most importantly my love, David.

Thank you all for your love and support.

ACKNOWLEDGEMENTS

First, I would like to thank my committee members, professors Maureen McDonough, Dennis Propst, and Tracy Dobson for their support and guidance throughout this process. I would also like to thank Jessica Edel and Dori Pynnonen-Valdez: great friends and colleagues who simultaneously served as my sounding board, editors, and support group. I would especially like to thank the participants of the Leech Lake Band of Ojibwe and the White Earth Band of Ojibwe for candidly offering me their thoughts and opinions, in hopes that they will be heard and acknowledged.

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CHAPTER ONE: INTRODUCTION

In the United States, sustainable forest management (SFM) has become a prevalent goal in current forest management approaches. SFM (described later in more detail) incorporates ecological, economic, and social aspects in managing forest resources while considering both future and present needs. SFM has been spurred by efforts to restore the integrity and health of U.S. forests. Primarily, population and income levels are two of the strongest influences that have affected the state of U.S. forests (USDA, 2004a). Increased population and income in the U.S. have amplified demands for all forest resources, including timber, non-timber products, water, fish and wildlife, and recreation. After World War II, income and population growth caused a need for an expanded transportation infrastructure for automobiles, which led to suburbanization (USDA, 2004a). Suburbs changed the landscape surrounding U.S. cities. Additionally, increased transportation enabled people to reach more remote areas of forested land. Finally, increased income and population drove consumer demands for U.S. agriculture, which caused further changes in remote areas by leading to the clearing of large areas of forestland to make room for crops.

Issues of water and air pollution have developed as a result of growth in population, income, industry, and development. Furthermore, competitions for land use have fragmented forest land across the U.S. Legislation such as the Clean Air Act of 1963 and the Clean Water Act of 1977 have made progress in reducing point sources of pollution. However, problems of nonpoint pollution caused by erosion, agricultural runoff, urban and residential development, and unsustainable forest practices for instance, remain problematic in the U.S. The United States Department of Agriculture (USDA)

Forest Service (2004a) reports that between 1982 and 1997, 11.7 million acres of forest land was changed into developed land, and 7.9 million acres of forest land was changed to agricultural use. This is significant because forests influence air and water quality. Forests filter the air by serving as a carbon sink which improves air quality. They also reduce erosion, filter runoff water, and improve water quality. Forests additionally supply habitat for flora and fauna, provide timber and non-timber products, as well as recreational opportunities to communities. Therefore, understanding and working toward forest health and restoration has become a principal goal in U.S. forest management.

Over the last two decades in particular, sustainable forest management (SFM) has become a global, national, regional, and local priority shared by a broad range of interests and diverse backgrounds. To address these global concerns regarding the environment and sustainable development, the United Nations Conference on Environment and Development (also known as the Rio Earth Summit), was held in 1992. One product of this conference was a set of forest principles which called for proposals for action toward achieving global sustainable forest management (SFM). The proposals for action targeted the improvement of all realms of forestry, which spans from the ecological and economic aspects to the social aspects (Sample et al., 2006).

Workshops held at the Summit discussed and rated the efficacy of the efforts in addressing each sustainable forest issue. Based on the set of forest principles, the following issues were deemed to be factors that were either not included or un-measurable by current standards: the monitoring, assessment, and reporting of social and cultural aspects of forests, including Traditional Ecological Knowledge (TEK) (Sample et al., 2006). The workshops concluded that social and cultural forest issues could be

fortified by endorsing community-based stewardship and better reporting of information such as traditional forest resource knowledge, and better planning for application of and dissemination of research project results. Ultimately, it was decided that there needs to be more collaborative efforts at all levels (national, regional, state, local) in the forest community. Individual countries were challenged to use forest programs to involve indigenous and local communities as participants in the formulation and implementation of measures which could preserve or restore rights and privileges pertaining to local forestlands, TEK, and forest biological resources (Sample et al., 2006).

The following year, Canada held an international workshop with experts on SFM and sustainable development, which was called the Montreal Process. Their purpose was to design an agreed upon method which nations could use to assess sustainable forest management. In 1995, many of the nations who have boreal forests within their borders[1], including the United States, signed the Santiago Declaration which summarized the goals agreed upon during the Montreal Process. It further acknowledges the importance of recognizing that characteristics of forests around the world are diverse in many ways (e.g. political, economic, geographic, and environmental differences). As a signatory of the Santiago Declaration, the United States has delegated the responsibility of measuring and reporting on the degree to which the nation's forests are sustainable to the United States Department of Agriculture Forest Service (USDA Forest Service).

SFM has become a priority for state and federal forest managers beginning in the 1990s, in an effort to restore health to many of the nation's forests. As a result of the Santiago Declaration, in 2004, the first U.S. report on sustainable forest management was

[1]The countries of: Australia, Canada, Chile, China, the Republic of Korea, Japan, Korea, Mexico, New Zealand, the Russian Federation, the United States, and Uruguay (MPWG, 1998).

released, entitled, "National Report on Sustainable Forests--2003." There are many definitions of SFM. For the purposes of this study, the United States Department of Agriculture Forest Service defines sustainable forest management (SFM) as:

> The stewardship and use of forests and forest lands in such a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, and vitality, and their potential to fulfill, now and in the future, relevant ecological, economic, and social functions at local, national, and global levels, and that does not cause damage to other ecosystems (USDA, 2004a, p. 128).

In a review of the 2003 report, Sample et al. (2006) found knowledge gaps in the Forest Service's first report in 2003 in understanding SFM, including social and cultural aspects of forests and in traditional knowledge. While many non-Native American communities in the U.S. have a long history of local knowledge, Native Americans have inhabited North America longer than any other population that currently resides in the U.S. They have the most in-depth history of local knowledge in the U.S. Knowledge gaps in forest management could be filled by including the missing perspectives of Native Americans in national discussions of SFM.

In working toward inclusive sustainable forest management for multiple uses, the different values and cultures of all forested communities should be taken into account. It becomes more possible to suit SFM to individual community attitudes and values when an individual community's culture is considered. As experts in their own local knowledge, Native American communities in the United States have the potential to

develop sustainable forest management in their communities based on their perspectives and values.

In order to consider viewpoints and forest management goals that are different from one's own social and cultural background, it is important to begin by understanding the circumstances of the past. The first European encounters with Native Americans began during the colonization of North America. In the 1620s, as Europeans began to settle in North America, they gathered many misperceptions regarding Native American ways of life (Cronon, 1983). For instance, Cronon (1983) accounts that Europeans described Native American lifestyles as ones of abject poverty, for they could not comprehend why Native Americans did not take advantage of the wealth of natural resources that surrounded them. Furthermore, European settlers assumed that Native Americans did nothing to manage the land. On the contrary, the open park-like forests that the settlers found in North America were a result of active forest management conducted by the Native Americans (Cronon, 1983; Denevan, 1999; Williams, 2001; MacCleery, 2007). Native Americans have inherited generations of traditional knowledge from their ancestors.

A growing body of literature offers support for incorporating traditional and local knowledge with current forest management methods in an effort to improve SFM, planning, and policies (Gadgil et al., 1993; DeWalt, 1994; Kimmerer, 2000). When TEK is applied to natural resource management techniques, it brings the human dimension (social, cultural, local knowledge) into forest management. Currently, the social, cultural and TEK elements of this nation's forests are lacking in "scientific forest management" (Sample et al., 2006).

By seeking Native American perspectives and incorporating traditional knowledge into current forest management methods, forest managers have the potential to increase their understanding of relationships between human, non-human, and the physical environment, thereby increasing their ability to manage our nation's forests more effectively for all stakeholders involved (Berkes, 1993; DeWalt, 1994; Kloppenburg, 1991; Murdoch and Clark, 1994; Emery, 2001). The Native American population in the U.S. has a rich heritage of TEK that has been passed down through generations over thousands of years. Seeking their input will strengthen sustainable forest management methods not only because of their valuable input and the addition of TEK, but also because of their potential contribution to a broader understanding local SFM issues.

Additionally, U.S. forest managers will benefit in recognizing TEK as a useful forest management method. It strengthens SFM by adding the connection of local knowledge with scientific knowledge. There have been few opportunities in the U.S. for tribal forest managers to work together with non-tribal forest managers to teach and explain traditional forest management methods (IUFRO, 2005). Increased communication between tribal and non-tribal forest managers who are charged with SFM will benefit both parties by allowing each to have a broader and richer knowledge and understanding of their stakeholder communities in order to make more effective decisions regarding forest management (IUFRO, 2005).

As non-tribal and tribal agencies work toward the goal of SFM, it is critical that communications and collaborations are conducted using respectful and inclusive approaches that are tailored to each individual community and culture. Along with a

history of traditional knowledge, Native Americans also possess a long history of deceit and betrayal by dominant organizations and agencies, including the federal government. Lack of communication between tribal and non-tribal agencies, and the perceived failure of non-tribal agencies to respect as sovereign nations has developed over time.

The purpose of this study is to achieve a greater understanding of Native American perceptions on SFM. This study will contribute to the national SFM dialogue in investigating the significance of seeking new perspectives and tribal input on forest management methods. The social and cultural aspects of forest management will be researched as this study examines the attitudes and values of two Native American communities in northwestern Minnesota regarding sustainable forest management.

CHAPTER TWO: BACKGROUND AND LITERATURE REVIEW

The literature reviewed for this study will address issues in the United States' efforts to move toward sustainable forest management (SFM), and the benefits of collaborations between tribal and non-tribal forest management. Historical Native American forest management will also be discussed. Finally, this chapter will focus on the possible contribution of Traditional Ecological Knowledge (TEK) in forest management, and current Native American forest management will be discussed. The premise of this chapter is that blending TEK and scientific knowledge in forest management techniques will advance SFM efforts.

2.1 The Beginning of Sustainable Forest Management in U.S. Forestry

In an effort to move toward sustainable forest management, the concept of ecosystem management became popular in the United States as a means to prevent further loss of biological diversity in the late 1980s and early 1990s. Ecosystem management has the main goal of maintaining ecological integrity by: maintaining native species populations, maintaining ecological processes, maintaining species' evolutionary potentials, and accommodating human use (Grumbine, 1994). In the United States, sustainable forest management became a part of state and federal agency management plans in the late 1980's and 1990's. This philosophy remains at present, as stated in the U.S. Forest Service's mission to: "Sustain the health, diversity and productivity of the nation's forests and grasslands to meet the needs of present and future generations (U.S. Forest Service, 2008, para. 8)." Native Americans have been using local ecosystem management techniques for generations (Grumbine, 1994; Bengston, 2004). It is

important to look to historical Native American forest management, as they were forest managers before European settlement occurred in North America.

The Rio Earth Summit

In pursuit of addressing the management issues of sustainability on a global scale, the Rio Earth Summit was held in 1992. One product of this conference was a set of forest principles, which were to be used as a platform for action toward achieving SFM (Montreal Process, 2005). It was the aim of the Summit to find ways to improve in all areas of forestry, spanning from the ecological and economical, and including the social aspects of forestry as well (Sample et al., 2006). The Summit workshops found that SFM could be strengthened by greater collaboration and stewardship at all levels (national, regional, local), and better reporting of stakeholder uses (including TEK). At the Rio Earth Summit, nations were encouraged to create policies that will work towards creating successful partnerships that will support land tenure law, improve access, and uphold the rights of indigenous communities and their sustainable use of forest resources while respecting the sovereignty of each nation. Workshops at the Summit focused on the need for TEK and the collaboration of non-indigenous organizations was recognized as being crucial in working toward better SFM. Finally, the Summit recognized that TEK should be protected in that fair compensation for services provided and intellectual property rights should be enforced.

The Montreal Process and the Santiago Declaration

In continuation of the progress made at the Rio Earth Summit in 1992, several countries[2] in 1993 met as a working group to develop Criteria and Indicators (C&I) for the Conservation and Sustainable Management of Temperate and Boreal Forests. This working group is also called the Montreal Process, which works toward furthering SFM (MPWG, 1998). Their collective purpose was to develop a universal method that can be used to assess SFM. In 1995, the Montreal Process Working Group, met once again to place the C&I into an official policy statement called the Santiago Declaration. It embodies their agreed upon goals of SFM. The declaration bonds these countries in their commitment to sustainably conserve the temperate and boreal forests of the world through SFM techniques. The most recent revision to the C&I (Appendix A) took place at the Montreal Process Working Group's seventeenth meeting in 2006, and these are the C&I that will be referred to from this point forward (Summary Table, 2006).

The Santiago Declaration further articulates that it is of value to recognize the environmental, geographic, political and economic differences in the characteristics of forests around the globe. This includes the importance of introducing the Montreal Process C&I to other places which have temperate and boreal forests so they can consider implementation as well. The Santiago Declaration maintains that the Montreal Process C&I must be looked at as flexible, not set in stone. Because the principles behind the C&I allow for dynamic change, the C&I must be updated and improved as new understandings become evident. Its goal is to provide a template for assessing, describing, and evaluating a nation's progress toward sustainability (MPWG, 1998). In

[2]The countries of: Australia, Canada, Chile, China, Japan, Korea, Mexico, New Zealand, the Russian Federation, and the United States (MPWG, 1998).

accounting for the long-term effects of local populations and national economies, this declaration requires that the entire biosphere be considered in the implementation of sustainable management of forests to provide for present and future generations.

The first five criteria of the Revised Montreal Process Criteria & Indicators (Appendix A) detail the ecological and environmental aspects of forest sustainability while the sixth and seventh criteria deal with social and economic factors respectively, the sixth criteria is particularly related to this study. Each forest is geographically, spatially, socio-economically and politically situated in different circumstances, thereby the Santiago Declaration entrusts the development and implementation of SFM to the abilities of local stakeholders and decision makers. For purposes of this discussion, Criterion 6.5 is the most salient criterion in that it addresses cultural, social, and spiritual needs and values.

In Criterion 6.5, Indicator 43 specifically measures the "area and percent of forest managed primarily to protect the range of cultural, social and spiritual needs and values" (Summary Table, 2006, p. 8). Indicator 44 measures the "importance of forests to people" (Summary Table, 2006, p. 8). This is substantial in that these indicators assign worth to services that have no monetary price attached to them. Indicators 43 and 44 underscore the importance of considering the effects of local forest management not only on a national scale, but also on an international level. These indicators are also an assessment of monitoring the non-consumptive uses and values (i.e.: recreation, education, ecological services, scenery, and values of existence). Criterion 6.5 recognizes these non-consumptive uses in particular as integral to furthering SFM in the U.S.

The National Report on Sustainable Forests—2003:

In an effort to address SFM on a national scale, the United Stated Department of Agriculture (USDA) Forest Service produced the first National Report on Sustainable Forests in 2003 (USDA Forest Service, 2004a). The purpose of this and subsequent sustainable forest reports is to measure the degree to which U.S. forests are moving forward toward sustainability. While establishing a metric to measure SFM is an important step toward achieving sustainable forest management (SFM), there is room for improvement in further defining and adjusting the criteria and indicators that describe what SFM entails.

The Pinchot Institute for Conservation's analysis of the 2003 report found, for example, that there is a cultural and social knowledge gap in understanding of SFM. Furthermore, the 2003 report is missing the perspectives and input of those who are experts of traditional knowledge (Sample et al., 2006). This translates directly to the missing input of Native Americans on discussions of SFM in the United States in that Native American populations possess the greatest store of traditional knowledge in the U.S., as they were here long before European settlers appeared. In making progress toward defining and implementing SFM in the United States, it is vital that these gaps be filled. Seeking missing input on tribal management methods and perspectives on non-tribal management is and will be important in bringing new input and perspectives to SFM.

The Montreal Process Criteria & Indicators are innovative policies because they support managing forests based around cultural and social values in addition to scientific knowledge. However, there is a fundamental problem with the criterion addressing this

issue, Criterion 6.5 (Sample et al., 2006). The problem lies in that the indicators only recognize that forests should be managed to consider social and cultural values. There is no reliable metric to indicate in the degree to which forests are being managed with regard to these indicators. For example, there is no way to interpret changes over time that may occur with changes in social attitudes, beliefs and values.

There are barriers in SFM in discovering where these valued places are, for instance, the intrusion of development (roads, loggers, etc.) and urban sprawl (USDA Forest Service, 2004b). In order to effectively address the issue of social and cultural values in SFM, a collaborative effort must be initiated for all levels of forest management. Collecting complete and consistent data will close the knowledge gaps that ultimately create bias in this criterion assessment by under-representing stakeholder cultural, spiritual and social values in SFM (Sample et al., 2006).

2.2 Benefits of Collaboration between Tribal and U.S. Forest Managers

In the United States, roughly 18 million acres of forestland lies on Indian Reservations (IFMAT II, 2003). Native Americans have the potential to share their perceptions and provide more dimensions to SFM in the U.S. Adding Native American perceptions will more accurately reflect not only scientific knowledge, but multiple local knowledge systems which will broaden definitions of forest productivity and sustainability.

In a comparison of forest management goals between tribal, commercial and federal agencies, the Indian Forest Management Assessment Team (1993) found that tribal resource management is more inclusive than non-tribal resource management in considering multiple stakeholder uses on tribal forestlands. For instance, some tribal

forests are managed solely to provide food, materials, crafts, medicine, as a place for worship or contemplation, hunting, or recreation (non-timber uses), while other areas are used for timber production (Morishima, 1997). There is a need for public forest managers to understand more fully the relationship between indigenous people and the land. Agencies have an obligation to make sure the views of all citizens are included in decisionmaking, and to be aware and informed of the social context in which decisions need to be made. Forest managers who understand community perceptions in regards to natural resource issues will be able to more effectively manage the forests for multiple stakeholders. This affords a better understanding of the social context within which decisions need to be made (Bengston, 2004).

SFM is extremely complicated on a national level, not to mention a regional level. From a social and cultural standpoint, there are issues of land rights, public and private land ownership, as well as industrial properties. Major discrepancies exist between various pieces of data collected by different agencies, the state, and private owners which translate to comparability problems when attempting to compile data at the national level. In these instances, there is a serious lack of social and cultural input from a local community standpoint (USDA Forest Service, 2004b). Additionally, social, cultural and spiritual needs are being increasingly valued and taken into consideration by natural resource managers in public forestlands (USDA Forest Service, 2004a). To fully assess SFM on a regional or state level, then, social and cultural data collection in respect to SFM needs to evolve in order to become more inclusive, consistent, reliable, and comprehensive.

In the interest of understanding the relationship between indigenous people in the United States (Native Americans) and the land, it is beneficial to acknowledge in each situation that there are differences in perceiving nature which have been defined by social constructs as well as culture, class, and ethnicity. (Rocheleau et al., 1996). Hoogte and Kingma (2004) explained that thoughtful contemplation of the multiple layers involved in policy making along with the need to consider the multiple intersections of each situation is imperative in collaborative efforts. It has become critically important that the many dimensions and stakeholders that are involved in SFM are acknowledged; it provides managers with a glimpse into the potential for political sustainability that could be incorporated in sustainability models (Arabas & Bowersox, 2004).

In an effort to understand perceptions, attitudes, and values of a culture different than one's own, it is important to begin with the history and background on which current perceptions and understandings have been built. In the following section, literature regarding the implications of these perceptions and understandings of TEK and SFM will be discussed.

2.3 Historical Context

Historical Misperceptions

It is important to address some common misunderstandings of historical forest uses and management approaches regarding Native American natural resource management (NRM), which have existed for centuries. For example, the early European settlers originally misinterpreted the Native American lifestyle as one of poverty. It was thought that Native Americans were living within an abundantly rich world surrounded by marketable natural resources, yet they took no advantage of this wealth in an

economical manner (Cronon, 1983). The settlers could not grasp why Native Americans did not institute a policy of land ownership. They did not understand why Native Americans did not try to profit from the abundance of mature forests and other raw goods that were not being marketed.

A second common misunderstanding of historical Native American forest use is due to the many depictions that have portrayed Native Americans as living in harmony with the land. At one time, the general impression of the makeup of pre-settlement forests, was that Native Americans had left the land relatively untouched (Day, 1953; Williams, 2001).

Yet another misconstruction lies in imagining pre-settlement America to be an untouched jungle of dense forests, which would make navigation nearly impossible throughout the under canopy (Denevan, 1999). To the contrary, upon arrival European settlers described the landscape they arrived in as vast areas of open, park-like forested areas (Cronon, 1983; Denevan, 1999; Williams, 2001, MacCleery, 2007). After some time, settlers began to understand that park-like landscape was no accident. Native Americans had, in fact been managing the forests of America to suit their survival needs for generations. The following discussion elaborates on the actual state of early forests in the United States.

Changes Due to European Settlement

North American forests saw great changes from the pre-settlement era as European settlers arrived. European settlers saw great financial value in the abundance of natural resources available in North America. The abundance of mature white pine and other large hardwoods were seen as particularly valuable for ship-building by the

Europeans, for instance. Therefore much of the New England supply of timber went to the British Royal Fleet. Of course, the colonists also took advantage of the ample timber supply by making their furniture and houses with old growth trees valued for their long, straight lines and continuous width (Cronon, 1983).

Vast areas of land were cleared and burned by settlers for agricultural land use and for fuel as well. Where Native Americans used purposeful fire to increase diversity, settlers used purposeful burns with the intention of uniformity and order (McWilliams, 2001). These were major contributors to deforestation. Once the forests were cleared, the soil had no way of maintaining its fertility, and nutrient depletion occurred. White pine and the populations of other tree species, such as cedar and hickory, declined rapidly, and were almost completely decimated in the lumber boom of the 1900s (Cronon, 1983). The remaining trees of those valued species were mainly smaller, second growth trees, which were not large enough to be marketable. Deforestation and depopulation were perhaps the greatest landscape changes incurred by European settlement in America (Cronon, 1983, MacCleery, 2007).

Deforestation changed many aspects of the landscape dynamic (Cronon, 1983, MacCleery, 2007). The species composition of both the native flora and fauna were altered, there was an increase in temperature and precipitation extremes in deforested areas, and the water-holding capacities of the soil were reduced. Deforestation also increased stream levels and the likeliness of the occurrences of floods, reducing the ground water tables. Much of the deforestation mandated by the European settlers was done in the name of "progress of civilization".

Changes in forest structure were also caused by the decimation of Native American populations with the arrival of European settlers. Native Americans sustained a great loss in population due to their exposure to exotic European diseases for which they lacked immunity. As a function of the drastic drop in the Native American populations, it is likely that North America was more heavily forested in the 1800s than it had been in the 1500s.

Although different estimations taken at the time of European settlement vary, the indigenous population in North America prior to European settlement ranged from somewhere between eight to twenty million people (Cronon, 1983; Williams, 2001; MacCleery, 2007). At one time, there were 600 different indigenous groups in North America, each with their own lifestyles, values, spirituality, and knowledge that had been handed down through the generations (Fiedel, 1987). Historians account that by the year 1800, the Native American population dropped to roughly one million people or less as they succumbed to new European diseases and killings. Over time Native American communities became fragmented and forced onto smaller reservation areas. This fragmentation has directly resulted in the loss of biodiversity in natural resources across the settled areas of North America (Cronon, 1983).

Historical Native American Forest Uses, and Management

Traditionally, Native Americans have played a role in managing natural resources in order to produce sustainable food and material supplies. Burning, pruning, coppicing (maintaining trees at juvenile stages), weeding, transplanting, and sowing are just a few methods practiced by indigenous resource management (Anderson, 1996; Martinez,

1999). Native Americans actively burned large sections of the forests with low intensity fires for various reasons.

Selective burning encouraged the "edge effect", referring to areas in which there were clearly defined boundaries between forest and prairie. This created opportunity for increased species diversity along the borders between forest and grasslands in which many animal species thrive (e.g. deer, elk, beaver, hare, porcupine, turkey, quail, ruffed grouse, and other ground nesting birds). By default, enhancing these animal populations (Cronon, 1983; MacCleery, 2007) also resulted in an increase of predator populations, which allowed eagles, hawks, lynxes, foxes, and wolves to flourish. Native Americans could then benefit from the food supply that they had created (Cronon, 1983; Williams, 2001; MacCleery, 2007).

Native Americans would often conduct seasonal burns in the spring and fall, and as a result the forest trees became widely spaced with few underbrush shrubs and many grasses and herbs (Cronon, 1983; MacCleery, 2007). The reduction of forest undergrowth made traveling much easier (Day, 1953). The appearance of many of the prairies and grasslands found in pre-settlement times were as a direct result of frequently-set fires, as fire provided ancillary benefits. In addition to producing desirable tree species, fires also reduced insect pests such as fleas and plant diseases, expedited hunting by driving out game and also drove away enemies (Cronon, 1983; Williams, 2001; MacCleery, 2007).

Fires produced the supplementary effect of increasing the rate of nutrient return to the forest soil, which allowed surviving trees and plants in the seed bank to regenerate from fire with vigor. These conditions favored species such as black and red raspberries and other gathering foods. With more of an open canopy, light was then able to reach the

forest floor, encouraging further under canopy growth, such as new growth of beech, sugar maple, red maple, black birch, and oak.

Prior to the decimation of pre-settlement Native American populations, North American forests were managed by Native Americans to produce yields of certain desirable plant and animal species. Many Europeans assumed that Native Americans sustained themselves on whatever happened to grow in the forest (Cronon, 1983; Denevan, 1999). They did not realize the deep ecological and seasonal understanding of the land that the Native Americans possessed. For example, Native Americans lit fires which created full sun openings in the forest canopy floors, which fostered the growth of birch, white pine, and other shrubs they needed in order to survive (Cronon, 1983). Fire is perhaps the most recognizable form of forest management used by Native Americans. Of course, natural forest fires as well as other disturbances such as windstorms shift species composition from one ecological make up to another. The species composition of pre-settlement forests was due not only to that of natural disturbance, but also to a history of human disturbances such as seasonal burns, which were put into motion by Native Americans as well as European influences (Cronon, 1983).

Historically, Native Americans were active and successful in managing and sustaining forests to serve their needs. They managed the forest for a variety of reasons: to cultivate desirable plant and animal species, to reduce pests, to facilitate travel, and to protect their communities from their enemies. The accumulated knowledge of a history of active forest management has been passed down from generation to generation. Native American communities across North America have acquired detailed traditional knowledge from their elders on the subject of forest management.

2.4 Traditional Ecological Knowledge

There is a growing body of literature that advocates that local knowledge and local standpoints should be incorporated with current forest management methods to serve as a base for sustainable policy, planning, and management (Gadgil et al., 1993; DeWalt, 1994; Kimmerer, 2000; see also Haraway, 1989 and Harding, 1986 for a discussion on local knowledge).

From a Native American forest management perspective, the human connection to and involvement with ecological processes are integral to the health and sustainability of the forest and all natural resources. Traditional knowledge would greatly complement scientific knowledge, particularly in local restorative efforts by adding a specialized human local knowledge of the specific area. Furthermore, this intimate local knowledge, referred to as Traditional Ecological Knowledge (TEK) adds a human dimension to ecosystem management. TEK implies that humans are connected to natural resources; they are not separate entities from nature (Kimmerer, 2000).

Including TEK with modern forest management approaches using scientific knowledge would add diversity to the natural resource management community. TEK can complement scientific knowledge by improving forest managers' understanding of local ecological dynamics, and increase their ability to more inclusively and sustainably manage our nation's forests for multiple stakeholder values (Bengston, 2004). While there is no one correct definition of TEK, Berkes (1999) has succinctly defined TEK as:

> A cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans)

> with one another and with the environment...is both cumulative and dynamic, building on experience and adapting to changes" (Berkes, 1999, p. 8).

TEK is the understanding of relationships between human, non-human, and the physical environment possessed by indigenous peoples in communities that are directly dependent on the land (Berkes, 1993; DeWalt, 1994; Kloppenburg, 1991; Murdoch and Clark, 1994; Emery, 2001). Through extended observation, direct interaction, and experimentation, TEK is the inherited knowledge of a specific location and its social and ecological characteristics over time. TEK is rich in precise detail regarding the trends and deviations of a place in which the knowledgeable person has direct experience. It is a valuable resource for forest restoration efforts in ecosystem identification and also incorporating values and cultural ties to the land. A partnership between scientific knowledge and TEK would be beneficial in achieving a goal of forest sustainability by utilizing centuries of local knowledge in addition to scientific methods.

In the field of sociology, standpoint theory asserts that over time, scientific knowledge has displaced other traditional knowledge systems and scientific researchers have attained the status of unique authority (Smith, 1987; Haraway, 1989; Harding, 1986). Although contemporary standpoint theory is used in feminist literature, it has also been adapted to investigating other issues of power, inequality, and social constructions. Standpoint epistemology is centered on the notion that the worldview of disenfranchised community members can more accurately identify whether research interests are truly relevant, and if the research will be beneficial and empowering to the participating community as well as to the general population. Harding (1991) posits that those who

stand on the margins, 'outsiders', have particularly valuable ways of interpreting that can help foster a more objective science.

Scientific approaches have not been able to achieve complete success when studying complex ecological systems which occur on greater levels of time and space. For instance, scientists have learned much about applying ecosystem management on a small scale, such as managing a particular forest. However, there are still many issues in applying ecosystem management over the entire boreal forest, for example. Although modern scientific knowledge has been beneficial in advancing our understanding of the more straightforward systems of the natural world, it separates humanity from nature (Gadgil et al., 1993). Scientific knowledge has allowed humans to take financial advantage of natural resources, and in some areas, through mismanagement and overuse, environmental degradation of valuable natural resources has occurred. When it comes to pursuing sustainable ecosystem management, scientific knowledge alone has not proven to be sufficient.

Natural resource managers and researchers often overlook the available value and expertise to be gained from those who possess TEK (Emery, 2001). The use of TEK in forest management can be very efficient in restoring a specific geographic location. In knowing how to improve the health of the land, for example, one must comprehend the complex ecology of forest systems, and more importantly, realize and come to understand the root source of the system imbalance (Gadgil, 1993), an understanding that is achieved through local knowledge. Because TEK is based on localized knowledge of a specific area, community members have established a long-standing relationship with the forest, and specialized knowledge of local forestlands. Unlike traditional science, the philosophy

of TEK views natural systems as cyclical, not linear. Ecosystems are life cycles, and like the seasons, they operate in a cyclical manner. The flexible dynamic of TEK makes change and disturbances expected events, and forest restoration and management then works around such anticipated ecological changes (Kimmerer, 2000).

There are many facets to TEK. For example, gatherers and hunters need to have considerable knowledge and skills to derive livelihood resources from plant matter. Emery (2001) suggests that there are three specific dimensions to TEK: use (what plant to use, how to harvest and prepare), ecology (how to find it in useful quantities, recognition of landscape characteristics, how to avoid over-harvesting, what time of year it is available), and economics (knowing what a fair price for the product is-including transportation, labor and equipment costs). These three aspects in combination with traditional science are necessary in order for TEK to make significant contributions in ecological restoration efforts and natural resource management in general.

TEK is also intertwined with cultural foundations. Native Americans and other indigenous people are found to focus on four different aspects in their learning processes: the mind, body, spirit and emotion (Cajete, 1994). Native Americans believe that humans are a part of nature, and they have a responsibility of stewardship and agency to the land, which is vital to maintaining ecosystem health and functioning. TEK is not objective knowledge in the traditional sense of scientific knowledge and should not be considered as such (Kimmerer, 2000). TEK is considered to be objective from the viewpoint of standpoint theory. As many standpoint theorists have suggested, local knowledge is entirely dependent upon the individual knowledge and perceptions acquired over generations of inherited knowledge and experience situated within their local places and

cultures (Smith, 1987; Kimmerer, 1998, Martinez, 1999; Kimmerer, 2000). If local knowledge is separated from the cultural aspects in TEK, both the accumulated knowledge and the values that surround and sustain the knowledge are diminished in quality. Natural resource managers are charged with the responsibility of managing forests for multiple stakeholder groups with diverse values. Therefore scientific knowledge, TEK, and local perspectives are all equally important in informing natural resource managers (Kimmerer, 1998).

To hunters, anglers, and gatherers alike, successful harvests are linked closely with the quality and reliability of their knowledge and observations about their local environment. Kimmerer (2000, p.9) highlights, "TEK is not unique to Native American culture. It is born of long intimacy and attentiveness to a homeland and can arise wherever people are materially and spiritually integrated with their landscape." Traditional knowledge is embedded into the cultural way of living for many Native Americans as well as some European communities in North America (Emery, 2001; Martinez, 1999; McDonough et al., 1999; Kimmerer, 2000; Love & James, 2001).

Emery (2001), for instance, found that in Michigan's Upper Peninsula, many Native Americans (as well as non-Native Americans) possess an extensive local knowledge of the products they harvest, and they observe stewardship practices to assure sustained non-timber forest product availability. Similarly, Love and James (2001) further reported in their Washington State chanterelle mushroom study that Mexicans and Southeast Asian populations immigrated to the western U.S. coast and took advantage of harvesting marketable forest products such as bear grass and mushrooms beginning in the 1930s. Love and James (2001) found that as the logging industry declines in the rural

Pacific Northwest, former loggers often gather non-timber forest products to supplement their incomes.

Traditional knowledge still has applicable value to communities across the U.S. The outcomes community members gain based on traditional knowledge (e.g. mushroom harvesting, crafts using birch, finding successful hunting, etc.) are not solely utilized by individuals or households as supplemental income. In fact, gathering, harvesting, and hunting keep TEK alive by providing opportunities for social fellowship, and for the passing TEK skills onto younger generations (Emery, 2001).

On the whole, TEK has the ability to provide important information about the ecology and social aspects of SFM. As a practice, gatherers encourage continued availability of non-timber forest product through SFM. A blending of TEK and scientific knowledge has been suggested as a combined methodology that could be used to implement more ecologically and socially sustainable natural resource management planning (DeWalt, 1994; Kimmerer, 2000).

2.5 Current Native American Forest Uses and Management Perspectives

Tribal sovereignty issues have developed as tribal nations are deciding to design SFM programs based on cultural and ecosystem management principles (LaDuke, 1994). Sovereignty is a top priority for many Native Americans (Bengston, 2004). There is a long history of deceit and betrayal when looking at dominant organizations, agencies, and the federal government in their treaty dealings with tribal nations (Cronon, 1983; LaDuke, 1994; Rogers Huff & Pecore, 1995; "Native Struggles", 1999; Bengston, 2004). The survival of Native American governments and culture is inherently linked with autonomous control and management of their natural resources ("Natural Struggles",

1999). Without the ability to be autonomous in natural resource management of tribal lands, it is virtually impossible for tribal nations to manage their forests to meet the needs of their communities and support community members livelihoods spiritually, socially, economically, and ecologically.

Tribal economic decisions are made after first remembering that they are part of a spiritual biosphere (a culture of spirituality, language, tradition, and land) that must be preserved and maintained (Bengston, 2004). Priorities regarding forest management for commercial activities are different than non-Native Americans. LaDuke (1994) confirms that to many, forests are the identity of the community. Generations of TEK concerning animal relationships, medicinal plants, ceremonies, etc. lie within forested communities.

From a Native American perspective, cultural values play a significant role in affecting forest management ideals and perceptions. These values identify important natural resources, and places which are to be respected and remain untouched. Bengston (2004) illustrates the importance of traditional knowledge, in the deep historical knowledge of ecosystems that Native Americans have handed down generation to generation for thousands of years. Cultural values also identify which appropriate management practices are to be used in significant areas (Adamowicz, et al., 1998). Cultural values are part of a community's heritage and identity ("Natural Struggles", 1999). Maintaining places of cultural significance is therefore nonnegotiable. Quoting from the Indigenous Peoples Restoration Network's mission statement (SER, 1995), Kimmerer (2000) illustrates that:

> Ecological restoration is inseparable from cultural and spiritual restoration, and is inseparable from the spiritual responsibilities of care-giving and world renewal. Collectively and individually, these indigenous spiritual values must be central to the vision of ecological restoration.

> Western science and technology...is a limited conceptual and methodological tool; the "heads and hands" of restoration implementation. Native spirituality is the "heart" that guides the head and hands (p. 6).

Native American culture expresses that people have a responsibility to be stewards of the earth. Ecosystem management has been the prevalent management theme for Native Americans in ensuring the sustainability of natural resources for thousands of years in managing the land for their subsistence needs (Bengston, 2004). While pre-settlement Native Americans actively managed the forest to continually renew subsistence resources, Native American philosophy continues to impress the idea that humans are directly responsible for their interactions with the earth to ensure survival to the seventh generation (Clarkston, et al., 1992; LaDuke, 1994). Therefore, tribal foresters work toward SFM plans that are carefully designed to consider the multitude of stakeholders (ceremonial and sacred places, timber and non-timber product uses, hunting, aquatic ecosystems, terrestrial ecosystems, recreation, etc.).

Natural resources are at the center of many Native American economies. As in any forest management, there is a need for a balance between ecological and economical sustainability in tribal forestry as well. Many tribal nations' economies derive a large portion of their income from commercial timber sales. In 1994, LaDuke reported that Indian Reservations in the United States contained roughly 56 billion board feet of timber on 15 million acres of Native American land. The point being that, in addition to being ecologically sustainable, forestry endeavors must also be economically sustainable. This poses a unique challenge to Native American forestry. In addition to not compromising the health of the forest while balancing economic returns, a balance must also be found in protecting traditional cultural values and practices (LaDuke, 1994; Kimmerer, 2000;

Bengston, 2004). Along with timber income and job opportunities, Native Americans presently use forest resources for arts and crafts, subsistence, spiritual, religious, and cultural purposes as well as for hunting (Rogers Huff & Pecore, 1995; Bengston, 2004).

The first Native American forest to be certified as sustainable in theU.S.is located within the Menominee Indian Reservation in northeastern Wisconsin (Rogers Huff & Pecore, 1995). The reservation spans 234,000 acres, with approximately 4,000 Menominee residents Menominee Tribal Enterprises (MTE) is the tribe-run corporation responsible for forest management. Their management plan is based on sustainable and intensive forest management. They manage for hardwood and softwood timber and pulp. They have also instituted a shelterwood management program, which allows shade loving pine seedlings to propagate and grow under mature canopy (Landis, n.d.).

Contrary to conventional timber harvesting methodology where the most valuable trees are harvested, the MTE selectively harvest damaged trees first, slow growing or diseased trees second, and finally, they remove trees where more stand spacing in necessary (leaving room for the most valuable timber to thrive). As the Menominee have discovered, it is more expensive to sustainably harvest forests, and it is more difficult to flex and react to changing market demands, at times making it difficult for them to make a profit (Landis, n.d.). Regardless of profit margins, however, MTE take pride in the fact that they are managing their forests not for profit, but for their tribal nation, and for their nation's future generations (Rogers Huff & Pecore, 1995).

Individual Native American perceptions on sustainable forest practices, however, cannot be generalized to the general Native American population. Individuals and communities will always differ in their values, concerns, and priorities on the topic of

land use and natural resource management issues (Jostad et al., 1996; Bengston, 2004). Because each tribal nation is historically and geographically unique in their circumstances, lessons learned from one community should not be generalized to the greater Native American population, or to their tribal communities (McAvoy et al., 2000; see also Haraway, 1989 and Harding, 1986 for a discussion on local knowledge). As McAvoy et al. (2000) stated, "Native American nations vary considerably both culturally and in situation, as do the individual communities within each nation" (p. 484).

In the interest of achieving SFM, a myriad of values and cultures must be considered. Therefore, it is impossible to represent an individual community's economic situation, culture or ethnicity (Jackson, 1993; hooks, 2000; Stein, 2004) in any one overarching statement. In this discussion of perspectives then, it is important to recognize and emphasize that the order of priorities varies widely from between communities and individuals regarding forest management (IUFRO, 2005). While at first, this may appear limiting, it is important to recognize that in local communities throughout North America, there are stores of information that when compiled will create a vast resource of knowledge. The applied value of localized knowledge with regard to SFM rests with the broad diversity of specific knowledge that can be utilized in each community.

2.6 Summary and Research Questions

The livelihood of Native American nations and culture is linked with the control and management of natural resources (Bengston, 2004). The economic and cultural benefits of non-timber forest products (hunting, gathering food, firewood, medicine, crafts, items for ceremonies, etc.) are vital to the survival of Native American communities. Traditional knowledge should be respected, and conscious efforts should be

made in an effort to preserve as much knowledge as possible. Acknowledgement of and respect for TEK and culture are the first steps to be taken in working toward mutually beneficial natural resource management knowledge sharing between native and non-native resource managers (Kimmerer, 2000).

Forested lands have been woven into the culture and livelihoods of Native Americans for past and future generations. The relationship between forests and Native Americans is extensive and complex (Mater, 2005). Forests are intertwined with many Native American aspects of life, and therefore it is imperative to tribal nations that indigenous rights are acknowledged, maintained and exercised. Inherent in tribal forest management is the protection of sacred places, the improvement of environmental quality of water and forest systems while balancing the tribal nation's social and economic and ecological needs. The primary goal in tribal forestry is to achieve a balance between economic, ecological, and social returns by managing the forest and at the same time, protecting its traditional cultural and spiritual areas in a sustainable way. Restoring people's relationship with the land is as important as restoring ecosystem functioning.

Research Objectives

This literature review makes the case that in order to achieve SFM, social and cultural components must be considered in forest management decisions. Because Native Americans are the population that has the most extensive history of forest management in the U.S., and therefore have a rich history of TEK, it is important to hear and incorporate their perspectives on SFM. The purpose of this study is to achieve a broader understanding of Native American perceptions of SFM. In this attempt to achieve a

broader understanding of Native American perceptions of SFM, the following objectives will be addressed:

1. Examine historical and current forest uses, and management approaches used by tribal nations.
2. Examine the relationship between tribal definitions of sustainable forests.
3. Compare resource management practices developed through tribal traditions with management practices currently advocated by natural resource professions.
4. Identify barriers and opportunities for tribal participation in the regional discussions of sustainable forests.

CHAPTER THREE: METHODS

This chapter will first discuss the use of qualitative data and the benefits of case studies. The specific protocol on data collection for this study will then be outlined.

3.1 The Use of Qualitative Data

Techniques used in qualitative data are used in this research in an effort to bring the maximum amount of depth and richness to the case study. Trochim (2006) has listed several criteria for applying qualitative methods to a research question.

- The need for exploratory study, in that variables are not easily identified, theories are not available to explain behavior of participants on their population of study;
- The need to present a detailed view of the topic;
- Where there is sufficient time and resources to spend on extensive data collection in the field and detailed data analysis of "text" information;
- The nature of the research question.

Qualitative interview studies inform researchers to observe others in order to gather the reality of a situation based on an individual's or a community's perception of events. It allows the composition of in-depth descriptions which interconnect diverse perspectives (Weiss, 1994). Qualitative methods help develop an entire picture or context which aids in piecing together the puzzle pieces of the *why* and *what* questions of social science (Marshall & Rossman, 1989). These methods enable a researcher to learn how diverse communities translate actions and events that occur in all aspects of life. Observed perspectives provide a rich background for actions and behaviors are revealed, whereby they would have been lost using solely quantitative methods.

Quantitative and qualitative research techniques complement each other when used together. Qualitative interview studies provide a better chance of discovering themes and perspectives which would not be expected at the beginning of a study. This would not be possible with quantitative methods (Yow, 1994). Qualitative data makes it possible to identify patterns which develop theories that clarify the reasoning behind such patterns.

Patricia Hill Collins (1991) speaks of the value of using standpoint theory in qualitative research approaches. Standpoint theory centers on the idea that the researcher is in a unique position of having the ability to see what is happening in a culture from the perspectives of both the researcher and the participant. Her claim is that being with participants, while still not being a part of their culture or, "outsider within", lends objectivity in that people in this position can observe patterns that immersed individuals would otherwise be unable to see. Doing qualitative research using standpoint theory allows participants to express experiences and observations in their own words through their own experiences (Smith, 1979; Reinharz, 1992). It becomes possible to learn from the experiences of others in asking participants what social and personal relations are involved in generating their perception or their story (Smith, 1979; Reinharz, 1992). For the purposes of this study, applying standpoint theory to this research acknowledges and gives deference to Native American local knowledge and perceptions of SFM.

Conducting in-depth interviews with participants allow researchers to discover which issues are most important to participants. It is important that social science methods allow participants to illustrate their worldview as they have lived it (Smith, 1987; Marshall & Rossman, 1989; Fonow & Cook, 1991). Perhaps one of the most

significant benefits of qualitative research is that it enables diverse audiences to comprehend another individual or community's situation looking from the inside out, as the participant themselves experienced it (Weiss, 1994).

3.2 Case Studies, In-depth Interviews, and Focus Groups

A mixed-method approach of using qualitative methods of field research (Babbie, 1998), as well as case study research (Yin, 1989; Reinharz, 1992) was utilized for this research study, using in-depth interviews and focus groups. Field research requires the researcher travel to the areas being researched. This is an effective manner in which to gather principal data for the reason that the case study method allows more flexibility, given that data can be and is gathered in multiple ways: archival information, published literature, personal interviews, direct observations, and focus groups (Marshall & Rossman, 1989; van Staveren, 1997; Krueger & Casey, 2000).

Unlike quantitative studies which aim to produce generalizations and trends, case studies focus on one issue or question or case. The many reasons for conducting case studies include: observation and analysis of change over time, gathering information regarding the importance of an issue for future impacts, and to further understand interconnected patterns and relationships between events, people, and places, brining depth to quantitative analysis, and simply put, to ask questions. Reinharz (1992, p. 174) articulates that "...social science's emphasis on generalizations has obscured phenomena important to particular groups..." Case studies enable social researchers to connect with actual people and grasp circumstances. They allow the reader to learn about and understand the participants' lived experiences as told from the perspectives of the participants' reality (Weiss, 1994). This is precisely why the case study is appropriate for

our research in partnership with Native American tribes regarding sustainable forest management discussions. In order to recognize as many perspectives as possible, it is important that social science has a method in which to reflect the multitude of diverse experiences within various cultures.

This case study used the in-depth interview method to conduct personal interviews and focus groups. In-depth interviews may consist of individual or group interviews (Trochim, 2006). In-depth interviews are based around several general questions designed to produce a dialogue about a particular issue or event. These interviews are more like conversations, which designed to support the participant in openly sharing their life experiences about the topic of interest. The researcher guides the interview based on the participant responses to the open-ended questions they are asked. In this way, the thoughts and opinions of the participants appear rather than those of the researcher (Reinharz, 1992). From these interviews, the researcher observes participant thoughts, ideas and opinions regarding the issue being discussed. The information gathering process can be recorded by either audio or video recorders, or simply by written notes. These interviews are typically audio-recorded if consent is given, and a transcript is made. The recorded conversations yield evidence produced from the guiding questions asked by the interviewer, and content analysis commences (Yow, 1994).

There are many grounds on which it is recommended and deemed appropriate to conduct focus groups and personal interviews. In-depth interviewing underscores the importance of doing research avoiding preconceived assumptions or hypotheses (Reinharz, 1992; Yow, 1994). Forums such as in-depth interviews permit researchers admittance into participants' own ideas, thoughts, and memories, and allow them, in their

own words, to share their own experiences (Reinharz, 1992). In this way, it is possible to enable participants a larger role in forming the research project, and it creates a situation where the researcher may develop a connection with the participants.

Quite possibly one of the most useful benefits of in-depth interviewing is that it becomes possible for the interviewer to immediately follow up on an interesting response or to probe deeper when a response needs clarification. Another added benefit to in-depth interviewing is that the researcher will physically spend time with participants in the research study location. If one is investigating a culture or community that is not their own, this is an excellent way to build respect, and rapport with participants while at the same time, being able to first hand observe unspoken communications (e.g. body language, facial expressions, personality traits, etc.). Echoing MacAvoy et al. (2000), Bengston (2004, p.48) explains:

> Gaining clear insights into the environmental perspectives of ethnic and minority groups is often difficult for forest managers, policy makers, and researchers who are not part of these communities. Differences in traditions, social mores, and language create obstacles to communication and understanding, and histories of exploitation often create profound distrust of government institutions and their representatives. Social science methods used to obtain information about attitudes, beliefs, and values of the dominant culture are often inappropriate and ineffective when used in the context of racial and ethnic communities. For example, mail surveys are widely used in social science research but have not been successful with Native Americans.

Focus groups and personal interviews consistently reveal information about all levels of communities that would not normally be found in interview formats using close-ended surveys, for example (Yow, 1994). They can uncover social norms in a culture that one was not previously aware of, and enlighten readers on the diversity of life within a

community. In her book *Recording Oral History: A Practical Guide for Social Science,* Yow (1994) states that:

> The in-depth interview can reveal a psychological reality that is the basis for ideals the individual holds and for the things he or she does... closely related is the way individuals see their own histories, both personal and group with which they identify. This becomes important in understanding a culture (p. 15).

By understanding the social dynamics of a culture, it becomes more possible to learn how people come to certain worldviews, and the role the culture one is living in plays in the origin of their thoughts and interpretations of issues (Yow, 1994). Clarification is vital in qualitative studies in uncovering underlying factors in influencing participant decisionmaking in an event (Weiss, 1994; Yow, 1994).

While in-depth interviews certainly have their advantages, their limitations must also be discussed. A major difference between qualitative research and quantitative research is the fact that while quantitative studies may be replicated, qualitative studies and case studies in particular cannot be replicated. Because qualitative studies are not repeatable, the data is not generalizable to the greater population (Weiss, 1994). Some claim that qualitative methods create a specific portrayal of the individual participants, which cannot be duplicated, and are therefore not of particular value (Yow, 1994). However, in qualitative data analysis, and in life in general, it is recognized that circumstances and viewpoints change over time, so in these research scenarios where case studies are conducted, there is no need for duplication or generalization. Case

studies are meant to be an account of a person or groups' thoughts and memories about an issue or event.

The potential for bias is another serious consideration when working with qualitative methods. It is inevitable that some social scientists will have some assumptions about their study before it even begins, especially if the researcher has specific questions they would like to address about a specific matter. These types of preconceptions could potentially bias the results by causing the researcher to (whether consciously or subconsciously) frame their questions with a possible bias toward their assumption. In qualitative analysis one might try to produce findings which support a viewpoint or assumption the researcher carries by admitting facts which support their theory while omitting facts which do not. This could make his or her argument the strongest in the study analysis. In many cases, this bias can be resolved by having peers critique and review the research analysis. In most situations, however, the primary goal of the researcher is to learn rather than validate (Weiss, 1994). It is important that researchers using qualitative data techniques commit themselves to telling the entire story. It is essential that the researcher develop a relationship with the participant where they understand that the study would benefit most by accurate information.

As the interviewer is certainly susceptible to bias and influence, so is the participant (Yow, 1994). Participants may consciously or unconsciously choose to leave out certain facts, details, or events in an attempt to frame their discussion toward their advantage. There will always be questions pertaining to accuracy with participant interviews. Conventional knowledge accepts that as time goes by, memories become less accurate then they were on the day of the particular event. However, research has found

that memories of a specific event fade most dramatically in the first hour after the occurrence and in the nine hours following the event than in any other subsequent time period, be they weeks, months, or years. If issues of participant reliability surface, it becomes the researcher's responsibility to cross check with credible resources and compare participant accounts to validate. It must be noted, that it is impossible to achieve complete confidence regarding any specific experience or detail regardless of the evidence. The best possible scenario becomes that a provisional conclusion is produced based on a thorough examination of the evidence (Yow, 1994).

In some cases, reports involving participants from communities the researcher is unfamiliar with may still be portrayed inaccurately regardless of the level evidence examination. The data may be misinterpreted due to cultural differences. As Bengston (2004) highlights, it is difficult to have a clear understanding of a community when you are not part of them. The following are potential obstacles: language, social norms, histories of exploitation, distrust (Bengston, 2004). It is critical that researchers take time to be reflective, and becomes critically aware of the social and cultural differences in their habits and mannerisms compared. In order to most accurately represent a population the researcher is not a member of, it is imperative that one educates oneself on the cultural etiquettes of conversation and speech, as this is the main medium through which communication and miscommunication takes place (Yow, 1994).

3.3 Research Protocol

The purpose of this study was to achieve a greater understanding of tribal perspectives of SFM. Interviews and focus groups were conducted with long-term residents, including tribal and non-tribal members.

To begin the process of this case study, interviews, phone calls were made; meetings were held, along with correspondences between those involved with the organizations mentioned below in order to discover which tribal nations would be the best suited to participate in this research. Consultations took place with the following knowledgeable organizations: the Upper Mississippi River Forest Partnership, the Great Lakes Indian Fish and Wildlife Commission, Region 9 of the USDA FS, the Great Lakes Forest Alliance, and Native American scholars at Michigan State University, various tribal nations were recommended as ideal participants for this case study.

Tribal nations were recommended for participation based on counsel with the College of the Menominee, and American Indian Studies experts at Michigan State University. The participant pursuit began with a snowball sampling technique (Trochim, 2006). This is where a possible participant who meets the research criteria and parameters is contacted and asked to recommend others who also fall within the research parameters, and importantly, who would be interested in participating. For qualitative research of this nature, it is important to enlist individuals who have definite characteristics or experiences related to the research questions of this study (Walker, 1985). Phone calls were made to Native American Reservations located within the Upper Mississippi River Watershed. Their recommendations were considered on who should be involved, who to contact first, and what the appropriate protocol in contacting individual tribal communities were.

As a result, twenty two individuals from Leech Lake and White Earth Indian Reservations agreed to participate. White Earth and Leech Lake Reservations, located in northern Minnesota (Figure 1), were identified as potential participants in this study

because they fell within the parameters set for the case study. The first participant parameter was that the tribal nations who agreed to participate must be federally recognized. The second parameter required that some amount of the reservation land exist within the boundaries of the Upper Mississippi River Basin (see Figure 2). Third, the reservation land needed to have some forested land on it where active management was being done. It was also preferred that the tribe had a natural resources management department. Tribal nations in the southern part of the Upper Mississippi River Basin have very small reservation boundaries, and do not have forestry programs.

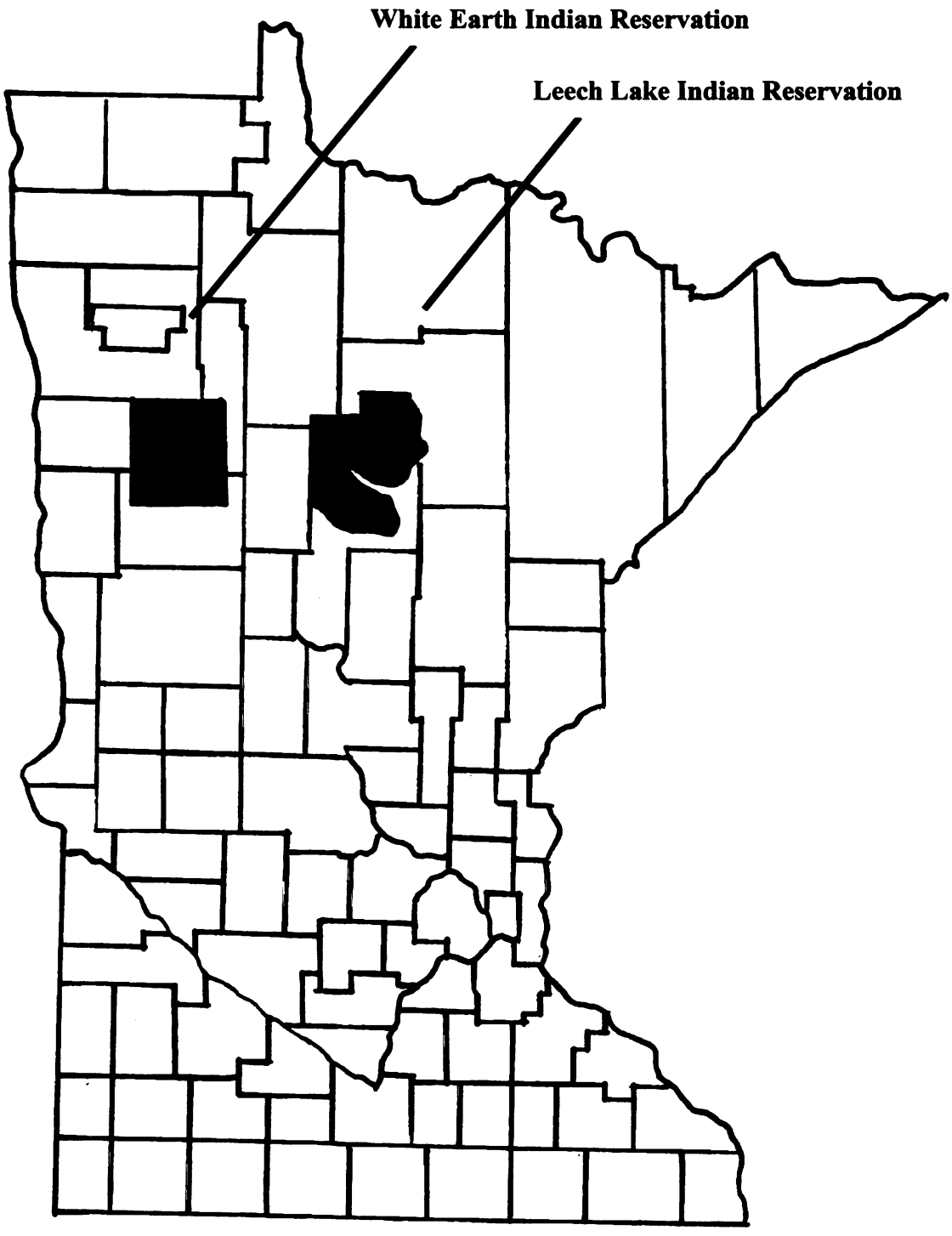

Figure 1. Location of in-depth study area in northern Minnesota.

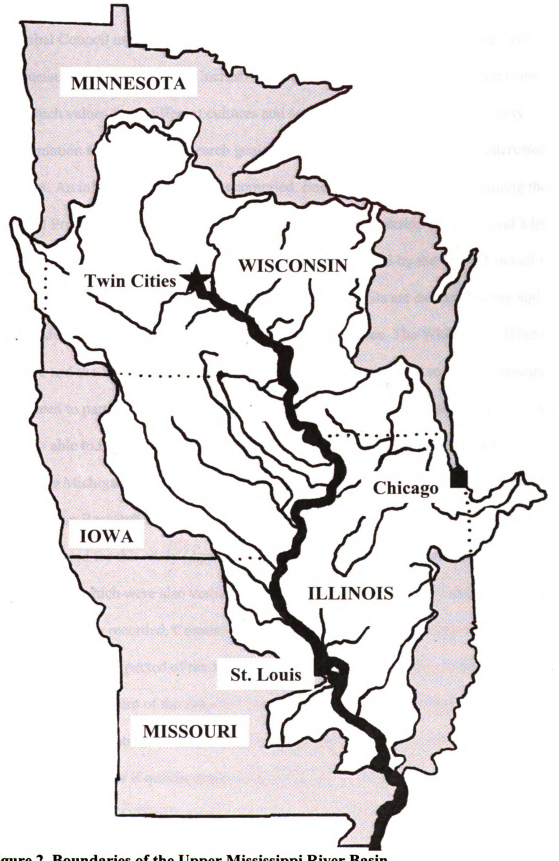

Figure 2. Boundaries of the Upper Mississippi River Basin.

Before field work began, it was necessary to obtain the proper approval from Tribal Council members. Efforts were made to ensure that communications were conducted using respectful and inclusive approaches that take into account the ways in which values from different cultures and societies interact in each community. Information related to our research goals were sent via mail to potentially interested parties. An information packet was compiled. Enclosed was literature explaining the Montreal Process, the Upper Mississippi River Forestry Partnership program, and a letter explaining our research interests and questions. Next, approval by the Tribal Council was sought. This was a lengthy process, as the Tribal Councils are extremely busy and overloaded with paperwork and other matters of importance. The White Earth Band of Ojibwe and the Leech Lake Band of Ojibwe approved our request to conduct research and agreed to participate in our case study. Once approval was obtained, the project was able to move forward and travel plans and interviews were scheduled.

The Michigan State University Institutional Review Board and the University Committee on Research Involving Human Subjects approved the informed consent form that was created for this study (Appendix B). It contained the risks and benefits of participation, (which were also verbally explained to participants), as well as asking for their consent to be recorded. Consent forms should include the following: the study objectives, what is expected of the participant, who will have access to interview material, an advisement of the risks and benefits of participating, a statement underlining the fact that participation is voluntary and can be withdrawn at anytime, and a way to contact the researcher if questions should arise (Weiss, 1994). Additionally, upon the Leech Lake Band of Ojibwe's granted approval, they provided participants with their

own informed consent form (Appendix C). If consent was granted to record the interview, the conversation is subsequently transcribed and hand coded. To date, none of the participants have objected to our informed consent form or to being audio-recorded.

Research data was obtained at the individual and community level via personal in-depth interviews and focus groups. In the spring of 2006, a total of eight in-depth interviews were conducted in northern Minnesota with community residents of the White Earth Indian Reservation and the Leech Lake Indian Reservation (Appendix D). Four personal interviews and two focus groups (with four and five participants, respectively) were conducted with participants from White Earth. One personal interview and one focus group (with nine participants) were conducted with participants from Leech Lake. Participants were comprised of a blend of tribal members, employees of the tribe, and community members who live within the reservation boundaries. Community residents who were non-tribal members were also interviewed. Because of the diverse landownership that checker-boards the reservation, they also make up a part of the community, as do tribal members.

When informed consent was granted from the participants, the interviews were recorded using a digital voice recorder, and were later transcribed and coded by hand. The in-depth interviews lasted from a minimum time of roughly one and a half hours to a maximum of three hours. The White Earth forestry department also made copies of the interview questions that were sent to them, and left them for people to fill out at their leisure in a commons area. Five people filled them out, and the responses to those will be incorporated into the rest of the report.

The research process of data collection was carried out using culturally appropriate approaches with community members about forest uses past and present, forest management on tribal lands, definitions of sustainability, measures of sustainability, and views in participating in regional discussions regarding forest management. Collaborating together with feedback from the Upper Mississippi Forest Partnership, the semi-structured interviews and focus groups were centered on the same several key questions (Appendix E). The key questions were offered to participants to review and reflect upon prior to the interview. Distributing these questions allow the participant to understand what expectations there are of the interview conversations, enabling a more thoughtful discussion. The interview process was kept as flexible as possible. In each case, the participants were encouraged to guide the dialogue (Trochim, 2006).

3.4 Study Location

This case study took place in Northern Minnesota. In-depth interviews and focus groups were conducted in participation with Leech Lake Reservation and White Earth Reservation. The White Earth Reservation spans across three counties in Minnesota: Becker, Clearwater, and Mahnomen. The reservation spans 850,000 acres. The Leech Lake Reservation extends across Cass, Itasca, Beltrami, and part of Hubbard counties. Located within the reservation boundaries of Leech Lake are the headwaters of the Mississippi River, which form in Itasca State Park.

3.5 Analysis of Data

The interview was the unit of analysis in this study and was selected for two reasons. First, the focus groups were recorded with a digital voice recorder, not video recorder. This makes it particularly difficult to assign a specific dialogue exchange to one specific participant. Second, a comment contributed by one participant may not have surfaced had another participant not brought up that particular subject. Due to the collaborative nature of focus groups, the responses offered by individual participants are not independent, nor are they intended to be. One of the advantages to conducting focus groups is the rich discussion produced by a group of individuals that likewise would not occur in an individual interview. Therefore, each focus group and individual interview was counted as one interview during analysis.

The digitally recorded in-depth interviews were transcribed by the researcher. Every interview transcript was first reviewed by the researcher who conducted the interviews. This process included carefully reading the transcripts and then highlighting text with potential codes. The transcripts were then handed to a second researcher to check for potential bias, error in interpretations, and consistency in coding. Several collaborative meetings took place where emerging themes were investigated in each transcript. Along with each theme, codes were attached to parts of the text which addressed specific interview questions. For example, the code "future generations" was attached to the transcript when participants offered their definitions of sustainable forest management. The frequencies at which codes appear in the transcript assist in drawing out patterns and themes in analysis.

Code Development

Sorting and coding field notes and transcripts for responses to the open-ended interview questions are an integral part of data analysis. Coding entails breaking down and organizing data produced from the guided by the interview questions into themes and categories based on the characteristics of the participants' responses and the dynamics of the events in each in-depth interview.

The main code categories used were based on the list of interview questions in Appendix E. The first interview question, for instance asked, "Think about when you were a child. How did you use the forest?" Participant responses to a topic area (e.g. childhood forest uses) were coded based on content. For example, if a participant mentioned in childhood that their grandmothers taught them about local forest plant uses, that comment would then be sub-coded as "elder-youth ecology education". Codes occurring multiple times in more than one individual interview were deemed to be potentially prevalent patterns or themes.

Once the coding and sorting of interviews was completed, observations and descriptions of what has been learned from the interview process were made by summarizing the interpreted meanings, and bringing out the articulate quotes and meaningful phrases of each interview (Weiss, 1994). The researcher then correlated the emerging patterns, themes, and relationships in how the data related to each other (Miles & Huberman, 1984; Dey, 1993). The findings of the analysis will be discussed in the following chapter.

CHAPTER FOUR: RESULTS AND DISCUSSION

The results of the conversations that took place in this study's focus groups and in-depth interviews are discussed below. This chapter discusses the research findings this study has obtained through the qualitative methods of focus groups and in-depth interviews conducted with participants from the White Earth and Leech Lake Indian Reservations.

4.1 Participant Tribal Nations Introduction

In establishing the profiles of the participants of this study, it is important to be aware of the circumstances through which White Earth and Leech Lake Indian Reservations were formed. White Earth and Leech Lake are two of six reservations that make up the Minnesota Chippewa Tribe (MCT), which was created in the Indian Reorganization Act of 1934. The other four tribes of the MCT are: Mille Lacs, Bois Forte, Grand Portage, and Fond du Lac. The White Earth Indian Reservation was created by the 1867 Treaty between the Mississippi Band of Chippewa Indians and the United States government. The Leech Lake Indian Reservation boundaries were established by the Treaties of 1855 and 1867.

Throughout the late 1800s and 1900s, the White Earth Reservation along with Leech Lake Reservation and countless other reservations, had been parceled by government acts and treaties (Dawes Act of 1887, Nelson Act of 1889, Rice Commission negotiations, Clapp Amendments of 1904 and 1906). The Dawes Act for example, allotted 80 acres to each individual tribal member in 1887. Participants explained that due to legislation such as the Nelson Act, townships with pine populations were annexed, and

then were made available for harvest by private companies. In the years shortly following 1889, all of the pine in the reservation areas had been clearcut, and there was no effort of reforestation. Native people did not benefit from the pine harvests.

The White Earth Band of Ojibwe[3]

The White Earth Band of Ojibwe people to this day reside within the land base of the White Earth Indian Reservation. The Reservation spans across three counties in northwestern Minnesota: Becker, Clearwater, and Mahnomen. It is one of seven Chippewa reservations in the state of Minnesota.

The governing entity of White Earth is its Tribal Council, which is comprised of five members: Tribal Chair, Secretary/Treasurer, and three District Representatives. All happenings and decisions regarding White Earth are presented to, finalized and approved by the Tribal Council. As of July of 2007, the White Earth Band of Minnesota Chippewa had an enrollment size of 19, 291 (MCT, 2007).

Within the White Earth Indian Reservation boundaries, there is a unique topography which creates a variation in soil characteristics from fertile clay soils in the west to sandy lower fertility soils in the east. Most of the forested land (360,637 acres) is in the eastern half of the reservation. The forests were comprised of mature white and red pine and mixed hardwood and softwood species before the lumber barons harvested all the white pine. Aspen stands primarily regenerated after this, and some acres regenerated to scrubland. The treasured white pine has not regenerated to its original population due to fire suppression. At present the forests consist of mostly even-aged stands with

[3] The following information is taken from the 2002 White Earth IRMP.

species including: paper birch, young red and white pine, swamp conifers, black and white spruce, balsam fir, red and white oak, and swamp hardwoods.

White Earth has a complex mixture of land ownership in common with many reservations across the United States. There is an assortment of tribal, trust land, state, county, private, and federal land ownership. Much of the White Earth Indian Reservation is now owned by non-tribal members. In 1975, 28,000 acres of lower-value land was returned to White Earth. In the 1990's, the White Earth Land Settlement Act acquired 10,000 acres for White Earth. Currently, approximately 8% of the reservation (63,000 acres) are owned and managed by the tribe (White Earth IRMP, 2002). Tribal members own roughly 47,000 acres of the 400,000 forested acres on the reservation. Tribally-owned forests produce a significant amount of income to the White Earth Band of Ojibwe: harvesting approximately 5.7 million board feet of timber year brings $50,000 per year to the tribe.

Unique to White Earth community members is the White Earth Land Recovery Project (WELRP). Its mission taken from their website (www.nativeharvest.com) is "To facilitate recovery of the original land base of the White Earth Indian Reservation while preserving and restoring traditional practices of land stewardship, language fluency, community development and strengthening our spiritual and cultural heritage." WELRP is presently involved in many projects that range from alternative energy to land acquisition to forest stewardship. They have recently been certified by the Forest Stewardship Council in 2003 for sustainable forest management of their 200 acres sugar bush forest. The WELRP forest is composed of aspen, sugar maple, birch, basswood, ironwood, oak, and hazel brush.

The Leech Lake Band of Ojibwe[4]

Leech Lake Indian Reservation is located in northwestern Minnesota. The headwaters of the Mississippi River (in Itasca State Park) are located within its boundaries, and the Reservation extends across Cass, Itasca, Beltrami, and part of Hubbard Counties. Leech Lake has a unique situation in the United States because the Reservation boundaries mirror the boundaries of the Chippewa National Forest almost exactly.

The Leech Lake Band of Ojibwe is governed by a five member elected Tribal Council. There is a Chairman, secretary/treasurer, and representatives from three districts of Local Indian Councils. Similar to the White Earth Indian Reservation, all happenings and decisions regarding the Leech Lake Indian Reservation are also presented to, finalized and approved by the members of the Tribal Council. The Leech Lake Band of Minnesota Chippewa has an enrollment size close to 8,861 members (MCT, 2007).

Leech Lake and White Earth Indian Reservations, sit on the edge of the northern boreal forest as well as the edge of the northern hardwood forests. Timber activities were carried out by railroad and timber companies in the Leech Lake forests in the early 1900s are primarily responsible for the composition of the forest as it stands today (this is when most of the timber logging took place). Pine was the most valuable species during that time period, and the reservation area was entirely logged over. Consequently, many wildfires ensued as a result of the large amount of pine slash accumulated. Over-mature aspen stands now dominate much of the forested acreage. Second to aspen stands in

[4] The following information was taken from the 2000 Leech Lake Draft IRMP.

predominance are northern hardwood forests. Because many of the northern hardwood forests were high-graded in the past, the residual stands are of low quality.

Complicated land ownership patterns are also a challenge to tribal forest management. Leech Lake, like White Earth land ownership throughout the Reservation is composed of a complex patchwork of trust lands; county owned land, privately owned land, commercially owned land, etc. Approximately 29,717 acres of the 864,158 acres on the Leech Lake Reservation are trust lands. These trust lands are divided into tribal, band, and allotted lands, where tribal lands are owned by the Minnesota Chippewa Tribe, band lands are owned by Leech Lake, and finally, allotted lands are owned by individual Indian and non-Indian owners. Roughly 74% of the land on Leech Lake Reservation is commercial forest land (22,134 acres).

In this case study, standpoint theory is utilized because it is important for the researcher is attempting to learn about a culture that is not their own. Additionally, the researcher must recognize that each individual participant (themselves included) is in some way situated in a unique position and views the world from their set of circumstances, life experiences, and surrounding environment. From where one stands individually, as a culture, or as a society, one can only see the issue from their particular vantage point (Haraway, 2000). Qualitative research brings the value of allowing multiple perspectives to make partial perceptions more complete. The efforts in this case study work toward that goal in terms of understanding Native American perceptions of sustainable forest management.

4.2 Historical and Current Tribal Uses and Forest Management Approaches

Values and opinions change over time (Sample et al., 2006). To achieve an accurate gauge in how sustainable forest management perceptions may change in the future, it is necessary to be informed of how attitudes and values in forest management have changed. Focus groups and in-depth interviews revealed that the way White Earth and Leech Lake Reservation forests have been managed has indeed changed over time.

Contrary to expectations, tribal members interviewed did not begin discourse on this issue by relating to a pre-settlement period where indigenous Americans influenced the land primarily by fire management. To the tribal members interviewed, "the past" was the time in history before their tribes took over forest management of tribal lands. When participants were asked how the forest was managed historically, one participant who is a White Earth tribal member responded, "*Basically, we didn't have input until 1994 on how many acres were going to be harvested, what kind of forestry practices were going to be used, or what kind of timber would be harvested. We had no input.*" Leech Lake's natural resources department has been active since 1972 (and managed by the Bureau of Indian Affairs), when both Leech Lake and White Earth were granted hunting fishing and gathering rights. White Earth took over management of their natural resources department in 1994, and Leech Lake did so as well around that time.

At present, the two tribal nations manage the forest sustainably for selective harvesting and harvest rotations. Both Leech Lake and White Earth have written Integrated Resource Management Plans (IRMPs). Additionally, the USDA Forest Service has drafted a Forest Management Plan for the Chippewa National Forest, which lies

within the boundaries of Leech Lake Indian Reservation. It becomes imperative that the Leech Lake Band of Ojibwe and the Chippewa National Forest stakeholders both come to an agreement on the forest management style, due to the patchwork of land ownership involved. When management decisions need to be made regarding forests in which many stakeholders hold an interest, it is important to understand the social values each stakeholder or land owner holds related to their forest.

Most of the participants in this study had lived in the area all of their lives. The forest was a playground and a place to socialize for many of the participants. Non-tribal members reported using the forest for more recreational purposes as children such as: hiking, bicycling, cross-country skiing, birding, and hunting squirrel and deer. In an effort to understand the relationships community members in White Earth and Leech Lake have to the forest land in the community, participants were asked how they used the forest as a child. One White Earth tribal member responded by saying, "*The woods were our entertainment, it was our livelihood. It was a lot of things personally, growing up.*" In the past, many people in the tribal community were dependent on the forest for survival. Many of the tribal members interviewed had fathers who either worked for logging companies or saw mills for a living. Several participants mentioned helping their fathers work by peeling pulp or piling brush. Their fathers would leave the reservation for weeks at a time to go on logging operations. It was expressed that there was there was high unemployment on both reservations in participants' childhoods. The principal employers were the timber companies.

Plants harvested from the forests nearby are mainly used for ceremonies, participants believe. They recalled from their childhoods that their families would grow

subsistence gardens, and deer hunt in the summer or trap in the winter to supplement their fathers' logging income. There were memories of fish camps and maple sugar camps. Everything seemed to move with the seasons. Several tribal members we spoke with shared their memories of growing up in tar paper shacks without running water and electricity until they were at least ten years old. They remember that they had no hunting, fishing or gathering rights or licenses growing up. These participants are now roughly in their 50s. Some participants remember trading wild rice at the store as children with their parents. They noted that they would, and still do trade other bands for some ceremonial plants.

Several participants mentioned that they knew all the names of the trees, plants, and mosses. Many memories included collecting firewood, balsam bough harvests, and picking berries. More so, participants recalled their grandmothers' teachings about medicinal plants. They emphasized the importance of knowing medicinal plants in their childhoods because there weren't many doctors in the area available to treat illnesses. One member of White Earth stated:

> *One of the things I've learned a lot of is the cultural aspects of the forest. Such as what we use different plants for: for medicine, for pain, for some type of ceremony, or things we still really can't disclose to non-Indians. A lot of plants that we use are in the forest. There are teas, there are medicines, and there are edible plants out there that we still use.*

In general, tribal members said they use the forest differently now compared to when they were children. As adults, they are more interested in cultural aspects in the forest now than they were as children. Written histories of White Earth and Leech Lake are spotty at best, and oral histories are relied on to pass the history of these people on to younger generations. As mentioned above, their grandparents and parents would spend

time in the woods showing them how to use certain plants and trees, and they would teach their children how to hunt or fish. Spending time in the forest with their elders gave children an opportunity to learn of their culture and heritage. As adults, participants say they still hunt, fish, gather mushrooms, trap, tap maple sugar, and use other plants from the forest. Although, several tribal members from Leech Lake interviewed expressed concern that they do not feel that their children are picking up the culture and traditions that were passed on to them as children in the forest. A tribal member from Leech Lake spoke of his experience:

> *I think of change, not only in forest composition, but also change in our kids. When I grew up, I hunted with my dad. We trapped, brought deer home, rabbits, we'd set nets. Now these kids don't want to do that. They've never been in the woods...They don't know what it's like to be out in the woods and be at peace. There's a big difference between my parents, me, and my kids...Things have really changed. My dad, he taught me how to rice, and how to hunt, and how to trap. I can teach my son, but this year we didn't go hunting. This is the first year in 40 some years I didn't go hunting. My son didn't want to go, he was too busy, my dad couldn't go, and I didn't feel like being out there anymore because I didn't have my dad or my son with me. Things are changing.*

The answer, "*All of them*," echoed from tribal members and non-tribal members alike when asked what plants and trees found in the local forests are considered spiritually or culturally significant. As one tribal member summarized about the local forest, "*It's part of our beliefs, history, and culture*." Participants communicated that each plant existing in the forest serves a unique ecosystem function and that everything found in the forest is spiritually or culturally significant to this community. Several tribal members from White Earth as well as Leech Lake mentioned that there are many plants and trees that are important to tribal communities for ceremonies, for crafts, and for

edible purposes. Those being: cedar, sweet grass, sage, tobacco, ash, white pine, sugar maple, birch, Norway pine, aspen, elm, tamarack, choke cherries, hazel nuts, plumbs, and mushrooms. The Leech Lake Department of Resource Management participates in an Inventory Resources Project which is for tribal member use only. It contains details on local native plants and their uses by community members. The Inventory Resource Project has found that roughly half of all plant species in the area of Leech Lake Indian Reservation have documented uses.

Tribal members and non-tribal members alike spoke a great deal about the mature white pine stands which used to characterize their landscapes. Most of the white pine has since been clearcut. As one White Earth tribal member understood about the history of white pine:

> *In the late 1800s, east of Naytahwaush, the white pine and red pine were harvested. Someone asked the BIA if they could log dead and downed timber. It wasn't regulated then, so they set fires and said the red and white pines were dead...then they cut them. This was before we knew red and white pine were fire specialized species. This was a trick for loggers.*

White pine was seen as a valuable wood because of the size, and it was easily manipulated. Leech Lake participants recalled that the white pine in their area was clearcut in the late 1800s and early 1900s when the U.S. government opened the reservation forests up to loggers as a result of the Nelson Act. They credit the decimation of white pine populations in the area to the birth of the Chippewa National Forest. They are symbolic of northwest Minnesota, and community members expressed that the white pine populations are not regenerating. This has ecosystem impacts that change flora and fauna in the area. Bears, eagles, wolves, and osprey are a few of the wild animals that thrive in white pine forests. When their habitat is no longer available, these animals must

search for new habitat elsewhere. Where areas have been clearcut, early succession tree species such as aspen thrive, and displace the pine trees.

Leech Lake and White Earth tribal forestry departments have a responsibility to tribal members to consider multiple forest uses in their management plans. Various non-timber forest goods (specific species of trees, plants, and shrubs) are highly valued by tribal members who choose to exercise their gathering rights. They are used for medicinal purposes, berries, basket-making, boughs and other crafts not related to timber sales. For example, balsam bough collection has become a popular means by which to supplement income. Paper birch stands are significant to the people of White Earth and Leech Lake as well. One Leech Lake tribal member mentioned that Native American crafters can turn a $13-25 piece of paper birch bark into a craft and receive $100-300 for their artistry. Paper birch is mainly used for crafts in the area, but it is also valuable for its medicinal qualities. Sugar bushes are also being preserved for sugaring opportunities. Furthermore, sustaining wildlife is a high priority to tribal members. Forest management greatly impacts wildlife in numerous ways and managers must consider the effect on both game and non-game species.

Economically significant trees found in local forests were highlighted by the non-Native American participants, such as: white pine, Norway pine, maple, and birch, aspen. One participant who lived within the White Earth Reservation boundaries noted that at the time of the interview, the price of aspen was around $60 per cord, and the price of paper birch was $5.50 per cord. They mentioned that sugar maples are important trees for maple syrup production, but that the tree itself was not considered "big lumber" at the time.

When White Earth and Leech Lake tribal members were asked during the interviews if they were aware of any specific conservation initiatives associated with significant forest flora or fauna, most were not aware of any stewardship or conservation programs in the area. However, the White Earth Land Recovery Project was mentioned as a local conservation initiative. Their mission is, "to facilitate recovery of the original land base of the White Earth Indian Reservation, while preserving and restoring traditional practices of sound land stewardship, language fluency, community development, and strengthening our spiritual and cultural heritage" (Native Harvest, 2004, para. 3).

Furthermore, both White Earth and Leech Lake tribal members who were tribal employees mentioned that they meet with other tribes and share information at least once a year with surrounding states (Wisconsin and Michigan) as well as the Native American Fish and Wildlife Society, and the Intertribal Timber Council to discuss forest management. One tribal of White Earth expressed:

> *No, um, not that I know of, other than our own determination of what plants need to be protected around here...There are some stewardship programs, conservation programs, planting trees, and that's all good, but in order to put this all together, our management practices and everything, we don't see that being addressed very much...We get together with other tribes and share our ideals and management activities with them. If we see something that's going to be beneficial, then we share that information on how we did it. We get together at least once a year, not only the tribes in Minnesota, but the tribes in Michigan and Wisconsin...If we have something pressing at a meeting that needs to be addressed; we address it when we get together.*

When one focus group of non-tribal members who live within the White Earth Indian Reservation was asked about their awareness of conservation initiatives, they

spoke of their involvement with the Resource Steward Association of Becker County (RSA). The RSA was described as a community watch dog group which is involved with resource conservation on state, county and private lands. The group also works toward forest restoration, and bringing back fire to ecosystems to control overgrown hazel brush. The RSA is also works toward the restoration of native forest wildflower species, such as the showy lady's slipper orchid. The RSA collaborates with the White Earth Land Recovery Project (WELRP) on forestry issues, such as watching county logging operations to ensure that regulations are followed. The focus group with RSA members cited times when counties have trespassed beyond their forest property during a timber harvest, onto WELRP land. The WELRP and RSA also work together against an initiative in Minnesota that would allow the production of genetically modified wild rice. The Resource Stewardship Association of Becker County is additionally engaged with the conservation of old growth forest stands and reducing the invasion of exotic species. Restoring white pine forests is also a priority, as it has not regenerated from the extensive clearcutting that happened at the turn of the last century.

4.3 Definitions of Sustainable Forestry

While participant definitions of sustainable forestry differed on some levels, this definition articulated by a participant of White Earth appears to encapsulate the general definition given by both tribal and non-tribal members interviewed. In his role as a manager of the forest, he defines sustainable forestry as, "*maintaining a sustainable population to harvest, but leave resources for the future in considering wildlife and plant survival.*" Moreover, tribal members and non-tribal members expressed a certain "sense of place" feeling when they are in a healthy or sustainable forest. Sense of

place can briefly be described as individuals having a personal relationship, emotional attachment to a specific place, possibly with historical or cultural significance (Williams & Stewart, 1998).

Tribal definitions of sustainable forest management emphasized a cultural component to the forest in their definitions. The previous participant went on to explain that he differentiated the previous definition from his personal definition as a tribal member:

> *My personal opinion of sustainable forestry is making sure that there's going to be a forest for future generations...Comparing our age to the age of trees, we're only here for a short time, and we have to make sure that it's always going to be here for their use. That's the way the Creator made it. You use what you need and you leave the rest for the next generation. Then it's their turn to take care of the resources after you're gone.*

A tribal member from Leech Lake defined sustainable forestry in this way:

> *Well, there's a lot of scenarios that go into that; socio-economic, and what else...plants, you know, exotic species... I think if you manage the forest in a sustainable way, you're taking care of the land for the people. It is protecting the health of the people in perpetuity. So you preserve the forest for future generations. Meet the needs of the people today. That's my understanding of it.*

Sustainable forestry was defined by a tribal member of White Earth as the following:

> *It means to me that we're not out there tearing up the trails, scarring up trees, and ripping everything to bits with diggers and heavy equipment. You watch over your forest, clean the dead stuff out and just leave it alone. The forests made it until we came and started chopping them down* [laughter]. *We need to try to get all the people in the community together and teach them what kind of forests they have, what kinds of plants they have, what good qualities they can get out of them, what the bad qualities of the forests are. Get everybody involved and keep those logging trucks out of there* [laughter].

Economics were deemed an essential component by non-tribal member participants to their definitions of sustainability (e.g., employment and market values for timber). As one participant expressed, "*It would include economic development and appropriate use that is beneficial and not detrimental to environment. It would include harvesting; not only preservation, but it would include wise use.*" One individual noted that there is a conflict between the values of the land for forest use versus forest use for real estate. The differentiation between tribal and non-tribal definitions appeared to be: restoration as sustainability, not production as sustainability. However, the economic components both in timber market value and employment, as well as non-timber forest products as supplemental income are recognized as being important to the viability of Leech Lake and White Earth tribal communities. Several tribal members mentioned that traditionally, they haven't had many people with business skills in their community, but they can supplement their income with: crafting; black ash basket making, sewing, beadwork for powwow garments, and making moccasins, and with hunting and harvesting; harvesting mushrooms, and berries, leeches (for fishing bait),balsam boughs, wild rice, maple syrup, birch bark.

Participants who were non-tribal members articulated that their definition of sustainable forestry depends on what the particular forest is being managed for; whether the forest is being managed for timber production or non-timber purposes. Most of the non-tribal community members interviewed appreciated the forest for its recreational opportunities as well, "*this place would be uninteresting without trees.*" Forest management at a landscape level, not just at a stand level was emphasized as being important for long-term sustainability. They stressed the need for balance between the

economic, cultural and ecological components of forest management as well as the need for successful joint management between agencies and tribal governments.

Another participant mentioned Lake Itasca State Park as the image (where the Mississippi headwaters begin) of what a sustainable forest should look like:

> *There, you would see seasonal flora, continuous flowering is an indicator of ecosystem functioning. There would be no earthworms in the forest. There would be no exotic species; spotted knapweed, aspen, curly pondweed, purple loosestrife, Eurasian milfoil. There would be no ATVs, which help spread invasive species, among other things. There would be old growth trees, and the existence of top predators.*

Tribal as well as non-tribal members emphasized a strong theme of forest restoration, stable forest stand growth, and returning the forest to its historical condition. Old growth forests were mentioned several times as an indicator of a sustainable forest. Almost all of the participants underscored the importance of bringing back white pine populations to their area and reducing aspen populations, and more of a conversion to hardwood forests. The point was made several times by all participants in the interview process that ecosystem functions are interconnected in affecting the overall health of a forest. Seasonal flora was noted as an indicator of continuous flowering indicator of ecosystem functioning. The presence of top predators and the absence of exotic species and disease were prevalent in discussions of sustainability indicators. One tribal member expanded on what indicators he considers in recognizing a sustainable forest:

> *Just by looking at what kinds of plants you have growing in it, you know. I would say a sustainable forest definitely has to be growing all the native plants back and stuff because you wouldn't have people in there smashing and killing them and it's not as competitive for the native plants to grow. My forest would be, well, we're trying to make a beautiful sugarbush out there for our kids, you know, and their kids. When all those big, overgrown poplar trees over-shading*

the young maples are gone and thinned out a little more, that's how I can tell my stand of forest is accomplished.

4.4 Native American and Non-Native American Forest Management

There were similarities in tribal and non-tribal forest management that were mentioned by all participants. For example, the interviews reveal that both are focusing more on selective harvesting and ecosystem management, and moving away from clearcut methods. However, the consensus from the interviews conducted appears to be that the tribes seem to be moving faster than non-tribal forest managers. Wetland preservation and restoration was also listed as a similar goal in both tribal and non-tribal forest management.

Although there are similarities between tribal and non-tribal forest management, a clear trend has emerged from the in-depth interviews in that the traditional knowledge handed down from generations in both White Earth and Leech Lake influences tribal forest management. The Local Indian Councils and Tribal Councils are heavily involved in forest management decisionmaking, and they ensure that forest management is in agreement with local use. Regarding the differences and similarities between management styles, one tribal member observed, "*I think it's the use of the forest. Respect. Culturally and spiritually. Reservations are more apt to look at those considerations. We try to manage it for everyone, not for just one specific reason.*" If there is an area of the forest that tribal members use, one participant for example, mentioned a black ash stand that people use for basketry, the tribe would protect that area from other uses. In the interviews, it became apparent that one difference between tribal and non tribal management was based around tribal management having a culture of

respect, communication, the manner in which tribal forestry stresses the importance of serving the community's interests.

Another significant difference participants noted between forest management styles lies in the paper bureaucracy that lies within federal and state forest management. As a result of the regulatory bureaucracy of forest management, participants remarked for example, that when state forest managers attempt to make decisions from a distance, they have no way of understanding the local dynamics of the impact their management decision would make.

Additionally, tribal members mentioned that some non-tribal forest managers are under pressure to harvest the annual allowable cut permitted. For instance, county harvest methods (where they harvest the maximum annual allowable cut) were mentioned by both White Earth and Leech Lake participants as being in contrast to non-tribal management where the primary focus in tribal forestry is on land management, not timber income. White Earth mentioned that they typically under-harvest their forests. Some non-tribal member participants from White Earth remarked on the careful timber harvests tribal forest management conducts as opposed to the seemingly careless harvesting techniques and clearcuts they have observed from local county forest management: "*we haven't seen many tribal cuts, but are pretty sure they could tell if it wasn't a county harvest.*"

Patchwork land ownership makes Leech Lake's goal of ecosystem-based management an arduous task. Complicated ownership makes it difficult to get many parties to agree to one management plan. At present, it is the goal of Leech Lake and White Earth to bring tribal, band, and allotment lands back to a productive state (with

productivity being restoring over-mature stands to younger, healthier, and more vigorous stands). For both tribal nations, one of their main goals is tribal land acquisition, in order to facilitate a more contiguous land management effort. Tribal members unanimously agreed that local forests are important to their communities, and that sustainable forest management is a goal that is being pursued.

When the tribal forestry departments have a management plan, they seek input from Tribal Council and Community Representatives. They institute management plans based on what the community's needs are in addition to the land's needs. They refrain from doing management if it is an important site to a tribal member. Leech Lake and White Earth both protect areas that are traditionally used by Band members. They are "off limits" for timber harvests and public use. For example: maple syrup camps, fish camps, medicine collection, burial sites, balsam harvests, birch bark harvests, cedar harvests, black ash harvests, sweet grass areas, wild rice areas, and other areas. One tribal member from Leech Lake contributed their thoughts on how decisions made on adjacent non-tribal lands affect tribal land:

> *I think a lot of the plants that are traditionally gathered are greatly impacted because of the timber management. The clearcutting. They need to start doing more selective cutting. Sometimes a clearcut is a surprise to a lot of people in the community because when they do bring a project to the table, a lot of the tribal members don't really understand what it is that they're saying...There's no diversity in the trees or anything after a clear cut. That's what you see occurring more and more.*

Both Leech Lake and White Earth Bands have Tribal Historical Preservation Officers (THPOs). They are responsible for knowing and protecting various cultural areas, sacred sites, and burial grounds. One of their responsibilities is to mark out sacred areas, and keep forestry operations off of them. Tribal Historic Preservation Officers are

consulted to protect cultural aspects: burial sites and sites with spiritual/cultural significance when management operations need to be done that are invasive. Often times, the THPOs who have records of the locations of these sites, are not consulted by the county or state when they break ground. A participant from White Earth added:

> *One thing that people have to realize within a reservation is that tribal land is not public land... We do issue permits for use. It doesn't cost anything. All they have to do is come in here and ask... We have no problem with it, as long as they let us know where they'll go.*

It was mentioned by several participants that despite their THPOs best efforts, trespassing and harvests do occur on off limits areas. It is difficult for one THPO to be aware of all that goes on in the tribal and adjacent lands within reservations that are the sizes of Leech Lake and White Earth.

Each tribal nation mentioned that they do indeed consult with other tribes about forest management. White Earth and Leech Lake meet with other tribes in Minnesota, Wisconsin and Michigan once a year to discuss and share current natural resource management information and issues. Furthermore, the White Earth Land Recovery Project (WELRP) meets with the Menominee Nation to discuss community forestry. Both tribal forestry departments hold quarterly meetings and regional meetings. White Earth and Leech Lake not only consult with other tribal nations regarding forest management, participants also cited consultation with the Bureau of Indian Affairs, the Department of Natural Resources, and the Society of American Foresters.

Decisions made on nearby public lands do indeed affect tribal forests. Because of the complex patchwork ownership within the reservation boundaries, there is often a lack of communication between land owners doing management. One participant provided an example:

Tribal forestry develops a management plan to do a selective harvest. When tribal forestry departments request is approved by the tribal council members, they proceed with their equipment out to the site. When they arrive at the stand, they find out that the county has already commenced logging activity in the land adjacent to the stand they were planning on harvesting. Now, they must postpone the harvest of that stand indefinitely because the bands do not want to do contiguous harvests. They are often limited in their options of where to harvest.

Participants also related that there is a lot of development with ownership of lakefront property. This puts pressure on areas which are also adjacent to tribal lands, as wealthier people from Minneapolis, St. Paul, and Fargo demand pristine land. This makes the price of lakefront land high, and access to tribal members becomes limited. This is especially problematic because trust leases are not being renewed after 25 years, meaning that after when a tribal landowner's lease is up, if they want to renew it, they must pay the current market price for that property. Many tribal members lack the financial resources to renew their leases at current property values and have no choice but to sell and lose access to that land.

4.5 Barriers and Opportunities for Participation in Forest Management Discussions

Resoundingly, participants agreed that White Earth and Leech Lake should be included and would indeed like to be a part of SFM discussions. As noted by one tribal member:

We could be partners in as far as enforcement capabilities, helping with planning, small projects, anything for environmental protection. Strategies of harvest practices out there, teaching some of the kids in schools about natural resources and stuff like that, because they're going to be the ones that will have this role in the future. We could easily help out.

However, the in-depth interviews and focus groups conducted for this study reveal several barriers to tribal participation that must be addressed in order for tribal participation in regional discussions of forest management to successfully occur, including issues of: sovereignty, trust, and respect.

Several participants emphasized the importance of other agencies treating Leech Lake and White Earth with mutual respect as autonomous sovereign nations. A tribal member from Leech Lake articulated that they are in support of "*working together, if that really means* working together." Another tribal member added their perception of previous interactions with federal agencies in that they tend to overlook tribal authority when it comes to land management and decisionmaking.

A cultural barrier in communication between tribal and non-tribal entities was perceived by tribal members from Leech Lake and White Earth in that 'mutual respect' is a fundamental element missing from meetings. A Leech Lake participant explained, "*at meetings, tribal members listen to everyone first, then add. Agencies try to run meetings at Leech Lake. They don't understand that there is a protocol that Leech Lake follows.*" It was explained for example, that at oftentimes at planning meetings run by the counties, by the time non-tribal community members have verbalized their opinions, the meeting is adjourned, and tribal members' thoughts and opinions were not heard. Additionally, participants who are tribal members noted that non-tribal agencies are perceived as trying to take control of meetings that are hosted by tribal governments.

Non-tribal agencies do not seem to understand that White Earth and Leech Lake, as sovereign nations, have tribal agendas and meetings conducted in a way that meets the standards set by the governing Tribal Council. When non-tribal agencies are perceived as

trying to 'take over' the meetings, tribal members interpret this as an insult to their government. It is imperative that non-tribal agencies recognize that tribal nations have protocols that they adhere to, just as they do. It is imperative that tribal governments are treated as sovereign nations. Additionally, as sovereign governments, tribal communities should be included in the planning process, not only input and participation processes.

Another barrier to tribal participation is the ongoing history of distrust earned between non-tribal agencies and tribal nations. During the focus groups and personal interviews, it was often mentioned that there have been times when agencies have said they had consulted with the tribes, when in fact they hadn't. Both tribes mentioned that they have had a long history of being ignored. They feel this is due to a fundamental lack of respect. One participant referenced a meeting between the band and a federal agency regarding forest management. In this meeting, the federal agency was required to take the comments of the band. But as a result of the meeting, no actions commenced based on the band's recommendations. In another example, a non-tribal recreation group proposed to the county to establish a 70 mile all-terrain vehicle trail that would run throughout the White Earth Indian Reservation. The county did not consult White Earth. When White Earth did find out about the trail, they initiated an effort to shut down the planning operations. Another tribal member from Leech Lake provided this example:

> *The county, state, doesn't consult with Leech Lake regarding harvest activities and burial issues. Leech Lake has records of where burial sites are located, and we aren't contacted. The Leech Lake Band has jurisdiction, yet non-tribal people remove markers. This is illegal.*

Yet another tribal member emphasized that, "*it is important for all things that are decided with the tribe and with the Forest Service or anyone else to be in writing or it doesn't exist.*"

With regards to participation, it's important to acknowledge that tribal communities, as sovereign nations have their own pressing needs and priorities. Some of the top priorities being those of housing, healthcare, education, and unemployment. One tribal member from Leech Lake contributed:

> *All the people here need jobs, they need an education. They've got so much on their plate; they don't have time to think about forest ecology or composition. It isn't one of the big issues, with housing, education, jobs, food. Tribal government is trying to maintain the culture, and protect the language, set it up in the school. Teach kids about traditional use plants, and traditional gathering and arts and crafts of the Ojibwe. But traditional education and environmental issues fall along the wayside when the Indian kids have to survive in America. Things are changing. The tribe's got a big responsibility. This is the last forested area around. We have all those lakes, and cultural and social, but the economy is what drives things.*

The theme of tribal priorities as a barrier to participation in local forest management discussions was echoed by several. It was reported that in the times they are invited to participate, they have not had the resources to send a tribal employee, as they are very busy due to limited funding resources. They said, "*One tribal employee does many people's jobs.*" Another tribal member contributed the following statement:

> *Well, I guess one of the big barriers is going to be the funding portion of it. Who's going to pay for what? Most of our natural resources departmental funding is for environmental protection and it comes from the Environmental Protection Agency...Some of the barriers I see is in the enforcement aspects of it. There needs to be coordination. On the reservation, people, when the state or county, or whoever is doing enforcements, will say "well, I don't have to listen because I'm non-Indian, you have no jurisdiction on me." The enforcement has to be worked out. So a major barrier on the reservation is the jurisdiction and enforcement issue. Once they get over that, and then see if all the ordinances are compatible to each other. This will be the biggest problem.*

Barriers to tribal participation in regional and national discussions of SFM are complicated. As one participant from the Chippewa National Forest commented:

> *I don't think there's a real easy answer to it...the real thing lies underneath in ecosystems and what you value in those ecosystems, how you sustain those or manage those is what makes the difference. What makes it challenging and what makes it imperative, in my opinion that the Forest Service and the Leech Lake continue to have discussions and talk about those things. It will change over time. Our forest plan talks about sustainable ecosystems on a landscape basis and that's not just watersheds, it's even bigger than that. It includes soils, and vegetation types and how you manage those. Forest management is an intermixing of things that with different land ownerships is a real challenge.*

However, in working toward sustainable forest management it is important for both tribes and non-tribal agencies to take leadership roles and work together toward solutions.

From the discussions which took place in this study, the general solution suggested to the dilemma of the lack of tribal participation is overwhelmingly to increase communications between tribal and non-tribal entities. Participants insisted that there need to be more meetings held, they should be clearly advertised in advance, and should be aimed at reaching people that care about the issues. All participants cited the need for tribal communities to be directly asked to attend, invited with advance notice, and encouraged to be present at meetings. Additionally, participants expressed a need for funding to facilitate tribal participation.

4.6 Summary

Maintaining natural resources and managing them properly is seen as central to the survival of Native American communities, their spiritual beliefs, and their cultural practices. White Earth and Leech Lake tribal governments own roughly 10% each of their

reservation lands. It is central to the survival of these communities that they acquire the land they have lost. Due to complex regional land ownership patterns, there are complex social and cultural barriers that must be bridged between tribal and non-tribal agencies if there is to be collaboration in working toward SFM. Implicit in progress toward SFM on reservation land is transparency between governmental agencies tribal governments, and private landowners. Providing funding resources for some to attend meetings, and creating inclusive public and community education initiatives will play a big role in furthering community understandings of land rights and management issues in working together toward sustainable forest management.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

This study contributes to the SFM dialogue on tribal perspectives by examining the absent perspectives of Native American voices in the dialogue on sustainable forest management. Bringing Native American viewpoints into sustainable forest management will add diversity and key missing perspectives to the national and perhaps global discussion. By increasing communication and collaboration between tribal and non-tribal resources, it becomes possible to further advance the United States' progress toward achieving SFM.

5.1 Research Conclusions

The overarching challenge to Native American forest management is the issue of economically sustaining a community while preserving tradition and cultural values (LaDuke, 1994). The results of this study and current literature support that the human element in ecosystem function is an essential factor in sustainable forest management from a Native American perspective (Gadgil et al., 1993, Kimmerer, 2000). Additionally, participants emphasized that the importance of culture and community in forests should not be overlooked. As authorities in their own local knowledge, culture, and values, individual communities in the United States have the ability develop sustainable forest management practices in their own communities based on their perspectives and values. In-depth interviews conducted for this study indicate that tribal and non-tribal forest management practices alike appear to be moving toward ecosystem management methods. Furthermore, the results of this study demonstrate that from a Native American

perspective, incorporating traditional knowledge and acknowledging the culture and values of communities should be a factor in SFM practices.

From the standpoint of tribal members who were interviewed, tribal forest management is a recent phenomenon. According to them, the governments of Leech Lake and White Earth had no input on natural resources until the mid-1990s. This is when the respective tribal nations took over management of their natural resource departments. This point in time marks their definition of the beginning of historical tribal forest management. Both tribal nations are actively involved in sustainable forest management and have Integrated Resource Management Plans written that mandate selective timber harvests and harvest rotations.

In the past, the local forests played a large role in the lives of many participants. For some, forest use consisted of primarily recreational uses. For many tribal member participants, the forests were a source of primary or supplementary income, as well as a central component to the culture in which they were brought up. Several participants report that they continue to use the forests to gather medicinal, ceremonial, and edible plants and trees, as well as forest materials for producing art and craft items. As children, they were taught by tribal elders about the usefulness of plants and trees in the forest. More so, the forest was also a place where ceremonies were held and a place for peaceful meditation. As adults, several tribal members expressed that they still use the forest for hunting and gathering, as well as spiritual purposes. However, they show concern that younger generations are not being exposed to the culture and traditions that they so heavily value. Participants explained, for instance, that the forest was where they learned

of their culture and heritage. Their children do not spend as much time in the forests as they did as children, and are therefore somewhat deprived of these important lessons.

There are many species which remain culturally significant to White Earth and Leech Lake. Important species recalled in interview conversations included, but were not limited to: white pine cedar, sweet grass, sage, tobacco, ash, sugar maple, birch, Norway pine, aspen, elm, tamarack, choke cherries, hazel nuts, plumbs, and mushrooms. One participant reported that a resource inventory project conducted by Leech Lake had discovered that roughly half of *all* species found in the area to have documented historical and present day uses.

There are volumes of knowledge to be learned from generations of Native American forest management. Traditional Ecological Knowledge (TEK) focuses on the interrelationships of human, non-human, and the physical environment through the knowledge of direct observation, interaction, and experimentation while incorporating local values and culture into management decisions that have been learned through generations of indigenous people (Berkes, 1993; DeWalt, 1994; Kloppenburg, 1991; Murdoch and Clark, 1994; Emery, 2001). TEK is a valuable source of knowledge for sustainable forest management efforts, when it is applied to the specific area it is learned from. Combining TEK with scientific knowledge in forest management applications would further sustainable forest management by applying centuries of local knowledge in addition to scientific knowledge (Gadgil et al., 1993; DeWalt, 1994; Kimmerer, 2000).

Several participants expressed that all of the plants and trees in their local forests are interconnected in ecosystem functioning, and together they compose the boreal and temperate forests that are native to their region. They stressed that without those

elements, the species composition of flora would change, and consequently, the species composition of the local fauna would change as well. Both tribal forestry departments expressed that they are charged with the responsibility of managing their forests with multiple uses in mind. They must manage the forest for sustainable timber harvests as well as for traditional and recreational uses. Leech Lake and White Earth natural resource departments communicate regularly with other tribal agencies to discuss difficulties they are having as well as sharing success stories they have in managing forests for multiple uses.

Each participant defined sustainable forest management in a different way. However, the importance of maintaining populations of forest flora and fauna while conducting responsible timber harvests was expressed by all participants. Additionally, the general definition given by tribal members provided supplemented a cultural and social component to the definition in that they consider future generations. They emphasized the importance of managing the forest with the community's cultures and values in mind. As one participant who was a tribal member noted, "I think if you manage the forest in a sustainable way, you're taking care of the land for the people." Moreover, non-tribal members stressed the importance of striking a balance between social, economic, and ecological components of sustainable forest management. All participants emphasized a goal of forest restoration, and stable forest stand populations. Non-tribal members mentioned that they would like to see the forests returned to pre-settlement conditions. Indicators of sustainable forests mentioned by participants included: old growth forests, white pine forests, and healthy native flora and fauna populations.

While tribal and non-tribal forest management agencies appear to be moving toward SFM, there are differences between their management styles. The results of this study demonstrate that traditional knowledge greatly influences tribal forest management practices. Participants additionally pointed out that White Earth and Leech Lake tribal foresters take local culture and use into consideration in their forest management unlike non-tribal forest managers in the area. The tribal forestry departments seek input from the Tribal Councils of White Earth and Leech Lake to ensure that forest management plans frame forest management based on the needs of the community and the land. The central difference between tribal and non-tribal forest management styles lies within the paper trails and red tape which remain in agency bureaucracy. Participants report that the process of bureaucratic forest management removes forest managers from the local community, and in doing so, their understanding of local community dynamics is greatly inhibited. Participants also remarked that non-tribal forest management agencies are under economic pressure to harvest the maximum allowable cut of timber from their lands within the reservation boundaries, whereas tribal forestry harvests far less timber.

In this study, Native American participants all expressed an interest and willingness to participate in regional and national discussions of SFM. Participants suggested possible partnerships in regulation enforcement, management planning, and environmental protection. Unanimously, participants admitted that there are barriers which have prevented tribal participation in the past, and such barriers must be removed if successful participation and partnerships are to occur. The barriers most frequently mentioned were issues of sovereignty, trust, and respect (Kimmerer, 2000; Bengston, 2004). In the interest of collaboration between tribal and non-tribal natural resource

managers, communities, and governments, it is imperative that tribal nations be treated as sovereign nations. For example, as sovereign governments, tribal nations should be included in the *planning* process, not only the input process. There are cultural differences in how the White Earth and Leech Lake nations hold meetings and conferences, and non-tribal guests need to be aware of and respect their protocols, just as tribal nations respect non-tribal protocols. Building a relationship of trust and respect based on non-tribal deference to the sovereignty of tribal nations would be a promising beginning to potential collaborative partnerships.

5.2 Research Limitations

Native American perceptions on sustainable forest practices cannot be generalized from this study to other populations. Communities will always differ in their values, concerns, and priorities regarding natural resource management issues (Jostad et al., 1996; McAvoy et al., 2000; Bengston, 2004). The tribal nations who participated in this study are historically and geographically unique in their circumstances. While the results of this study are not generalizable, valuable information was obtained that may be of interest to other communities in the United States that may also be working toward increasing the diversity of voices in local discussions sustainable forest management. Stakeholders from those communities will be the best decisionmakers as to whether this study holds relevance and application for their own communities.

5.3 Management Implications

Although patchwork land ownership makes the goal of ecosystem-based management an arduous task, it creates a compelling case that advocates the necessity of

consistent and clear communication between natural resource managers. In light of this, forest managers should strongly consider the value of collaboration and communication which tribal member participants have endorsed between tribal nations and some non-tribal agencies in sharing success stories as well as challenges they face.

As demonstrated by the focus groups and personal interviews conducted in this study, the importance of local forests in their communities and sustainable forest management as a goal is valued because it includes the human and social element in sustainable forest management. The participants in this study have stressed the importance of understanding the social and cultural values each community holds relating to their forests when decisions need to be made regarding forests in which many stakeholders hold a vested interest in forest management applications. More frequent and more inclusive management discussions are needed where Native American voices can be heard and taken into account. Resource managers can use the results of this study to gain a deeper understanding of the importance of considering the dynamics of individual communities and culture in forest management applications.

5.4 Future Directions

The results of this study indicate the need for further study and communications with diverse community members as well as finding ways to get younger generations involved. It would be interesting to learn whether other tribal nations would find similar definitions of SFM, attitudes and values regarding sustainable forest management. Furthermore, studies could be conducted in partnerships with Native American communities to find out more specific information. Future research in participation with tribal nations regarding regional and national discussions about SFM would benefit the

goal of furthering SFM by working toward closing the communication gap that exists between tribal and non-tribal agencies. Efforts in sustainable forest management would be furthered by bringing in a greater diversity of viewpoints into the conversation.

5.5 Synopsis

In the Native American tradition, the spoken word is powerful because it is understood to be the breath of life (Cajete, 1994). Words have the ability to reveal worldviews to their root. In Native American languages, the word for "forest" is equivalent to the word "home" (Kimmerer, 2000). The way we participate in working toward SFM directly relates to the way individuals perceive the "forest", either as a natural resource, to be manipulated for human benefit, or as a valued place in one's community.

This study brings to light the lack of input Native American nations have had in discussions of sustainable forest management and what their definition of "sustainable" is. Native American communities have a continued history of being ignored and marginalized by government agencies and local communities.

The aim of this research is not only to provide more of a voice for tribal perspectives, but to also underscore the importance of removing communication barriers between tribal and non-tribal entities. The goal of increasing communication and cultural understanding between tribal and non-tribal forest managers must be met under conditions of earned trust on all fronts.

APPENDIX A: REVISED MONTREAL PROCESS CRITERIA AND INDICATORS

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Criterion 1: Conservation of biological diversity

1.1 Ecosystem diversity

1 (1.1.a) Area and percent of forest by forest ecosystem type, successional stage, age class, and forest ownership or tenure

2 (1.1.b) Area and percent of forest in protected areas by forest ecosystem type, and by age class or successional stage

3 (1.1.c) Fragmentation of forests

1.2 Species diversity

4 (1.2.a) Number of native forest associated species

5 (1.2.b) Number and status of native forest associated species at risk, as determined by legislation or scientific assessment

6 (1.2.c) Status of *in situ* and *ex situ* efforts focused on conservation of species diversity

1.3 Genetic diversity

7 (1.3.a) Number and geographic distribution of forest associated species at risk of losing genetic variation and locally adapted genotypes

8 (1.3.b) Population levels of selected representative forest associated species to describe genetic diversity

9 (1.3.c) Status of *in situ* and *ex situ* efforts focused on conservation of genetic diversity

Criterion 2: Maintenance of productive capacity of forest ecosystems

10 (2.a) Area and percent of forest land and net area of forest land available for wood production

11 (2.b) Total growing stock and annual increment of both merchantable and non-merchantable tree species in forests available for wood production

12 (2.c) Area, percent, and growing stock of plantations of native and exotic species

13 (2.d) Annual harvest of wood products by volume and as a percentage of net growth or sustained yield

14 (2.e) Annual harvest of non-wood forest products

Criterion 3: Maintenance of ecosystem health and vitality

15 (3.a) Area and percent of forest affected by biotic processes and agents (e.g. insects, disease, invasive alien species) beyond reference conditions

16 (3.b) Area and percent of forest affected by abiotic agents (e.g. fire, storm, land clearance) beyond reference conditions

Criterion 4: Conservation and maintenance of soil and water resources

4.1 Protective function

17 (4.1.a) Area and percent of forest whose designation or land management focus is the protection of soil or water resources

4.2 Soil

18 (4.2.a) Proportion of forest management activities (e.g. site preparation, harvesting) that meet best management practices or other relevant legislation to protect soil resources

19 (4.2.b) Area and percent of forest land with significant soil degradation

4.3 Water

20 (4.3.a) Proportion of forest management activities that meet best management practices, or other relevant legislation, to protect water related resources such as riparian zones, water quality, quantity and flow regulation

21 (4.3.b) Area and percent of water bodies, or stream length, in forest areas with significant change in physical, chemical or biological properties from reference conditions

Criterion 5: Maintenance of forest contribution to global carbon cycles

22 (5.a) Total forest ecosystem carbon pools and fluxes

23 (5.b) Total forest product carbon pools and fluxes

24 (5.c) Avoided fossil fuel carbon emissions by using forest biomass for energy

Criterion 6: Maintenance and enhancement of long term multiple socio-economic benefits to meet the needs of societies

6.1 Production and consumption

25 (6.1.a) Value and volume of wood and wood products production, including primary and secondary processing

26 (6.1.b) Value of non-wood forest products produced or collected

27 (6.1.c) Revenue from forest based environmental services

28 (6.1.d) Total and per capita consumption of wood and wood products in round wood equivalents

29 (6.1.e) Total and per capita consumption of non-wood products

30 (6.1.f) Value and volume in round wood equivalents of exports and imports of wood products

31 (6.1.g) Value of exports and imports of non-wood products

32 (6.1.h) Exports as a share of wood and wood products production and imports as a share of wood and wood products consumption

33 (6.1.i) Recovery or recycling of forest products as a percent of total forest products consumption

6.2 Investment in the forest sector

34 (6.2.a) Value of capital investment and annual expenditure in forest management, wood and non-wood product industries, forest-based environmental services, recreation and tourism

35 (6.2.b) Annual investment and expenditure in forest-related research, extension and development, and education

6.3 Employment and community needs

36 (6.3.a) Employment in the forest sector

37 (6.3.b) Average wage rates, annual average income and annual injury rates in major forest employment categories

38 (6.3.c) Resilience of forest-dependent communities

39 (6.3.d) Area and percent of forests used for subsistence purposes

40 (6.3.e) Distribution of revenues derived from forest management

6.4 Recreation and tourism

41 (6.4.a) Area and percent of forests available and/or managed for public recreation and tourism

42 (6.4.b) Number, type, and geographic distribution of visits attributed to recreation and tourism and related to facilities available

6.5 Cultural, social and spiritual needs and values

43 (6.5.a) Area and percent of forests managed primarily to protect the range of cultural, social and spiritual needs and values

44 (6.5.b) The importance of forests to people

Criterion 7: Legal, Institutional, and Economic Framework

48 Clarifies property rights, provides for appropriate land tenure arrangements, recognizes customary and traditional rights of indigenous peoples, and provides a means for resolving property disputes by due process.

49 Provides for periodic forest-related planning, assessment, and policy review that recognizes the range of forest values, including coordination with relevant sectors

50 Provides opportunities for public participation in public policy and decision making related to forests and public access to information

51 Encourages best practice codes for forests

52 Provides for the management of forests to conserve special environmental, cultural, social, and/or scientific values

53 Provide for public involvement activities and public education, awareness, and extension programs, and make available forest-related information

54 Undertake and implement periodic forest-related planning, assessment, and policy review, including cross-sectoral planning and coordination

55 Design and maintain human resource skills across relevant disciplines

Source:
http://www.sustainableforests.net/docs/Summary%20of%20Indicators%20and%20Refinements.pdf

APPENDIX B: INTERVIEW CONSENT FORM

APPENDIX B: INTERVIEW CONSENT FORM

Michigan State University Approved Consent Form

Description

The objectives of this study are to achieve a greater understanding among regional stakeholders of opportunities and challenges associated with the goal of sustainable forests on tribal lands in the context of each region's unique environmental, social and economic situation. We feel the best way to accomplish this objective is to have open discussions with you on the topic of forest sustainability.

Risks and Benefits

There are no serious risks to you from participating in this discussion.

A major benefit to you is that what we learn from you will help guide on-going regional dialogues about the goal of sustainable forestry in relation to tribal nations, where achieving sustainable forestry is a major goal. A second benefit is that your ideas and suggestions will help improve the means by which government agencies communicate with citizens regarding natural resource policies and plans. An additional benefit is that this participation will be of a more personal nature. By listening to how other individuals define sustainable forests, you may develop a fuller appreciation of the similarities and differences between your views and those of others. This awareness may prove valuable as you continue your involvement in community development and well-being.

Time Commitment, Cost and Payments

Our discussion time will be approximately 45 minutes to an hour. There are no other costs to you for helping us with this study. The grant for this study does not permit us to offer you any payment for your participation.

Confidentiality

Although we will record our discussion, we will not put your name on the tape or transcript. The only information that will be on the tape will be a code number which will be stored in a separate location from the interview material. Your privacy will be protected to the maximum extent allowable by law.

Right to Withdraw

Participation in this study is voluntary. You may choose not to participate at all. Furthermore, you may refuse to answer certain questions. If you begin, you may discontinue your participation at any time.

Contact Information

If you have questions about the study, contact Maureen McDonough at 119 Natural Resources Building, Michigan State University, East Lansing, MI 48824, phone: (517)442-2293, e-mail: mcdono10@msu.edu. If you have questions or concerns about your rights as a research participant, please feel free to contact—anonymously, if you wish—Peter Vasilenko, Ph.D., Michigan State University's Chair of University Committee on Research Involving Human Subjects by phone: (517)355-2180, fax: (517)432-4503, e-mail: ucrihs@msu.edu, mail: 202 Olds Hall, East Lansing, MI 48824.

Statement of Consent:

I voluntarily agree to participate in this study.

Signature Date

I also consent to be recorded for this study.

Signature Date

Signature of Investigator Date

APPENDIX C: INTERVIEW CONSENT FORM FOR THE LEECH LAKE BAND OF OJIBWE

APPENDIX C: INTERVIEW CONSENT FORM FOR THE LEECH LAKE BAND OF OJIBWE

You are invited to be involved in the "Sustainable Forests and Tribal Nations in the Upper Mississippi Watershed", interviewing to be conducted by Michigan State University.

This study is a cooperative effort of the Leech Lake Band of Ojibwe Division of Resource Management's (DRM) Tribal Historic Preservation Office.

We estimate the interview will take about 30-45 minutes to complete. The records of this interview will be kept confidential. Any future materials developed regarding projects will not list any individual's identity.

Your decision whether or not to participate will not affect your current or future relationship with the Leech Lake Band or Michigan State University. If you decide to participate, you are free to withdraw at any time without affecting those relationships.

If you have any questions about this study please contact Gina Papasodora, Tribal Historic Preservation Officer at the Leech Lake Band at (218)335-2940 or 1-800-422-3942.

Statement of Consent:

I have read the above information. I have asked questions and have received answers. I consent to participate in this interview of information.

Signature of Interviewee_____Date_____

Signature of Interviewer_____Date_____

APPENDIX D: PARTICIPANT DEMOGRAPHICS

APPENDIX D: PARTICIPANT DEMOGRAPHICS

Table 1. White Earth (WE) Interviews

Interview Type	Participant Affiliation	Tribal Member
Personal interview: One participant	WE Land Recovery Project	Yes
Personal interview: One participant	WE Natural Resources Department	Yes
Personal interview: One participant	WE Economic Development Department	No
Personal interview: One participant	WE Historic Preservation Department	No
Focus Group: Four participants	Community resident of WE Indian Reservation	No
	Community resident of WE Indian Reservation	No
	Community resident of WE Indian Reservation	No
	Community resident of WE Indian Reservation	No
Focus Group: Five Participants	WE Forestry Department	Yes
	WE Forestry Department	Yes
	WE Forestry Department	Yes
	WE Forestry Department	No
	WE Forestry Department	No
13 Total Participants		5 Total Tribal Member Participants

Table 2. Leech Lake (LL) Interviews

Interview Type	Participant Affiliation	Tribal Member
Personal interview: One participant	LL Tribal Historic Preservation Department	Yes
Focus Group: Nine Participants	LL Tribal Historic Preservation Department	Yes
	LL Division of Resource Management	Yes
	LL Division of Resource Management	Yes
	LL Division of Resource Management	Yes
	LL Division of Resource Management	Yes
	LL Division of Resource Management	No
	LL Division of Resource Management	No
	LL Division of Resource Management	No
	US Forest Service-Chippewa National Forest	No
10 Total Participants		6 Total Tribal Member Participants

APPENDIX E: INTERVIEW QUESTIONS

APPENDIX E: INTERVIEW QUESTIONS

1. Think about when you were a child. How did you use the forest?

2. How do you use the forest now?

3. In the past, how did this Tribal Nation manage (take care of) the forest? Has this changed?

4. How does this community manage the forest currently?

5. Does your community's traditional knowledge of the forest influence forest management?

6. What plants and trees found in the forests nearby are considered spiritually or culturally significant to your community?

7. Are you aware of any conservation initiatives associated with these species?

8. Are you familiar with the term "sustainable forestry"? In your mind, what is it?

9. What are the indicators you would look for to determine if sustainable forestry was accomplished?

10. In your opinion, what are the major differences between tribal and non-tribal management of forests? Similarities?

11. How do decisions made on nearby public lands affect your forests? How are these decisions made? Is the Tribe consulted?

12. Do you consult with other tribes about forest management? Explain.

13. Do you consult with non-tribal resources about forest management? Explain.

14. Many agencies and groups have come together in the Upper Mississippi Watershed to form a partnership on sustainable forestry in the region. What should be the tribe's role in these discussions? Do you see barriers to tribal participation in these discussions? If yes, how might these be overcome?

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