

## 3.1 INTRODUCTION TO AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Chapter 3 describes the existing physical, biological, and social resources of the environment that may be affected by the alternatives presented in Chapter 2. It also presents the effects that the alternatives may have on those resources. The discussion of affected environment and environmental effects was combined into one chapter to provide a clear picture of what the resources are and what could happen to them under the different alternatives. The analysis of environmental effects provides the basis for the comparison of alternatives that appears at the end of Chapter 2.

Section 3.1 introduces the context in which the alternatives are analyzed. This section has five parts:

**Social and Economic Setting** – Gives a brief overview of the key social and economic components of the area.

**Physical and Biological Setting** – Gives a brief overview of the key physical and biological components of the area.

**Ecosystem Management** – Presents the ecosystem management framework that was used in the analysis of resources and issues in Chapter 3. This section also introduces the reader to key components and concepts of the framework.

**Analysis** – Outlines the different scales and units used in the analysis. Some methods used in the analysis are also summarized.

**Chapter Organization** – Describes how the affected environment and environmental effects are presented in Chapter 3.

### 3.1.1 Social and Economic Setting

The Chippewa and Superior NFs have an interdependent and complex relationship with the lives of local people and local economies. Outdoor recreation, wilderness areas, exceptional scenery, and associated natural resource economic opportunities provide a backdrop for northern Minnesota communities.

The Chippewa and Superior NFs are located in the northern third of the State of Minnesota. The Chippewa NF is primarily in Beltrami, Itasca, and Cass Counties (Figure INT-1). The Superior NF is primarily in Lake, Cook, St. Louis, and Koochiching Counties (Figure INT-2). The external boundaries of the Leech Lake Reservation and Chippewa NF overlap each other. The Bois Forte, Grand Portage, and Fond du Lac Indian Reservations are adjacent to the Superior NF.

### Historical Setting

The National Forests in northern Minnesota were created on land once held by the Ojibwe (Chippewa, Anishinabe) and countless prior generations of American Indian peoples over at least 11 thousand years. Although their land base was drastically reduced under treaties with the United States government in the mid-19<sup>th</sup> century and subsequent federal laws and executive orders, the Ojibwe and their traditions and land uses continue today on lands within and surrounding the Chippewa and Superior NFs.

The Chippewa and Superior NFs were created in the early 20<sup>th</sup> century while Euro-American settlement

grew throughout Minnesota. Opportunities to use land for industrial logging, agriculture, and mining provided impetus to Euro-Americans to move northward by the thousands.

### **Chippewa NF History**

The forest reserve that became the Chippewa National Forest was established by law in 1902 as a means of resolving competing social, political, and economic interests that would shape the future of north-central Minnesota. The heart of the debate leading to the legislation revolved around the fate of lands, timber, and of native peoples within the reservation of the Leech Lake Band of Ojibwe.

Prior to this era, the treaty of 1855 between the Ojibwe and the United States ceded millions of acres to the United States and created reserved lands for the Ojibwe inside what is now known as the Leech Lake Reservation. Toward the end of the 19<sup>th</sup> century, however, Indian policy of the United States government focused on assimilating Indians into the larger Euroamerican society and eliminating tribal ownership.

The Dawes Act of 1887 and Nelson Act of 1889 initiated a process that would “open” nearly all of the Ojibwe reservations in Minnesota to sale. Under these Acts, individual Ojibwe band members received small land allotments on which they were to live and farm, while the remaining unallotted lands within the reservations were ceded to the United States to be sold for logging or Euroamerican settlement. Proceeds from the sales were to be held in trust by the federal government for the benefit of the Ojibwe people.

The early sales of the timber from these unallotted lands were poorly regulated and the corrupt practices of timber companies resulted in well-documented cases of fraud. As these practices became revealed publicly, prominent citizens and conservation-oriented groups brought enough political pressure to bear to halt the sales until reforms could be made that were palatable to a spectrum of interests ranging from the timber industry, to preservationists, to those non-Indians concerned primarily with the welfare of the Ojibwe.

Compromise was reached in 1902 in the form of an amendment to the Nelson Act to create a forest reserve

from the remaining unallotted lands of the Leech Lake Reservation. The 1902 act established that large blocks of land were to be publicly managed such that pine timber was to be offered for sale at set minimum prices and scaled by a standard method. The Act also contained provision for reserving seed trees and reducing the risk of wildfire. Subsequent legislation beginning in 1908 established National Forest status, and further specified for what the Ojibwe were to be compensated.

The expectation that the Ojibwe would, in one generation, turn from centuries old traditions to undertake market-based farming in the midst of poverty and marginal agricultural lands proved to be untenable. The Ojibwe also did not fully understand nor support provisions of the Nelson Act regarding the creation of the forest reserve that would become the Chippewa National Forest. Compensation to the Ojibwe for creation of the National Forest was not made until 1923.

In decades following these events, the Ojibwe have petitioned the United States and initiated court actions to regain control of lands or receive additional payment for what in their view was an unfair compensation. Today many Ojibwe believe they should be owners of the lands and are strongly committed to maintaining their sovereign status and rights to hunt, fish, and gather on the lands as guaranteed by treaty.

The policy of forced assimilation pursued by the United States in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries were economically and socially disastrous for the Ojibwe. It not only failed to improve the welfare of the Ojibwe, it increased poverty and virtually eliminated the tribal land base. Previous policies were redirected to some extent with the Indian Reorganization Act of 1934 that allowed for the establishment of tribal governments and the return of certain lands to tribal ownership. Considering the upheavals created as a result of Euroamerican settlement and ill-fated government policies, the extent to which Ojibwe culture has survived and grown is a testament to its strength.

Today, as in 1902, many of the same social, political, and economic forces compete for influence on the use of public lands and resources of the north-central Minnesota, including the Chippewa National Forest.

The Leech Lake Ojibwe are well aware of these competing forces and actively advocate for further recognition of rights to lands and resources vital to a flourishing Ojibwe culture.

In 1908, the Forest Reserve became the Minnesota National Forest, the first National Forest established east of the Mississippi River. The name was later changed to the Chippewa National Forest to recognize and honor the original inhabitants. During the early decades, the Forest was managed to provide timber and other resources, provide protection from wildfire, and offer opportunities for recreation. These and other functions continue to the present.

During the mid-1930s, the size of the Forest expanded dramatically with the addition of the North and South Purchase Units. These units were formed primarily from the purchase of hundreds of parcels of land that were homesteads, which were failing or forfeited during the economic and farming crises associated with the Great Depression.

The Forest boundary now encompasses about 1.6 million acres, with approximately 660,000 acres managed by the Chippewa National Forest. Approximately 44% of the Chippewa NF land is within the Leech Lake Indian Reservation boundary. The vast majority of the area is forested, with water, non-forested wetlands, and shrublands also covering much of the area. Only one percent is occupied by land uses such as road and utility corridors, summer homes, resorts, and pastures.

Residential and commercial development, farms, and wild rice paddies occurring on the private land make up 20 percent of the acres within the Forest boundary (Figure INT-3). The Forest overlaps with the Reservation of the Leech Lake Band of Ojibwe; State of Minnesota land; parts of Beltrami, Cass, and Itasca counties; and numerous township and municipal jurisdictions. State, county, and tribal land makes up 40 percent of the area within the Forest boundary. This checkerboard ownership leads to coordination of land management activities with other landowners. For further discussion of American Indian Tribes, please see “Tribal Rights and Interests” section below.

### **Superior NF History**

The Superior National Forest was established in 1909

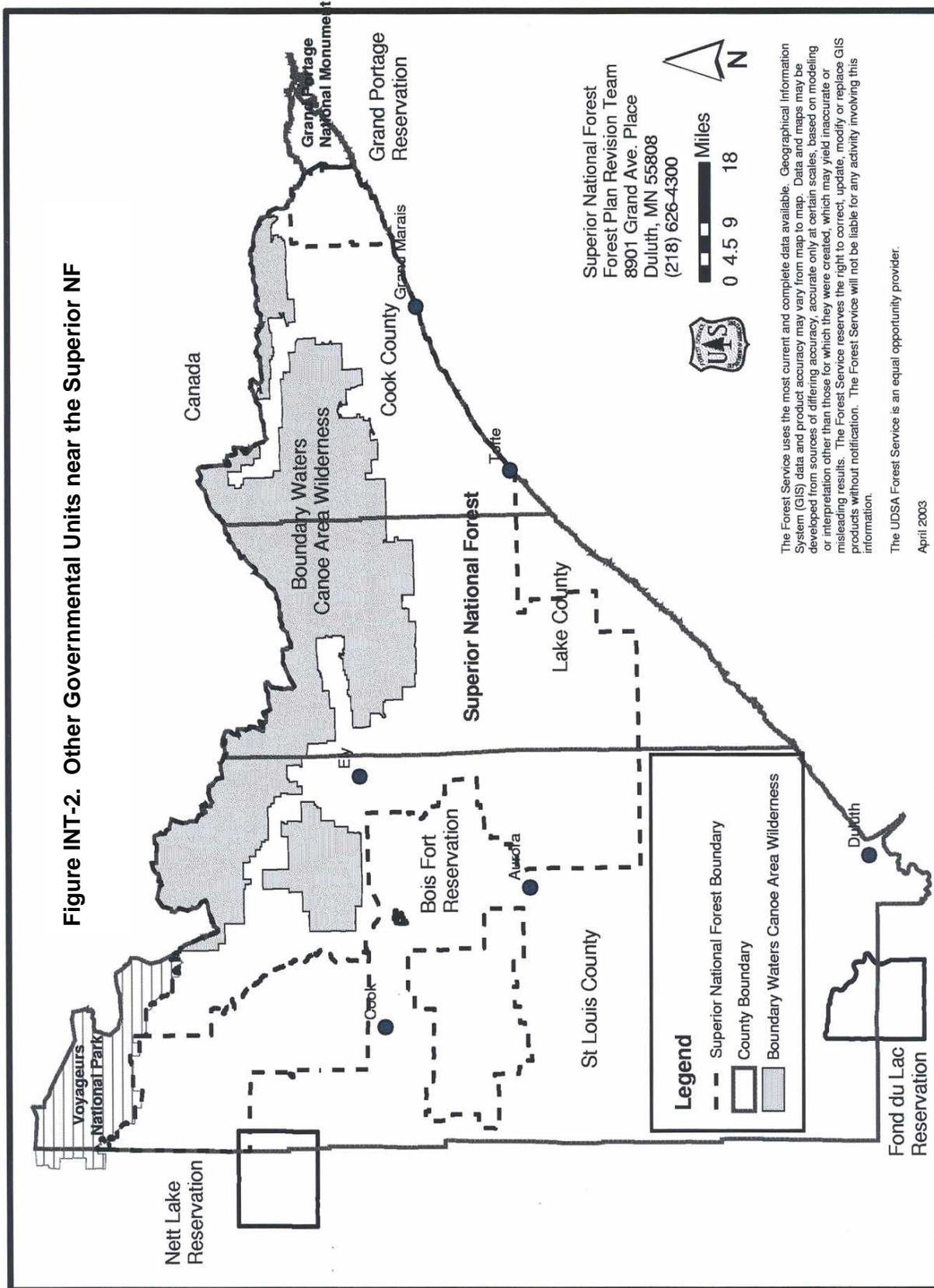
by proclamation of President Theodore Roosevelt and was expanded by a series of acquisitions from 1911 to 1936. The Forest name was derived from its proximity to Lake Superior. In 1926, Secretary William Jardine set aside 1,000 square miles as a canoe recreation area. Purchase of resorts and private lands was authorized in 1948 and 1956. The Wilderness Act of 1964 and the BWCA Wilderness Act (1978) limited authorized uses and expanded the BWCAW. Recreation and natural resource extraction continue to be important activities in the Superior National Forest.

The current Forest boundary encompasses 3.9 million acres. About two-thirds of this area is under Forest management. It includes the BWCAW, over 1 million acres in size, which attracts nearly 300,000 visits each year to its many lakes.

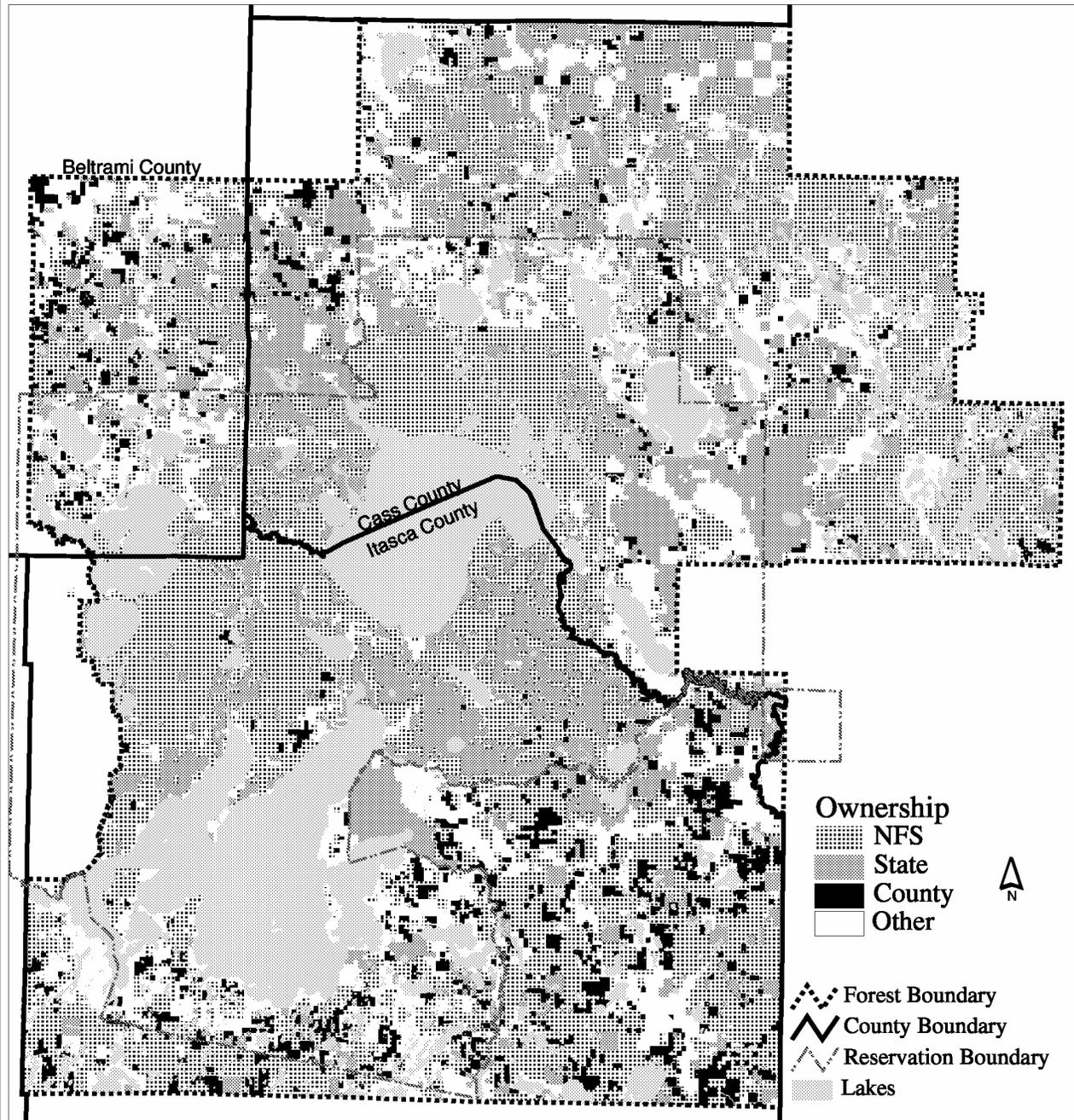
The vast majority of the area is forested, with wetlands, lakes, and rivers also covering much of the area. Only one percent is occupied by land uses such as road and utility corridors, summer homes, resorts, and pastures. Within the Superior NF boundary, the Forest Service manages 56 percent and State and county governments and private owners manage the remaining 44 percent (Figure INT-4). The Superior NF is a majority landowner and land manager in Cook and Lake counties and a minority landowner and land manager in St. Louis County. Non-Forest land uses include residential, commercial, and recreational. Three Ojibwe reservations are adjacent to the Forest: Bois Forte, Fond du Lac, and Grand Portage.



Figure INT-2. Other Governmental Units near the Superior NF



**Figure INT-3  
Chippewa National Forest Ownership**



The Forest Service uses the most current and complete data available. Geographical Information System (GIS) data and product accuracy may vary from map to map. Data and maps may be developed from sources of differing accuracy, accurate only at certain scales, based on modeling or interpretation other than those for which they were created, which may yield inaccurate or misleading results. The Forest Service reserves the right to correct, update, modify, or replace GIS products without notification. The Forest Service will not be liable for any activity involving this information. This map shows all ownerships within the National Forest boundaries. However, management direction would only apply to land managed by the Forest Service.

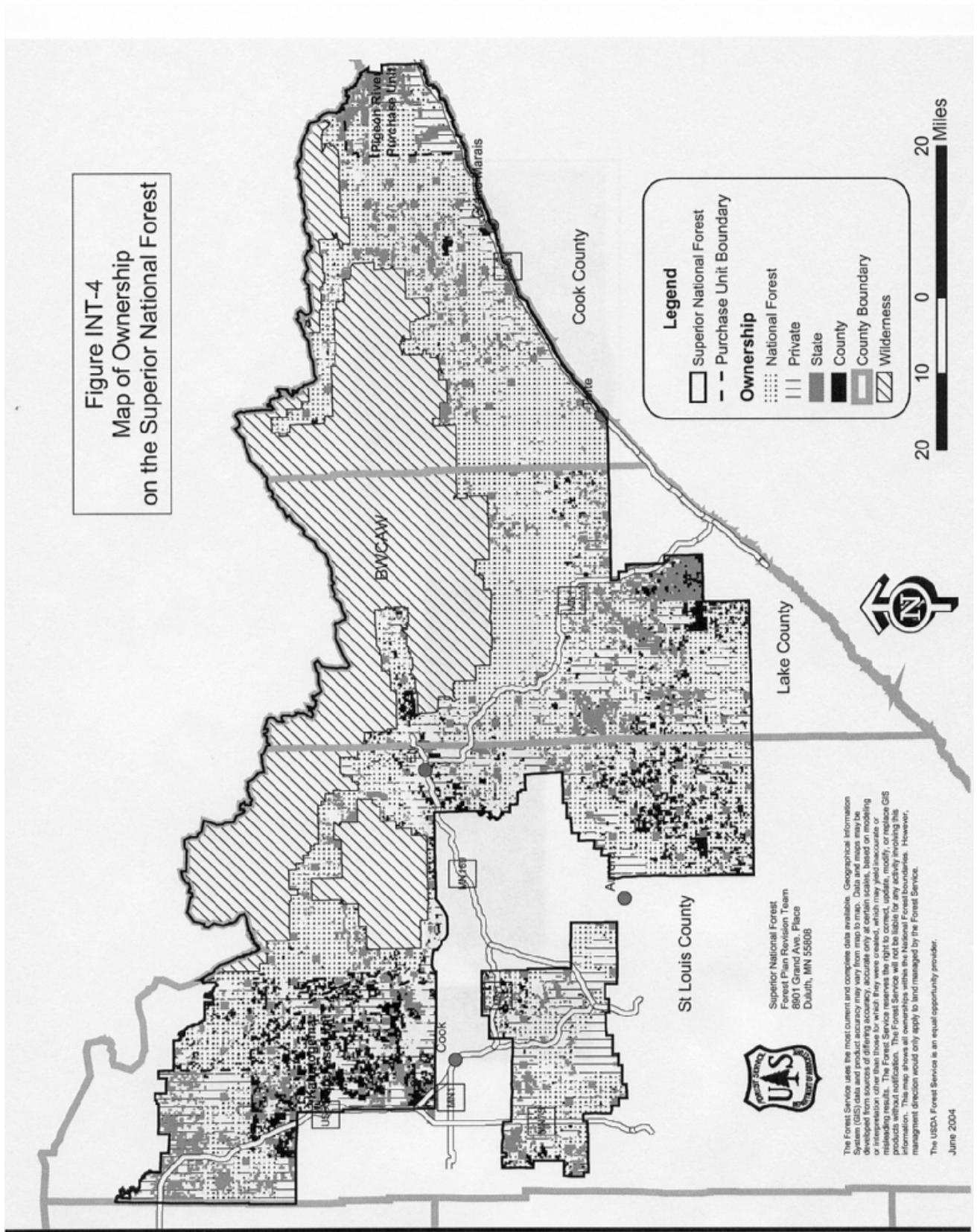
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## Northern Minnesota

The social and economic environment is comprised of the people living in and adjacent to the Chippewa and Superior NFs. It includes the lifestyles and attitudes of people toward the area's resources and the ways in which these resources are used. The economic environment is tied to the many natural resources within the Forests, including vegetation, scenery, lakes, trails, campgrounds, roads, and wildlife.

These forest resources, including the openness and solitude offered by the National Forest System, will become increasingly important to local, regional and national populations as the country becomes more urbanized and public space becomes more scarce. The resources of the Forests play an important social and economic role now and will continue to do so in the future for many people.

There are very diverse social and economic settings within and adjacent to the Forests, such as urban and rural landscape living conditions; occupations; education; and family compositions. The social and economic setting that an individual lives within affects that person's interpretation of the effect of management activities. For instance, a management decision made as a result of Forest Plan direction that changes the landscape character around Ely would likely be viewed differently if one was a business owner in Ely or a once a year visitor to the area. Because there is such diversity of interpretation, analyzing impacts based on the larger social and economic conditions and trends is difficult for all involved in the process of Forest Plan revision, including forest managers, individuals, organizations, other governmental agencies, and tribal governments.

### Economic Condition

The Ojibwe developed a deep and rich cultural legacy within the history of northern Minnesota going back many hundreds of years. The Eastern Woodland culture supported themselves with fishing, farming, manufacturing, medicine and hunting. The Ojibwe people were highly regarded for their leather and metal working, excellent canoe and lodge building, prowess with large open water navigation, food gathering and cultivation skills and were able to trade with other

bands and tribes, including Europeans as time passed.

Mining and logging were the first industries in the area. The Vermilion Gold Rush of 1855-1866, the discovery of iron ore on the Vermilion Range, and the development of mines and permanent settlements in Soudan and Ely in the late 1880s and early 1890s brought the first large influx of prospectors and settlers into the area.

Extensive logging also began in the 1880s, with mills at Duluth, Virginia, Bemidji, Cass Lake, and other towns. Duluth became the center of Minnesota's white pine lumber industry.

Today in Minnesota, mining is heavily concentrated in Itasca, St. Louis, and Lake Counties, and it employs less than one percent of the State's workforce. The current wood products industry (manufacturing) accounts for just over 8 percent of the total employment in the three county area of the Chippewa NF and just under 4 percent of the total employment on the Superior NF (Arrowhead Regional Development Commission 2002b, Headwaters Regional Development Council 2002c).

The local timber base remains the most important reason for the timber industry's development and continuation in the region. Prior to 1993, public timberland was the primary supplier to Minnesota's wood industries. In 1994, private individuals became the primary suppliers for fiber in Minnesota (Northeast Regional Landscape Monitoring and Assessment Working Group 1999).

Private logging from the late 1800s to the 1920s cleared forests in much of northern Minnesota until the Great Depression hit in the 1930s. Opening up the Chippewa and Superior NFs through mining and timber harvesting provided the opportunity for people to explore and enjoy the area. In the 1930s as logging declined, recreational use of the land increased. Local residents, and people traveling from the Twin Cities, Duluth, Fargo, and other locations now seek recreational opportunities such as hunting, fishing, camping, snowmobiling, and boating that are provided by the Forests.

Tourism also remains an important part of the northern Minnesota economy. It is hard to determine what part of the tourism industry can be attributed to the natural

amenities offered in the area in and around the Forests. However, the presence of large tracts of undeveloped, usually public, land with its lakes and forests creates the character of the region and are an important draw for visitors.

Employment within the tourism industry is measured by accommodation employment. Gross sales for lodging places are also used as an indicator of trends within the tourism industry. The area in and around the Superior NF has had significant growth in employment between 1990 and 2000 (80.2 percent). Lodging receipts from the area in and around the Chippewa NF showed a 20.7 percent increase between 1996 to 1998, a significant increase in revenue.

The unemployment rate of northern Minnesota has always been higher than the State average. In the 1980s, parts of the area had double-digit unemployment. Since then, employment has improved somewhat in northern Minnesota due to callbacks in mining, expansions in the wood products industry, tourism, service industries such as health care and education, and new business startups.

There are many wood product companies being acquired by international firms. These recent acquisitions have resulted in the loss of more than 1,000 positions directly related to the industry over northern Minnesota within the last two years.

Although unemployment rates remained high in the areas in and around the National Forests, relative to those of the State during the 1990's, they experienced an overall decline between 1990 and 2001.

### **Social Condition**

People use the Chippewa and Superior NFs for a variety of purposes. These uses fall within three broad categories:

- Recreation
- Gathering of forest products and extraction of resources from the Forest for economic gain
- American Indians who use the Forests and its resources for traditional purposes

These activities contribute to individuals and communities lifestyles and sense of place. Over 90 percent of the people who visit the Chippewa NF do so for recreational purposes only (Headwaters Regional

Development Council 2002c). Wildlife viewing, sight seeing, and lake use are the most popular recreation activities in the Forests. Approximately five to 13 percent of people that visit the Forest (Headwaters Regional Development Council 2002c) indicated direct reliance on the Forests for a portion of their livelihood.

American Indians use the Forests differently than the general population. Many rely on the Forests to provide resources for traditional practices, and a greater percentage of the population rely on its resources for a portion of their livelihood. Managing the Forests to protect their traditional way of life and still provide economic benefits is an expectation of many people.

There is a difference between local residents and non-local visitors in the priority of functions the Forests should provide. Generally, both user groups value Forests for recreation opportunities, as a place to preserve habitat for wildlife and the protection it provides for water resources, but non-local visitors place a higher value on these two functions. Local residents place a higher value on the Forest and utilization of the timber resource. Non-local visitors place less value on the harvest of timber as an acceptable use of the Forest resources. They also place a higher value on the large tracts of public land.

There are also many people who are seasonal residents who generally stay in a home or cabin in the snow-free season and move to southern environs for the cold, snowy months. This population has a considerable affect on the area's social and economic character. The temporary increase in population results in more people using the roads, lakes, trail, parks, stores, health care, and other community provided services in the area. The bulk of the seasonal residential population have a large amount of available leisure time, placing a higher than normal demand for service related businesses and recreationally related activities. The summer population nearly doubles in northern Minnesota due to the influx of seasonal residents and tourists.

The State of Minnesota's population increase between 1990 and 2000 was 12.4 percent, a larger growth percentage than northern Minnesota. Northern Minnesota counties show a range of growth trends over the past decade, with some losing greater than

five percent of the population to some counties gaining more than 25 percent. Research indicates that retirees and the boom in recreation and vacation homes are contributing to the population growth in northern Minnesota. (Arrowhead Regional Development Commission 2002 b, Headwaters Regional Development Council 2002c)

### Chippewa NF Social and Economic Condition

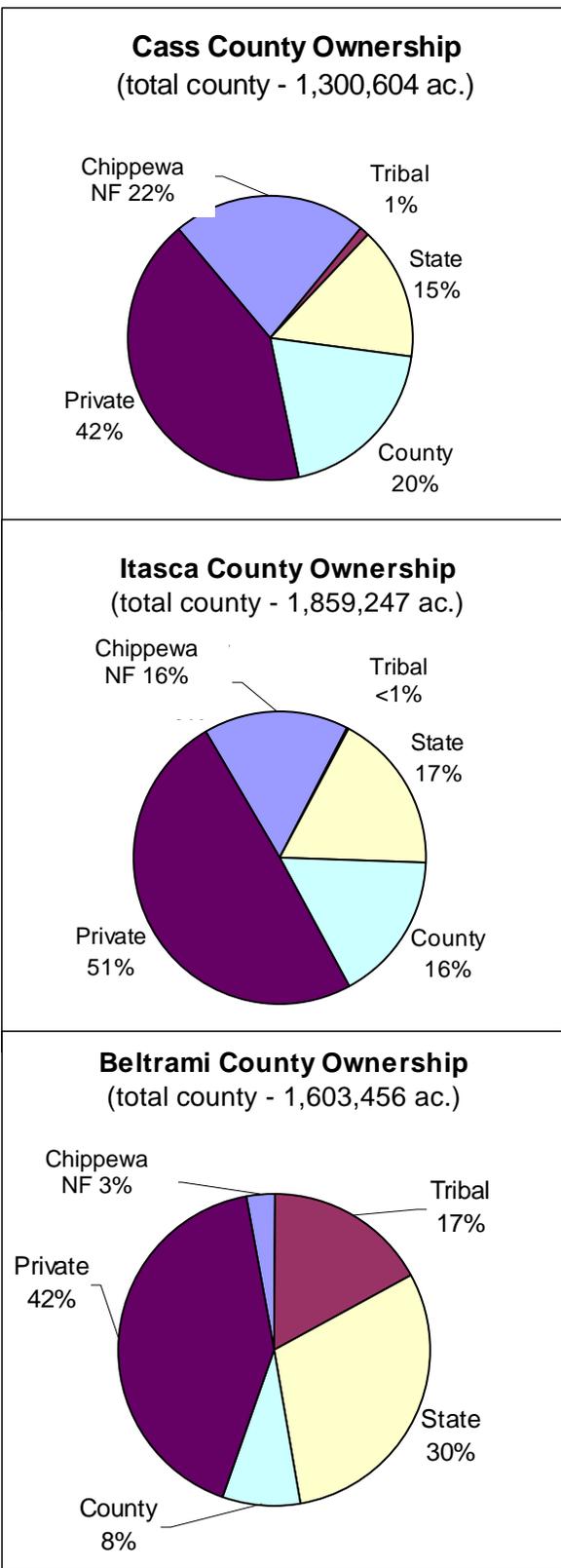
The Chippewa NF is located in three counties: Beltrami, Cass, and Itasca (Figure INT-1). Information provided generally relates to these three counties. Land ownership in the three counties is mainly private, with some federal, State, and tribal ownership (Figure INT-5). The Chippewa NF’s boundary is nearly contiguous with that of the Leech Lake Indian Reservation. Approximately 44% of the Chippewa NF is within the Leech Lake Indian Reservation.

The Forest is located in the high amenity corridor (proximity to lakes, towns with attractions, and good roads) that extends north out of the Minneapolis and St. Paul metro area into the lakes and pines region of north central Minnesota. As such, the population of the area is expected to continue to grow. All communities within the Chippewa NF boundary are 1,100 or less in population; however, two communities with populations between 8,000 and 12,000 are located within 15 minutes of the Forest boundary.

Growth within the Forest is quite high on a percent basis, but in absolute numbers, it is more modest. The most significant growth immediately adjacent to the Forest is occurring on the south and west boundaries. The bulk of the growth within the Forest boundary is in the development of private shoreland properties. With the out migration of young adults from the area and the in-migration of older, retired individuals, the area is facing a considerable labor shortage in the future.

Approximately 11 percent of the population in the three-county area is American Indian, compared to one percent American Indian population of the State as a whole. This segment of the population is experiencing

**Figure INT-5. Ownership in the three counties in and around the Chippewa NF**



considerable growth, increasing 35.5 percent over the last decade. The growth can be attributed in part to the increasing economic opportunities provided for on the Leech Lake Reservation and the Red Lake Reservation.

Other minority groups make up 2.3 percent of the population. These groups include Black, Asian, people of Spanish origin, and people that have defined themselves by two or more races.

The majority (77 percent) of the jobs in the three counties are in the service sector (restaurants and hotels), trade sector (retail stores and wholesale distributors), and government. Manufacturing, which includes the wood products and printing industries, accounts for about eight percent of all employment in the area. Unemployment has been in decline over the

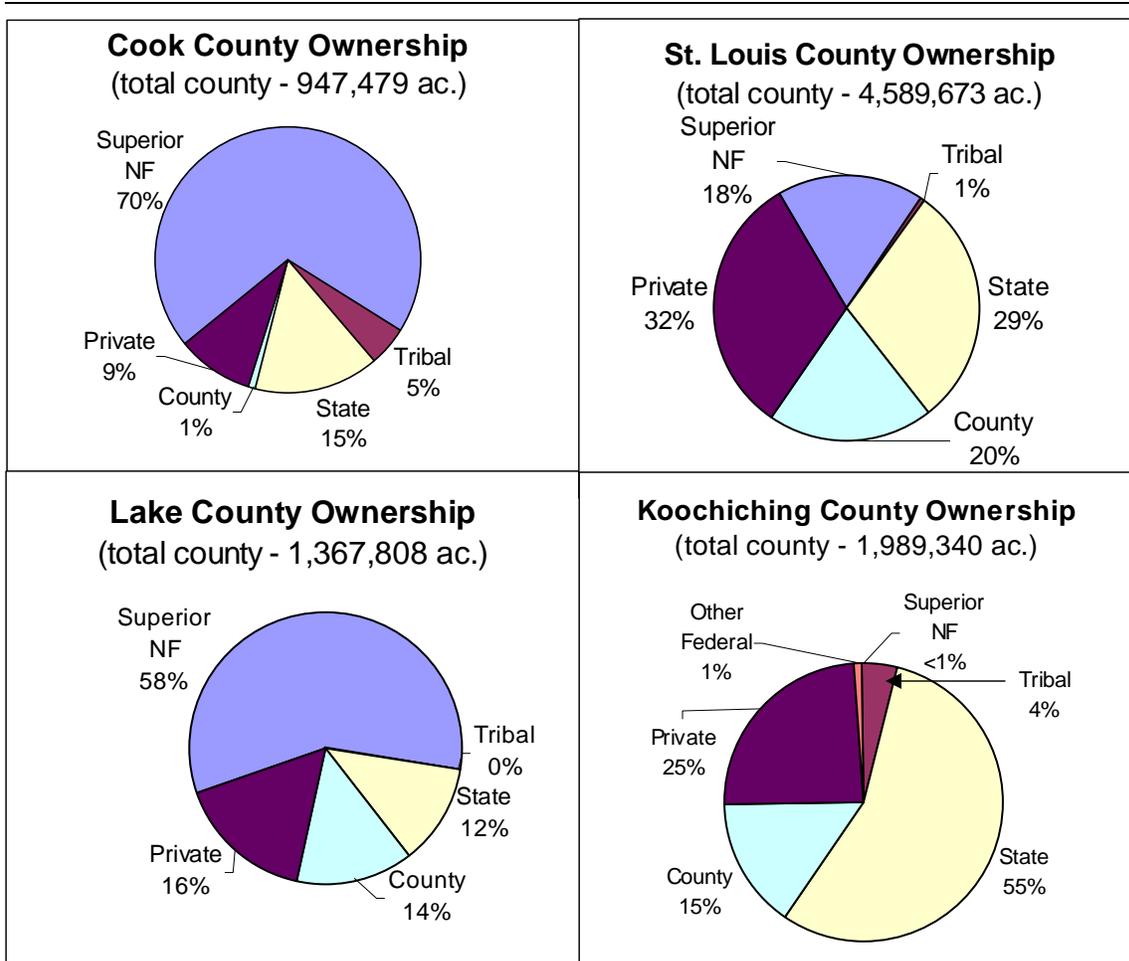
past decade, but the current rates remain considerably higher than the State average (3.3 percent state-wide, 6.5 percent in and around the Chippewa NF).

The area's average annual wage (\$24,000) is increasing but still low compared to the State's average (\$35,000). Public assistance income, as a measurement of poverty, averages about five percent for all three counties.

### Superior NF Social and Economic Condition

The Superior NF is located in all of Cook and Lake Counties and in the northern half of St. Louis County

**Figure INT-6. Ownership in the four counties in and around the Superior NF**



(Figure INT-2). Information provided generally relates to these three counties. Land ownership in Cook and Lake Counties is dominated by the Superior National Forest, while in St. Louis County there is a relatively even split among State, county, private, and federal ownership (Figure INT-6). Koochiching County is dominated by State, private, and county ownership.

There are two major population corridors: the Iron Range from Ely to the Virginia/Hibbing area, and the shore of Lake Superior in Minnesota (known as the 'north shore'). Much of the growth within the Forest is quite high on a percent basis but is more modest in absolute numbers. The largest growth in total numbers of population is in high amenity areas with access to lakes or in close proximity to public land. These areas are concentrated around Ely, the north shore of Lake Superior, and the Gunflint Trail corridor. Much of the demand, as elsewhere in Minnesota, is focused on private lakeshore development.

American Indians are the largest group of minority residents, approximately 2.1 percent of the total population. When the Black, Asian, and individuals of Spanish origin groups are combined, they total 2.2 percent of the total population.

Natural resources form the economic basis of the three major geographical areas within the Superior NF. The iron mining industry is the major employer in the southwest, which is the most populous portion of the Forest. Timber is the lead industry in the southeast. In the north and east areas, recreation, especially in the Boundary Waters Canoe Area Wilderness, is the largest employer.

The majority (75 percent) of the jobs in the three-county area are in the service, trade, and government sectors. Similar to the Chippewa NF area, manufacturing in and around the Superior NF accounts for about eight percent of employment. Unemployment has been in decline over the past decade, but the current rates remain considerably higher than the State average (3.6 percent State-wide, 5.2 percent in and around the National Forest).

The average median income for the three counties is \$23,500, approximately \$7,000 below the State's median income. Poverty is defined as the number of people below the poverty level as a percentage of the

population as a whole. The State of Minnesota poverty level is 10.2 percent, while the poverty level is 9.5 percent in Lake County, 10.9 percent in Cook County, and 14.2 percent in St Louis County.

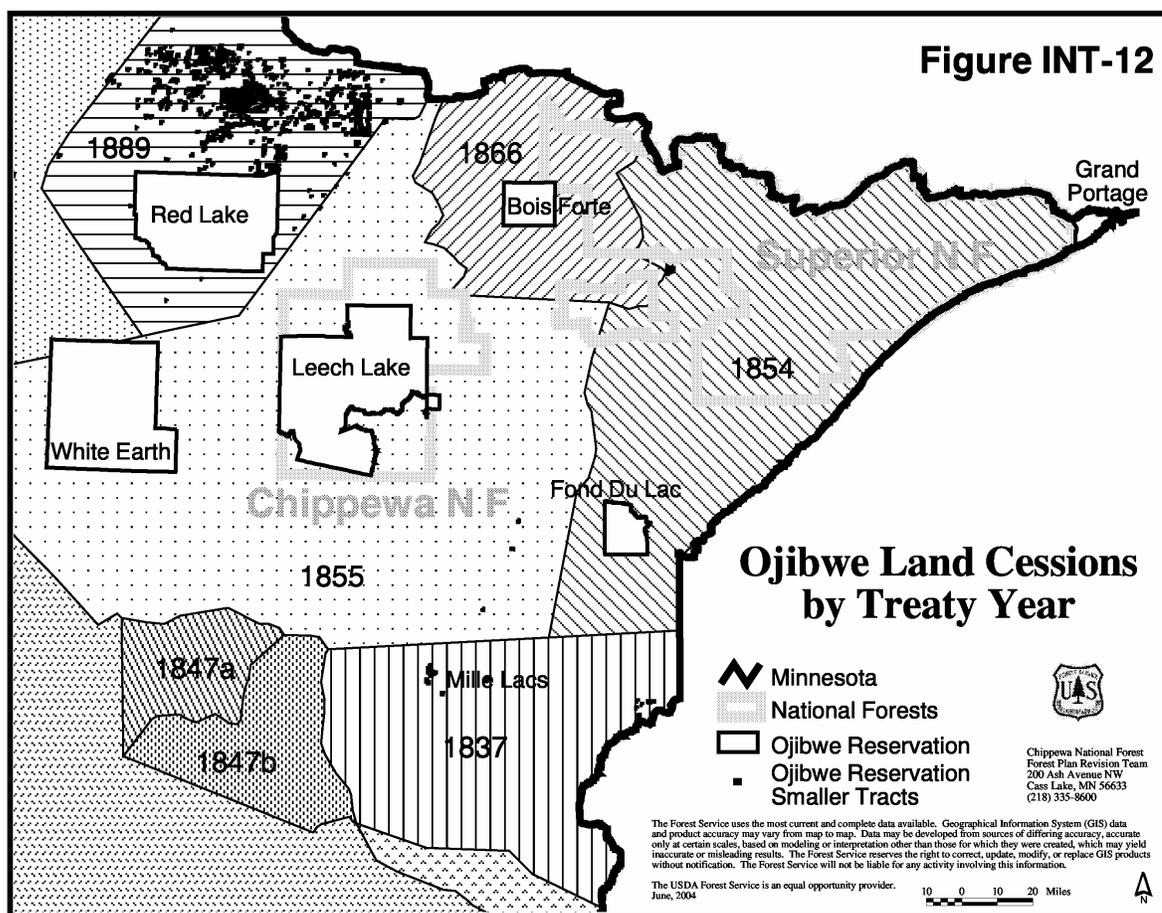
## Tribal Rights and Interests

Beginning in the mid-19<sup>th</sup> century, the government of the United States made treaties with the Ojibwe that created reservations and ceded areas of land in northern Minnesota to the federal government (Figure INT-12). The treaties also preserved the right of the Ojibwe bands to hunt, fish, and gather within the treaty area. This guarantee is important in the context of natural resource management. The Chippewa and Superior National Forests have a role in maintaining these rights because they are offices of the federal government responsible for natural resource management on lands subject to these treaties.

The Chippewa NF is located on land subject to treaty between the U.S. and the Ojibwe in 1855. The affected Ojibwe include the Leech Lake Band. The treaty and subsequent treaties, executive orders, and laws established the present boundaries of the Leech Lake Reservation. Most of the reservation is located within the external boundaries of the Chippewa NF and jurisdiction is mixed among many landowners including the Forest and the Band (Figures INT-1 and INT-3).

Courts have confirmed that the Leech Lake Band retains the right to hunt, fish, and gather on public lands within the Leech Lake Reservation without regulation by the State of Minnesota (*Leech Lake Band of Chippewa v. Herbst*). A recent U.S. Supreme Court opinion indicates that this status would also apply within the ceded territory (opinion regarding 1855 treaty in *Minnesota v. Mille Lacs Band of Chippewa*).

Band members in these treaty areas use and rely upon a wide array of plant and animal resources. Both National Forests have a role in maintaining ecosystem health on lands under their jurisdiction so as to have the overall effect of allowing for continued resource use through Ojibwe hunting, fishing, and gathering activities as reserved by treaty.



The Superior NF is located on lands ceded by the Ojibwe to the United States by treaty in 1854 and 1866. The bands affected by the 1854 and 1866 treaties include Grand Portage, Fond du Lac, and Bois Forte. These and subsequent treaties, executive orders, and laws established the present boundaries of reservations for these bands that are adjacent to the Superior NF (Figure INT-2). Article 11 of the 1854 treaty states that Ojibwe within the treaty area would continue to have the right to hunt and fish on lands they ceded. A court decision (*Fond du Lac Band of Chippewa v. Carlson*) has confirmed this right to hunt, fish, and gather without regulation by the State of Minnesota.

In addition to the unique responsibilities the Forests have to the Ojibwe bands and their recognized sovereign status, people of other tribal backgrounds, and potentially other tribal governments may have concerns regarding National Forest management.

Federal agencies are required by law to take such concerns into account in their decision-making processes.

Forest Plan revision alternatives and management direction generally assure the availability of resources to support the continued exercise of treaty rights and cultural practices and not impair access to such resources and places of traditional practices. Specific availability of resources and access considerations may be determined through government-to-government consultation with the objective of maintaining sufficient availability of resources for the continued harvest or utilization needed to satisfy tribal needs. Trends in species viability (see forest vegetation, wildlife habitat, and social indicators), trends in watershed conditions (see watershed indicators), and changes in access to traditional places (see social indicators) are important considerations. It should be noted that the area of consideration includes lands administered by the National Forests, and lands

of other ownerships both within and adjacent to the National Forest boundaries. Tribal interests extend beyond National Forest land, and this larger area lends a broader landscape perspective to maintaining ecological sustainability on the Forests.

### **Tribal Cultural, Economic, and Governmental Interests**

Culture is the whole set of learned behavior patterns common to a group of people at a certain period of time, as well as their interactive behavior systems, material goods, or thoughts and beliefs. People rely on their culture in order to live, relate to others as collective groups, and know how to both understand and function in their world. Among the tribal people who live in or use the two Forests, Ojibwe tribal culture is dominant, and each Ojibwe band has their own traditions and social, political, and economic structures.

The continued availability of traditionally utilized natural resources is crucial to Ojibwe culture. Now, as in the past, many places throughout the landscape are visited during a yearly cycle to collect food, medicines, and other materials, as well as for religious practices and social gatherings. Plants and animals gathered from prairie openings, aquatic environments, and forests, provide sustenance. The traditions of gathering these and other natural resources continue to be economically and spiritually important. Because of their concern with the continuation of this aspect of Ojibwe culture, the bands take an active role in the protection and restoration of many species of plants, animals, and fish. The bands also claim that access to these resources and traditional cultural places is an inherent right.

Use of the natural resources for economic benefit is important to many band members through employment and the operation of various forest product businesses. The Forests, State, county and tribal governments themselves provide employment opportunities in natural resource management and there is interest in terms of job training, fire fighting, contracts for construction and forest management, and State and Private Forestry rural assistance opportunities. There is also widespread use of forest products tied to the gathering for personal, traditional and treaty purposes and includes fishing, hunting, trapping, harvesting wild rice, tree boughs, saps, roots,

bark, berries, medicines, and firewood.

There are numerous areas throughout the Forests that have traditional, cultural, and spiritual significance to the bands. The use and protection of these areas is a way of maintaining traditional links to past generations. Traditional use areas often have some aspect of spiritual significance. The bands believe that archeological sites and past cemetery areas, many of which are unplatted, are sacred and should be protected.

The Ojibwe interest in the Forests goes beyond that of spiritual and cultural to the unique legal relationship that the United States government has with tribal governments. These federally recognized tribes have a sovereign status similar to or above that of State government. The federal relationship with each tribe was established by, and has been addressed through, the Constitution of the United States, treaties, executive orders, statutes, and court decisions.

Tribal interests and uses on the Forests are protected through various statutes. The federal trust doctrine requires that federal agencies manage the lands under their stewardship with full consideration of tribal rights and interests, particularly reserved rights, where they exist.

### **Resource Protection**

Numerous laws, executive orders, and regulations govern the relationship and collaboration between American Indian tribes and the federal government, represented here by the two National Forests. Examples of specific legislation designed to identify and protect American Indian artifacts, cultural resources, human remains, and traditional cultural uses of interest to American Indians include, but are not limited to, the following:

- Antiquities Act,
- Archaeological Resources Protection Act,
- American Indian Religious Freedom Act (as amended),
- Native American Graves Protection and Repatriation Act,
- National Historic Preservation Act,
- Executive Order No. 13007 on Indian Sacred Sites, and

- Forest Service Manual 1563

The current National Forest Management Act regulations refer to the core of many of these directives: the recognition and protection of sacred sites and sites of archaeological, historic, and cultural importance. In planning and implementation, the Forest Service must comply with these laws and regulations, and in doing so, must meaningfully consult with tribal governments (see Appendix A for more detail).

In addition, numerous laws, regulations, and policies govern the use and protection of Forest resources that may be of tribal interest or covered under tribal reserved rights. Many of the more important ones are discussed under the sections pertaining to vegetation, wildlife, rare natural resources, and watersheds. National laws and regulations have also been interpreted for implementation in Forest Service Manual 1563 and Regional Guides. Activities authorized or implemented by the Forest Service must comply with these laws, regulations, and policies, which are intended to provide general guidance for the implementation of management practices, and for protection of resources, including those of interest to the tribes

### 3.1.2 Physical and Biological Setting

In a global context, north central and northeast Minnesota are in the southern edge of the boreal forest biome (global ecological communities). The boreal biome is the largest biome in the world, crossing northern Asia, Europe, and North America.

The National Hierarchical Framework of Ecosystem Units (USDA Forest Service 1993a) classifies and maps ecological units based on associations of different factors. These factors include climate, topography, soils, water, and potential natural communities.

In the national ecological framework, Minnesota is at the western edge of the eastern block of Humid Temperate Domain (Figure INT-7). Minnesota is

unique because it has three different ecological Divisions, meaning the State supports a diversity of natural communities. These ecological Divisions are Warm Continental, Hot Continental, and Prairie. The Chippewa and Superior NFs are in the Warm Continental Division. The Divisions are made up of Provinces; the Chippewa and Superior NFs are in the Laurentian Mixed Forest Province.

The Chippewa NF is located in north central Minnesota less than 100 miles east of the Great Plains, and near the headwaters of the Mississippi River. The Superior NF is located in northeastern Minnesota, adjacent to the western shores of Lake Superior.

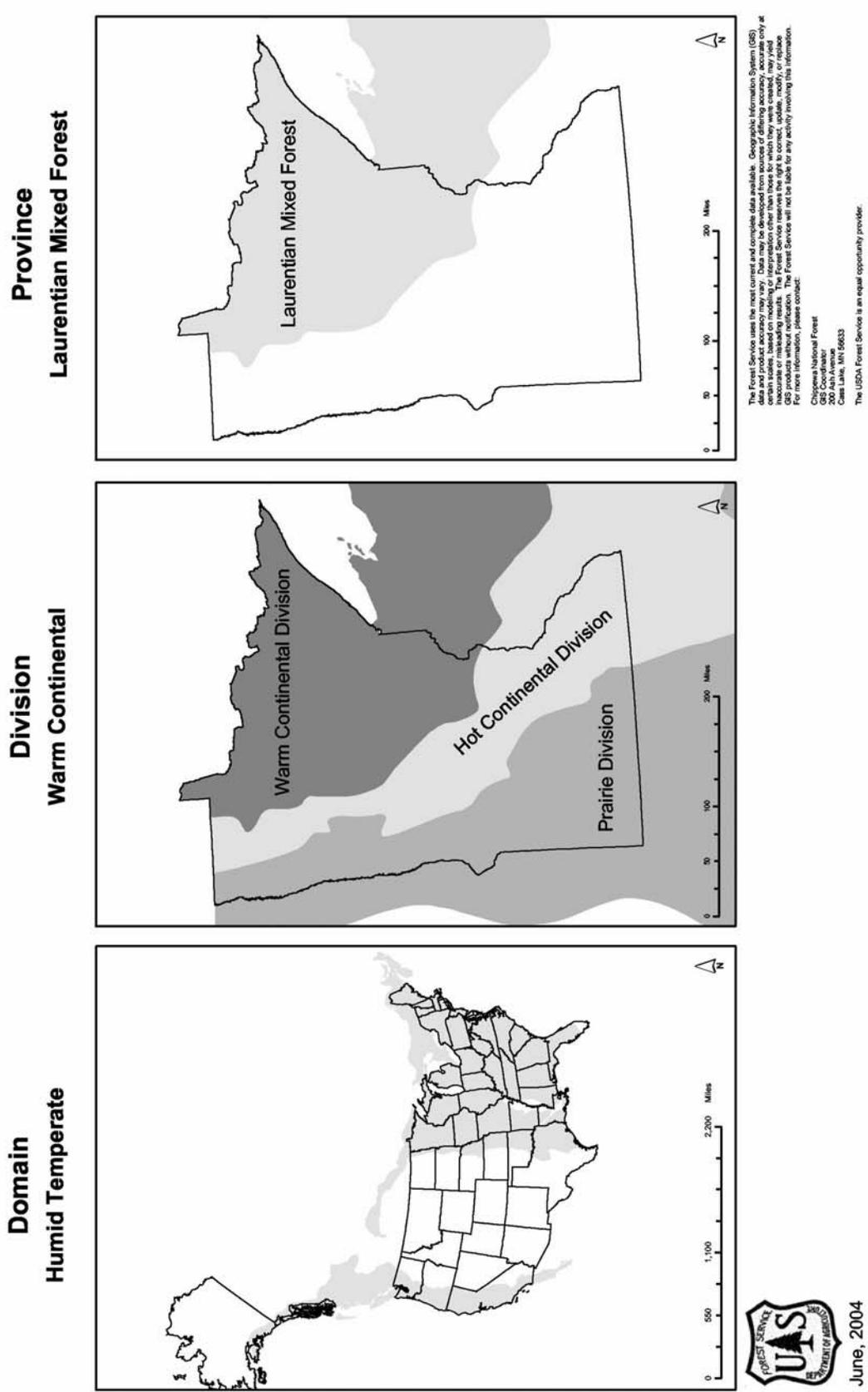
### Climate

Short, warm summers and long, cold winters define the climate of northern Minnesota. Average range of summer temperature is from 55°F to 78°F in July and average range of winter temperatures is from -11°F to 12°F in January. On the Chippewa NF, total precipitation varies from 23 to 27 inches annually, with the greatest amount occurring on the southern boundary. Snowfall seldom accumulates to more than two feet in depth on the Chippewa. On the Superior NF, precipitation is similar at 26 to 29 inches annually. However, deeper snow accumulates on the Superior NF than on the Chippewa NF.

### Topography and Soils

Most of the Laurentian Mixed Forest Province has little relief with rolling hills. The Chippewa NF is predominantly flat with low, glacier-formed hills along the southern edge and northeastern portion. The highest point is 1,630 feet above sea level; the lowest point is slightly over 1,270 feet. Relief seldom exceeds 100 feet, and slopes are mostly gentle with occasional steep grades for short distances. The Superior NF has more relief than the Chippewa NF, but it is still relatively flat. The highest point in Minnesota, Eagle Mountain, is on the Superior NF and is 2,301 feet high. The lowest point is approximately 600 feet on the shore of Lake Superior.

**Figure INT-7 Hierarchical Framework for Ecological Classification System**



Almost all landforms in the area resulted from glacial deposition. Moraines, along with outwash plains and deltas, glacial lake plains, kames, eskers, kettle holes, tunnel valleys, drumlins, and other glacial features are common on the Chippewa NF.

Geologic processes resulted in the accumulation of organic debris in wet lowlands and lakes, forming peat deposits. In the central portion of the Chippewa NF, sand blowouts and dunes are a result of windblown material between 8,000 and 35,000 years ago. A diversity of glacial materials created the wide variety of soils found within the Chippewa NF, which range from coarse sand to fine clay.

Early in the Earth's history, the bedrock underlying the Superior NF was deposited during the Early, Middle, and Late Precambrian ages. Early Precambrian rocks have been a valuable source of iron ore and have yielded small quantities of gold. The present day Mesabi Range has been producing high quality iron ore from Middle Precambrian sedimentary rocks for over 100 years. The most important mineral deposits of the Late Precambrian age are the copper-nickel deposits that occur along the base (northwest margin) of the Duluth complex.

The formation of the Superior NF's soils is directly related to glaciation. As the glaciers advanced and retreated, different textured soils were deposited. Mixed, poorly sorted depositions called glacial till dominate the surface soils on the Forest. These deposits vary from large, extensive ground moraines to localized drumlins. Outwash deposits, which tend to be more sorted and stratified than till, are limited on the Forest and occur primarily in small outwash plains and eskers.

## Water

Water is a major feature on the Chippewa NF. Lakes, wetlands, rivers, and streams provide important habitat for waterfowl, fish, amphibians, wild rice, and fur-bearing animals.

There are over 1,300 lakes on the Chippewa NF, totaling about 350,000 acres. They range in size from

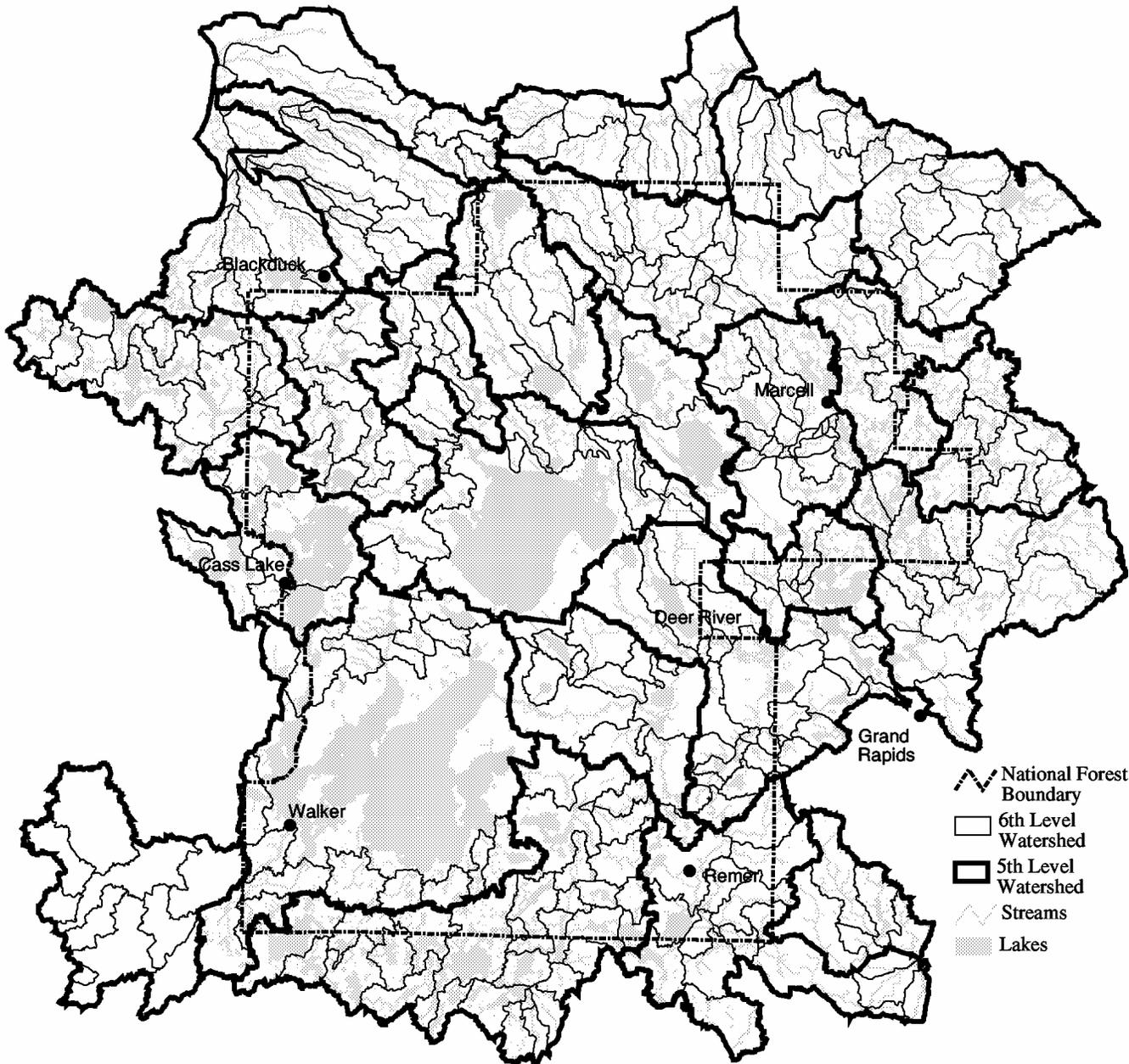
two acres to approximately 109,000. Leech Lake and Lake Winnibigoshish, on the Chippewa NF, are the third and fourth largest lakes in Minnesota. Wetlands occupy about 400,000 acres on all land ownerships within the Forest boundary, and about 150,000 of these acres lie on National Forest System land. An estimated 920 miles of rivers and streams are found within the Forest. The Mississippi and Big Fork Rivers are both classified as navigable waters for interstate commerce.

The Superior NF contains over 445,000 acres of surface water, or about 12 percent of the Forest area. There are almost 2,000 lakes at least 10 acres in size; over 1,300 miles of major streams supporting cold water fisheries; and over 950 miles of major streams supporting warm water fisheries. The quality of the water in lakes and streams is good to excellent. Although many lakes and streams do not support a diversity of aquatic organisms, they are still an important fisheries resource.

On both Forests, the quality of water in most lakes is good, with only a few classified as either very degraded or very pure. On a national, scale these lakes rank in the upper 50 percentile for water conditions; and on the average the lakes are in the upper 20 percentile.

In Section 3.6 of the EIS, impacts to watersheds and riparian areas are measured by watershed units. The size of watersheds ranges from 1,000 acres to 180,000 acres on the Chippewa NF and from 10,000 acres to 50,000 acres for the Superior NF (Figures INT-8 and INT-9).

**Figure INT-8**  
**Fifth and Sixth Level Watersheds**  
**on the Chippewa National Forest**



The Forest Service uses the most current and complete data available. Geographical Information System (GIS) data and product accuracy may vary from map to map. Data and maps may be developed from sources of differing accuracy, accurate only at certain scales, based on modeling or interpretation other than those for which they were created, which may yield inaccurate or misleading results. The Forest Service reserves the right to correct, update, modify, or replace GIS products without notification. The Forest Service will not be liable for any activity involving this information. This map shows all ownerships within the National Forest boundaries. However, management direction would only apply to land managed by the Forest Service.

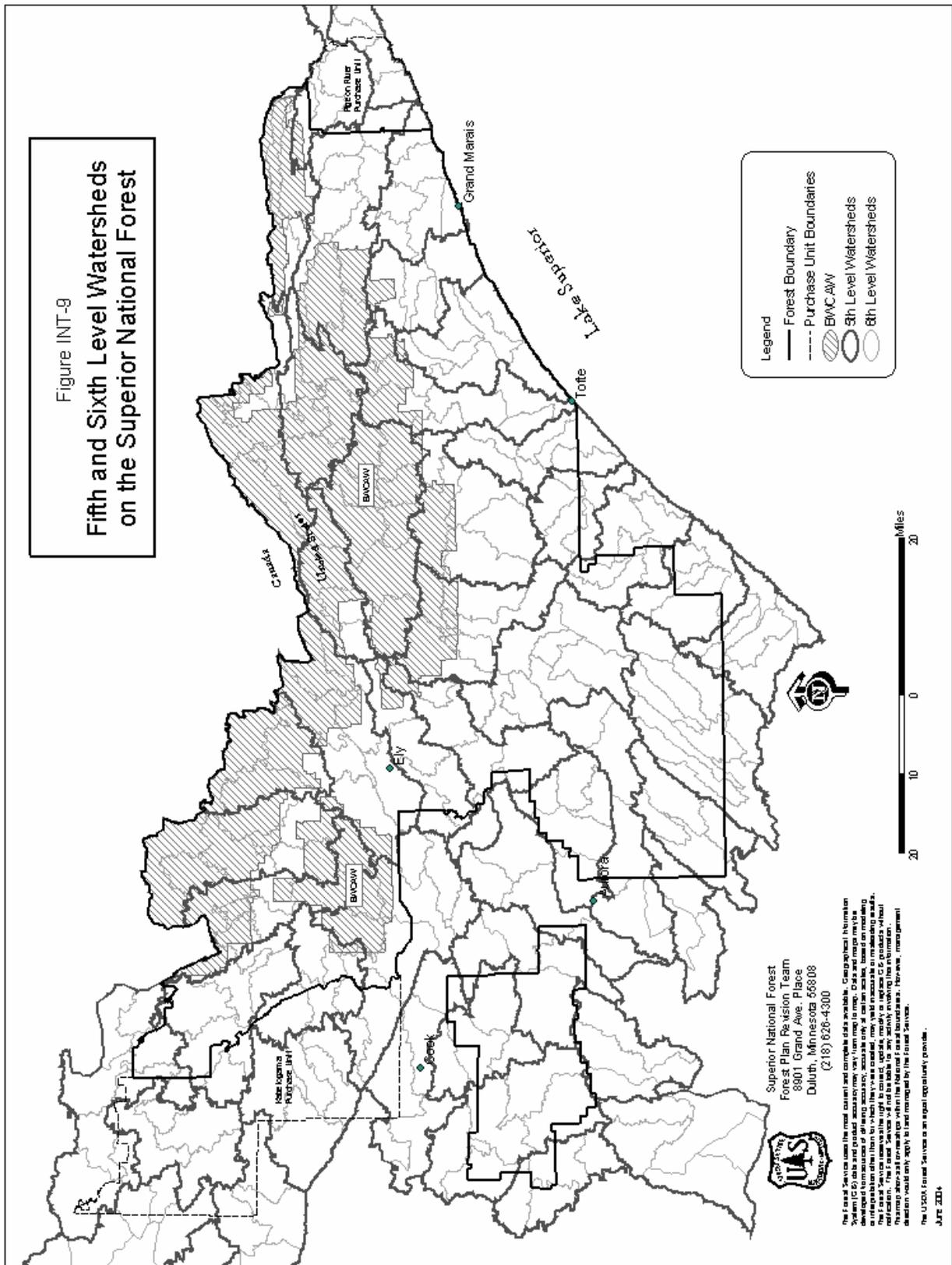


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June, 2004

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## Vegetation

The Chippewa and Superior NF lie within the transition zone between the boreal forests to the north and the broadleaf deciduous forests to the south. The forested region of northern Minnesota is a mosaic of forest communities ranging from relatively pure stands of hardwoods (mainly birch, maple, and basswood) in areas with relatively nutrient-rich soils to relatively pure stands of conifers (mainly pine) in areas with relatively nutrient-poor soils. Between these two extremes are a variety soil types and habitats, which produce mixed stands of conifers and hardwoods. The dominant landscape forest communities include:

- Jack pine
- Red pine
- Red and white pine
- Mixed boreal hardwoods and conifers
- Northern hardwoods
- Aspen, birch, and spruce-fir
- Conifer bogs composed of black spruce, tamarack, or white cedar

Embedded within these forested landscapes are smaller-scale native plant communities, such as black ash swamps, riparian forests, forested bogs and fens, barrens, shrub swamps, and sedge meadows.

The patterns of dominant forest communities in northern Minnesota are largely a product of climate, geology, soils, topography, and a variety of disturbance factors. Historically, fire and wind have been the primary natural disturbance factors shaping forest vegetation patterns in this area. Floods, insects, and disease also influenced forest vegetation. The compositional and structural characteristics of forest vegetation at both the landscape and stand levels shift through time in response to both natural and human-induced disturbances. For instance, the size, amount, and spatial arrangement of dominant forest vegetation types, early successional vegetation, and old-growth forest at the landscape-scale changed from decade to decade. These shifts in landscape patterns are primarily in response to stand-replacement disturbance events.

Similarly, the composition and structure of the understory, midstory, and overstory of individual stands are shaped by more local, less severe

disturbance events. Less intense, more localized disturbance events, such as low intensity ground fires, small-scale wind events, and localized insect and disease outbreaks, influence individual stand characteristics, such as crown closure, canopy gap creation, understory and midstory development, and the availability of snags and downed woody material.

Both the Chippewa and Superior NFs fall within the boreal hardwood transition zone. However, there are some notable differences between the two National Forests. The western portion of the Chippewa NF is much more influenced by the prairie parklands immediately to the west and the southern portion is more influenced by broadleaf deciduous forests to south. While some of these influences do extend to the Superior NF, forests there are more boreal in nature, especially in the north.

## Terrestrial and Aquatic Species

The Chippewa and Superior NFs provide abundant and diverse habitat for thousands of breeding, wintering, and migratory species of terrestrial and aquatic wildlife. These include: over 350 species of birds, mammals, reptiles, amphibians; 50 species of fish; and thousands of species of invertebrates, plants, lichens, fungi, and other organisms. Three species are listed as threatened under the federal Endangered Species Act of 1973: Canada lynx, gray wolf, and bald eagle. All these species provide for a wide array of crucial ecological benefits as well as social and economic benefits and uses, from big game hunting and fishing to wildlife watching and research.

The rich diversity, abundance, and distribution of species are largely a function of the biological and physical settings and environmental conditions of the National Forests. The most important factors include:

- Climate
- Geology
- Diversity of lake and stream types
- Wide variety of vegetation communities in different successional stages
- Natural disturbances and other ecosystem processes (such as nutrient cycling, fire, wind, and flooding)
- Interrelationships among species

Species have also been affected by humans' past and present use of forests through such activities as settlement, agriculture, logging, recreation, introduction of nonnative species, hunting, and fishing. Human influences far from the National Forests such as airborne pollutants and climate change also affect wildlife diversity. All these factors result in a continuously changing mosaic of environmental conditions and, in response; wildlife habitats and populations also continuously fluctuate in numbers, extent, quality, and location across the landscape and over time.

The two National Forests share a large number of species, including those that to many people are emblematic of the northwoods: over 100 species of migratory breeding birds in a zone that has the greatest diversity in North America of songbirds, including forest-dependent warblers; among the largest populations outside Alaska of gray wolves, common loons, and moose; popular game species such as walleye, trout, deer, ruffed grouse, fisher, and beaver; and numerous rare species such as great gray owl, black-backed woodpecker, ram's-head ladyslipper and other orchids, and lake sturgeon.

The National Forests also have some notable differences in both the number of species and their relative abundance. The Chippewa NF has greater abundance and diversity of species common to the prairie biome to the west and the broadleaf deciduous biome to the south, such as red-shouldered hawk, northern goshawk, trumpeter swan, prairie vole, pugnose shiner, and goblin fern. The Superior NF has a greater abundance and diversity of species common to the true boreal forest biome to the north, such as three-toed woodpecker, boreal owl, boreal chickadee, lynx, moose, and grizzled skipper butterfly.

### 3.1.3 Ecosystem Management

#### Framework

In 1992, the Forest Service adopted ecosystem management as an operating philosophy (Overbay 1992). Ecosystem management is scientifically-based

land and resource management that integrates ecological capabilities with social values and economic relations to produce, restore, or sustain ecosystem integrity and desired conditions, uses, products, values, and services over the long term. This means an ecological approach is used to achieve multiple-use management of the national forests and grasslands.

The *Forest Service Strategic Plan 2000* identifies "Ecosystem Health" as one of four strategic goals needed to accomplish the agency's mission "to sustain the health, diversity, and productivity of the nation's National Forests and Grasslands to meet the needs of present and future generations" (USDA Forest Service 2000d). Through ecological sustainability, National Forest Management Act (NFMA) goals for maintaining species diversity and ecological productivity can be addressed. According to the Committee of Scientists in their recommendations for *Sustaining the People's Lands*, "ecological sustainability means maintaining the composition, structure, and processes of an ecological system". They go on to state that, "sustaining ecological processes so that they operate within their expected bounds of variation is the only way to sustain ecological diversity and productivity for future generations" (USDA Committee of Scientists 1999).

Due to the current conditions in terms of land ownership patterns, roads, communities, and other human induced factors that are relatively permanent, the ability of northern Minnesota landscapes to again operate totally within their expected bounds of variation is extremely difficult. The guiding premise used in the EIS and Forest Plans for addressing ecological sustainability is based upon the understanding that the closer ecological processes operate to their expected bounds of variation, the greater the confidence is that diversity and productivity will be sustained for future generations.

The EIS and Forest Plans address the four basic components of ecosystem management:

- Physical
- Biological
- Economic
- Social

Sustainability is a cornerstone of the National Forest

Management Act. It has been and continues to be the essence of Forest Service land and resource management. The EIS presents current conditions and analyzes effects of alternative management strategies on key components of ecological, social, and economic sustainability throughout the resource sections of Chapter 3.

## Role of Disturbance in Ecosystems

Weather, fire, insects, disease, floods, and other natural and human-induced disturbance agents shape ecosystems. Typically, these agents alter the ecosystem composition, structure, and function. Timber harvest, for instance, can change a forest with large trees to an opening or a young forest, thereby changing the habitat for terrestrial species that live in the area. Floods can change the shape of stream channels and the kinds of species of plants in riparian habitat. The variety of animals, plants, and ecosystems found across the landscape is related in part to the extent, timing, and severity of these disturbances. Historically, the disturbance agents that have had the most impacts on vegetation patterns and distribution across the landscapes are fire and wind.

Ecosystems in northern Minnesota have evolved with fire and wind, and many species have adapted so that they can persist in communities over time in the presence of these disturbances. Historically, fire and wind were the primary disturbances that altered or controlled the kind of species present, density, and vertical diversity of plants, shrubs, and trees. Disturbance also affected the spatial arrangement of forests across the landscape.

## Range of Natural Variability (RNV)

Ecological systems are dynamic in nature; however, they have historically changed sufficiently slowly that there was apparent continuity in landscape processes across multiple species life cycles and human generations. The composition, structure, and processes of ecosystems fluctuate over time. In order to address ecosystem sustainability, these fluctuations must be interpreted in light of the natural and historical variation of the landscape (USDA Committee of Scientists 1999). This variation is predictable when it

happens under a relatively stable set of physical and climatic conditions, disturbance regimes, and natural succession processes (when a system regenerates without human influences). The term "range of natural variability" (RNV) is used to describe these fluctuations.

The importance of understanding the concept of RNV lies in the premise that ecosystems operating within RNV are more resilient after disturbances; and therefore the effects of disturbances, either human-induced or natural, are more predictable. Conversely, ecosystems operating outside of RNV tend to be affected by disturbances in ways that are much different than those conditions under which plants, soils, animals, and other ecosystem elements evolved. Disturbance effects to landscapes functioning outside of RNV become much less predictable; and the risk of losing resiliency and compositional, structural, or functional elements of ecosystems increases (USDA Committee of Scientists 1999).

## Coarse-filter and Fine-filter Approaches

Estimates of the range of variability in the composition, structure, and processes that were established by natural disturbance patterns prior to extensive human alteration of the landscape provide reference conditions that may in fact define the "coarse filter conditions" within which the current physical landscape and biota evolved. The coarse filter strategy applies to the larger landscape and focuses on maintaining the full range of habitats and conditions that inherently occurred on the landscape. The conservation and restoration of diverse ecosystems and landscapes will maintain habitats for the vast majority of species and thus improve the possibilities of conserving biological diversity at all levels (Hunter et al. 1988, Hunter et al. 1999). To the degree that future management scenarios can achieve these reference conditions, the more likely it is that the coarse filter will achieve the biological diversity objectives for maintaining ecological sustainability and the less likely that "fine filter" strategies will be needed for individual species (USDA Committee of Scientists 1999). The focus of fine filter strategies is at the site level. These management strategies are more costly and information-intensive and generally used for species of special concern, such as threatened, endangered, and sensitive species (Hunter 1990).

## Characterizing RNV

Early in the Forest Plan revision process, the Forest Service recognized that the picture of the past compared to the present provides a basis for understanding the range of landscape conditions needed to sustain ecosystems and species. Understanding the range of natural variability of ecosystem composition, structure, and processes that formerly were common at a variety of landscape scales but are now greatly reduced can help identify what elements of the ecosystem may need special consideration in management (USDA Forest Service 1997a).

The Minnesota Forest Resource Council, in coordination with the Chippewa and Superior National Forests, chartered a panel of experts to define various aspects of the range of natural variability for forested communities in northern Minnesota (Minnesota Forest Resources Council 1998). The expressed purpose for defining elements of RNV was to provide a context for 1) analyzing forest management alternatives, 2) making allocation decisions, 3) describing desired future conditions at the management area level, and 4) defining management area prescriptions. The panel was tasked with defining the appropriate timeframe and scale for characterizing RNV as well as identifying and defining the major forest ecosystems in northern Minnesota for which RNV characterizations were needed. The outcomes of this process were documented in two reports authored by Dr. Lee Frelich. The report for the Northern Superior Uplands was completed in 1999 and the one for the Drift and Lake Plains in 2000.

The expert panel determined that the forested landscape conditions that occurred during the time period from 1600AD to 1900AD provide a characterization of those landscapes under RNV. The range of forest conditions during this time period is thought to most closely represent the natural cycles, processes, and disturbances under which the current forest ecosystems and the accompanying biological diversity of northern Minnesota evolved. They also agreed that the appropriate scale for characterizing RNV was at the ecoregion scale within the National Hierarchical Framework of Ecological Units identified as the Section. For the Superior NF then, the forest conditions within the Northern Superior Uplands (Figure 2-3) from 1600-1900AD provide the

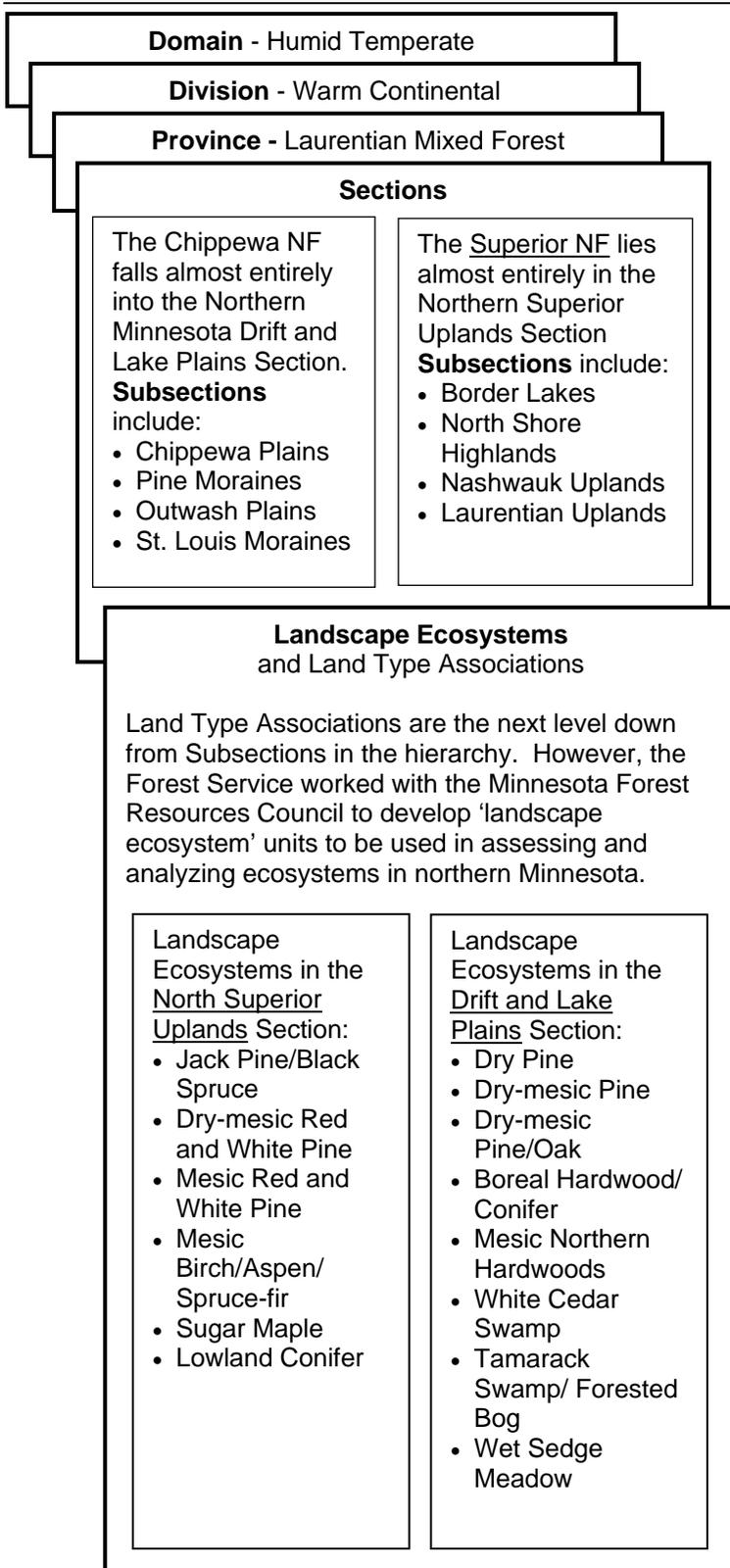
appropriate characterization of RNV for the landscape ecosystems in that Section. For the Chippewa NF, the forest conditions within the Minnesota Drift and Lake Plains (Figure 2-2) during that same time period provide the appropriate characterization of RNV for the landscape ecosystems in that Section. Appendix G has more information on RNV and the Minnesota Drift and Lake Plains Section and the Northern Superior Uplands Section.

It is not the expressed goal of future national forest management to restore the forested landscapes on the Chippewa or Superior National Forests completely to those conditions that occurred when these landscapes operated within the range of natural variability. However, the information derived from a better understanding of these conditions provides a more complete context for analyzing and managing these landscapes in a more ecologically sustainable way. The concept of RNV as a reference condition for analysis can be useful for comparing and evaluating the ability of a national forest to contribute to an acknowledged healthy landscape condition. The analysis of ecological sustainability, when balanced with a similar analysis of the economic and social sustainability offered by the alternatives will guide decision-makers in determining forest management strategies for the future. A more detailed discussion of RNV and how it is used in the Forest planning process can be found in Appendix B.

## Ecological Classifications and Landscape Ecosystems

Ecological systems are hierarchical structures and are best evaluated at a variety of spatial scales. Ecosystems must be viewed from both the local and landscape perspectives (USDA Committee of Scientists 1999). In order to implement ecosystem management, a consistent approach to ecosystem classification and mapping at multiple geographic scales was developed. The Forest Service adopted the National Hierarchical Framework of Ecological Units in 1993 (USDA Forest Service 1993a). These classifications represent ecosystem units that have similarities in their resource capabilities and relationships. In resource planning, the national hierarchy is useful for:

**Figure INT-13.** How landscape ecosystems on the Chippewa and Superior NFs fit into the National Hierarchical Framework of Ecological Units



- Evaluating inherent capability of land resources
- Predicting changes over time
- Evaluating effects of management strategies
- Allocating land to management areas
- Discussing and analyzing ecosystems and biological diversity at multiple scales

When combined with information on existing conditions, ecological units may be used to establish desired conditions and to manage and monitor natural resources.

Landscape ecosystems and Landtype Associations represent the landscape scale. Landscape ecosystems have been described and delineated for the Northern Minnesota Drift and Lake Plains Section (Figure 2-2) and the Northern Superior Uplands Section (Figure 2-3). Landscape ecosystems are derived from a combination of individual or groupings of native plant communities, ecological systems, and Terrestrial Ecological Unit Inventories at the Landtype Association and Ecological Landtype scales. Each landscape ecosystem is characterized by its dominant vegetation communities and patterns, which are a product of local climate, glacial topography, dominant soils, and natural processes, such as succession, fire, wind, insects, and disease (Shadis 1997a, Frelich 1999 and 2000, Almendinger 1998).

The Terrestrial Ecological-Unit Inventory collects data at many levels of the National Hierarchy, and some units in the inventory are small (a few acres in size), while others are large and represent a landscape (100s to 1,000s of acres). Landscape ecosystems are also 100s of acres to 1,000s of acres.

Figure INT-13 illustrates how landscape ecosystems on the Chippewa and Superior NFs fit into the national framework. Appendix G has more information on landscape ecosystems.

Figures INT-10 and INT-11 illustrate more detailed mapping units scales of the Terrestrial Ecological Unit Inventory for each Forest. Specifically illustrated are the Landtype Association and Landtype scale for the Chippewa NF and the Landtype Association scale for the Superior NF. These are the mapping unit scales that are used the basis for analysis of soils indicators (watershed indicators #4, #5 and #6) in section 3.6 of this EIS.

### 3.1.4 Analysis

#### Analysis Units - Spatial and Time Scales

The national hierarchy may be used to provide information at appropriate scales for ecosystem mapping, environmental analysis, developing desired future conditions, and monitoring.

Scale is important to understand in terms of both space and time, but scale is often difficult and challenging for resource managers to analyze and communicate. Relationships viewed on a small scale or over a short time period can be very different when viewed over large scales or for a longer time period. For example, the immediate aftermath of a large fire may appear to be highly destructive to a specific site, but the same fire viewed in terms of long-term landscape dynamics, may provide many ecological benefits.

Different time scales are used in the effects analysis to provide a temporal context and comparison for the way conditions may change through time as a result of management activities or natural events. Three general time frames are used: 1) temporary, 2) short-term, and 3) long-term. Unless otherwise stated, temporary effects are generally expected to last anywhere from 0 to 3 years. Short-term effects can include temporary effects but can last up to 10 to 15 years, or the period of time between Forest Plan revisions. Long-term effects generally last longer than 10 to 15 years, or begin to occur after the first 10 to 15 year planning period.

The model used to estimate vegetative condition and

timber outputs provided data for every decade after the Plans are finalized. Therefore, many effects are described in terms of ‘decade 1’, ‘decade 2’, and so on. Decade one means the first ten years of implementing the revised Forest Plans.

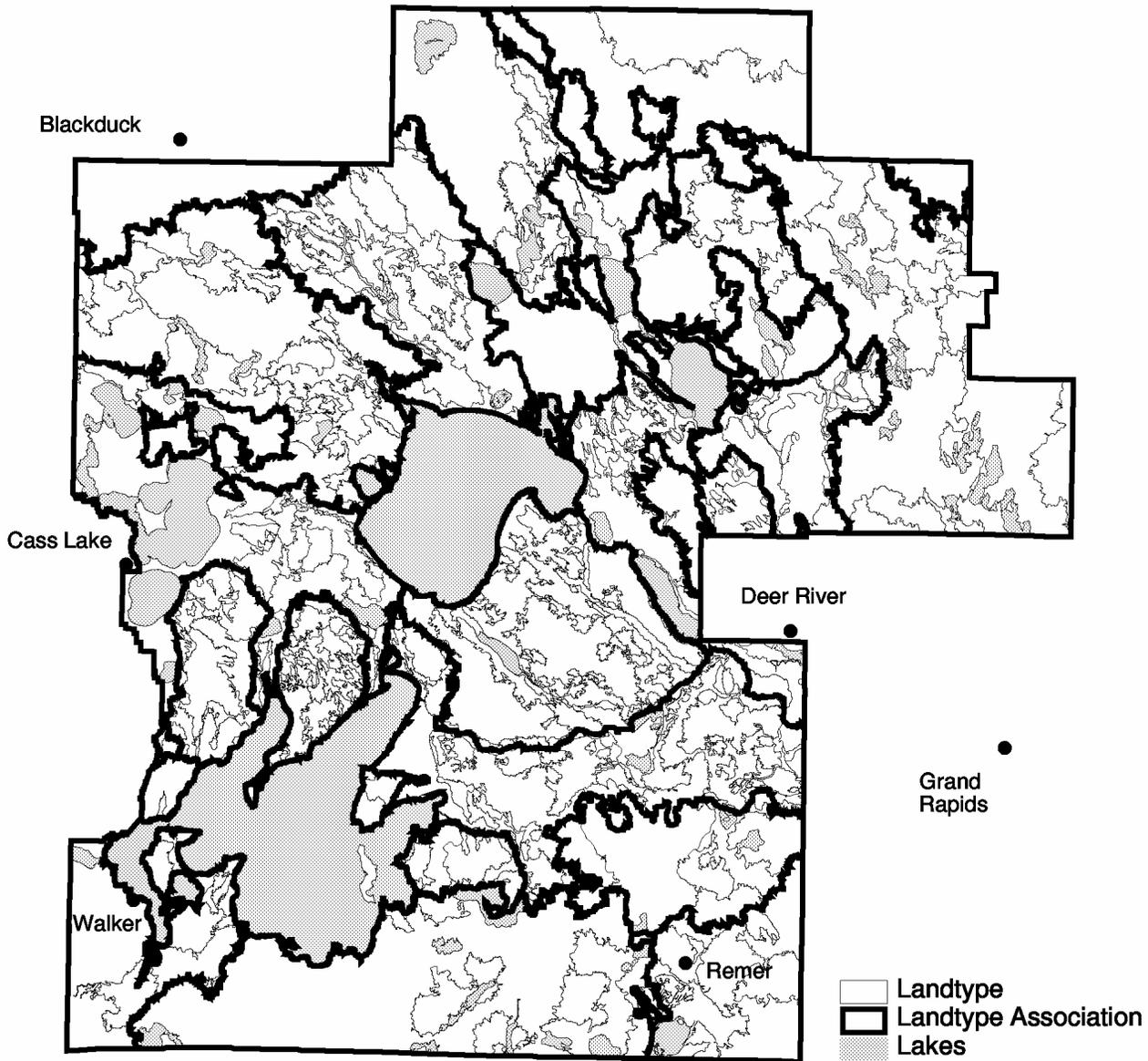
#### Available Information and Use of Models

The data and level of analysis in the EIS are commensurate with the importance of the potential effects (40 CFR 1502.15). In the modeling and analysis for Forest Plan revision, the numbers for things such as management areas, road miles, and acres of timber harvest are all best estimates based on the latest available information.

When a gap in information was identified, the interdisciplinary team concluded that the missing information may have added precision to estimates or better specified a relationship; however, the basic data and central relationships are already sufficiently well established in science so that additional information was considered unlikely to reverse or nullify understood relationships. Thus, new information would be welcomed and would add precision but is not essential to providing adequate information for the decision maker to make a reasoned choice among the alternatives.

The purpose of modeling is to provide comparative insight into complex questions, not to provide an answer. Decision makers and managers use modeling results along with an understanding of the assumptions used in building the model as a factor in their decisions, but there are many other factors that are considered, many of which are not in the model. The modeling and analysis conducted for the EIS were intended and designed to indicate relative differences among the alternatives, rather than to predict absolute amounts of activities, outputs, or effects.

**Figure INT-10  
Chippewa National Forest  
Landtype Associations**



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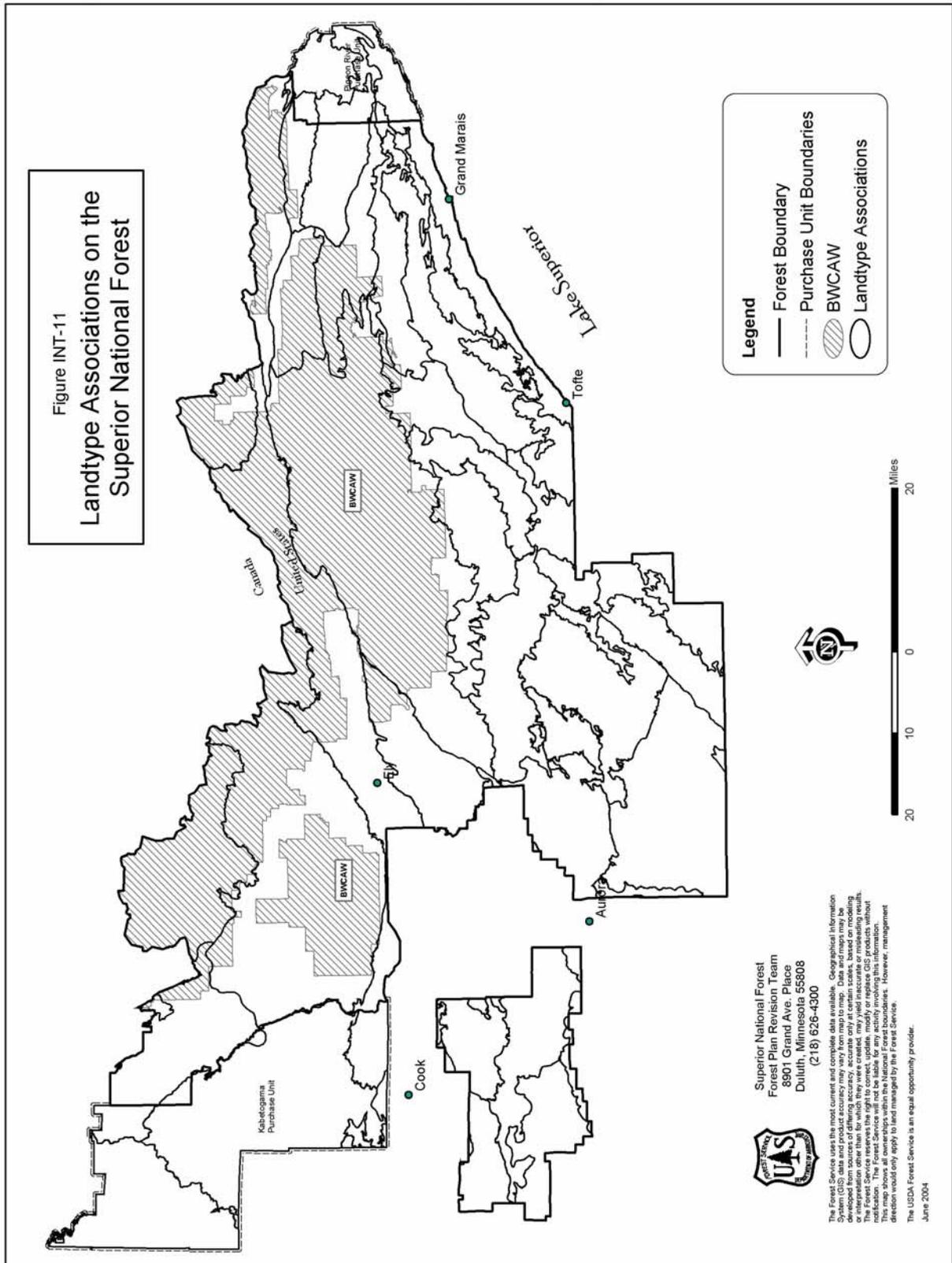


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## Analysis Processes

Appendix B of the EIS has a more detailed discussion of analysis processes. Appendix B includes information on the following:

- How ecosystems were modeled
- Spatial analysis of forest vegetation
- Analysis of wildlife habitat
- Adjustments made to timber model outputs
- Social and economic resiliency analysis

### 3.1.5 Chapter 3 Organization

The remainder of Chapter 3 is organized by resource, focusing on those resources related to the issues described in Chapter 1. Each resource section is presented in the following format:

- **Issue Statement**
- **Issue Indicators** – Used to compare the effects of the alternatives on the issue.
- **Analysis Area** – Briefly describes the geographic area used for analysis. Analysis areas may vary depending on the resource, issue, or anticipated activities. Within a specific resource or issue, analysis areas may also differ for direct, indirect, and cumulative effects.
- **Affected Environment** – Describes the current conditions of the resources relative to the issues and issue indicators. This section may also include history, development, past disturbances, naturally occurring events, and interaction that have helped shape the current conditions.
- **Environmental Consequences**
  - **Effects Common to All Alternatives**  
Describes the general type of effects that may occur to the resource from implementing the alternatives.
  - **Direct and Indirect Effects** – Describes the direct and indirect effects that each alternative could have on resources or issues. Direct effects occur at the same time and place as the action. Indirect effects occur later in time or are spatially

removed from the action. Although a forest plan would guide management for 10 to 15 years, effects may be discussed for both the short (1 to 10 years) and long term (greater than 10 years). Direct and indirect effects often overlap and are frequently discussed together.

- **Cumulative Effects** – Describes the cumulative effects by alternative for each resource or issue. Cumulative effects are the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes the other actions. Cumulative impacts can result from individually minor but collectively significant actions that take place over time.