Forest Stewardship Plan for the Keweenaw Bay Indian Community

L'Anse Reservation
Baraga County, Michigan

2018-2028

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This Forest Management Plan qualifies as a Forest Stewardship Plan, a program of the US Forest Service, administered by the Michigan Department of Natural Resources.

_____ _____

Mike Smalligan Date

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I. RECOGNITION

Development of this plan relied heavily on the professional input and hard work of many people from the following organizations: KBIC Natural Resources Department, KBIC Cultural Resources Department, KBIC Fire Management, Great Lakes Indian Fish Wildlife Commission, Inter-Tribal Council, BIA Forest Management Inventory and Planning, Northern Institute of Applied Climate Science, and USDA Natural Resources Conservation Service. These people all made great thoughtful input and time contributions to help successfully implement forest stewardship on the L'Anse Reservation.

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CHAPTER 1: KBIC FOREST STEWARDSHIP GOALS

1.1 Introduction: Who we are

This Forest Stewardship Plan (FSP) establishes the forest management goals and objectives developed by the Keweenaw Bay Indian Community (KBIC), or Anishinaabe, meaning "original human." The Anishinaabe that established in the west, where KBIC resides, were the people of medicine. Their forests are rich with diverse plants and medicines, and they care for and use these medicines in good ways. In 1936 KBIC was established to include bands of Chippewa Indians who lived dozens of generations in the areas that are now the L'Anse, Lac Vieux Desert, and Ontonagon Reservations. Today approximately 3,700 Tribal Members make up KBIC on the L'Anse and Ontonagon Reservation lands. The L'Anse Reservation, the target of this stewardship plan, spans an area of almost 66,000 acres in Baraga County, surrounding beautiful Keweenaw Bay.

1.2 Statement of Purpose

Two important teachings lay the foundation of KBIC forest stewardship: Seven Generations, and the First Treaty. KBIC strives to care for the land and waters so that they may sustain its people into the future for use by the next Seven Generations. The social, economic, and ecological well-being of the Reservation are all sustained and improved for the next Seven Generations. The First Treaty describes humans' first and most important compact. When humans came into the world during the first days, the animals, fish, and plants took pity on the defenseless humans. They had many needs to survive. So the creatures held council to decide what to do with humans. After talking and discussing, all the creatures offered themselves to help the humans survive: the bear offered its warm coat, the deer its meat, the plants their medicine, the trees their wood to build lodges and keep warm with fires. In return the humans offered language, and to be the voice for those creatures and fellow beings who do not have a voice. Thus it is our obligation to speak and be a steward for those beings, as told in The First Treaty.

The purpose of this forest stewardship plan is to provide a written description of Keweenaw Bay Indian Community's goals and objectives for forest stewardship on the forestlands of the L'Anse Reservation. Since Forest Stewardship Plans require one plan for each county of land ownership, Ontonagon and Marquette County ownerships will be in separate plans.

While directly guided by KBIC objectives and vision, this plan also meets the requirements of the following programs:

- BIA's Indian Affairs Manual (IAM) Part 53, Chapter 2 Section 1.7B

- Natural Resources Conservation Service (NRCS) Environmental Quality Improvement Program (EQIP) Forest Management Plan
- USFS Forest Stewardship Plan
- Tree Farm Association

1.3 Existing Plans and Policies

There are many existing planning documents that are consistent with the intent of this FSP, including:

- KBIC Terrestrial Invasive Management Plan (2018)
- KBIC Integrated Resource Management Plan (under revision)
- KBIC Wildlife Stewardship Plan (2014)
- KBIC Comprehensive Strategic Plan (2013)
- Fire Management Plan for Keweenaw Bay Indian Community (2004)
- 25 CFR Part 163, General Forestry Regulations
- Indian Affairs Manual-Part 53 (Trust Lands)
- Indian Forest Management Handbook (Trust Lands)

The KBIC IRMP 2002-12, 2004 edition (Integrated Resource Management Team, 2004), is the most current guide for KBIC natural resource management. It is currently under revision. As additional ordinances pertaining to Forest Protection and Land Management are approved, their application will be incorporated into the implementation of this Forest Stewardship Plan. The Tribe's Comprehensive Strategic Plan identifies the following goals that are directly fulfilled by this FSP. First, "to develop a sustainable forest management initiative that is effective, profitable, and culturally appropriate;" and secondly, "to develop management plans and tools necessary to make informed and respectful development and management decisions on Tribal lands."

This FSP is consistent with all existing local KBIC laws and ordinances such as Title 10 of KBIC Tribal Code, and the 1936 Constitution, as well as the applicable policies and direction established through the Department of Interior, Bureau of Indian Affairs. The KBIC Constitution is the backbone of forest policy for the Tribe. Article VII, Section 9 states that "Community land which is not assigned, including community timber reserves, shall be managed by the Tribal Council for the benefit of the members of the entire Community…" KBIC policies are the governing force behind KBIC forest stewardship. There are two primary policies that guide KBIC Forest Policy: The KBIC 1993 Timber Use Policy (KBIC, 1993) and the 2011 Addendum to the 1993 Timber Use Policy Statement (KBIC, 2011). Both of these policies were passed by KBIC Tribal Council and are the current guidance for the sale and use of KBIC forest products. These documents should be updated to reflect current Tribal goals.

This FSP is also consistent with other applicable Federal mandates, including:

- National Indian Forest Resources Management Act (NIFRMA)
- National Environmental Policy Act (NEPA)
- Clean Air Act
- Clean Water Act
- Endangered Species Act
- National Historic Preservation Act
- Archeological Resources Protection Act
- Native American Graves Protection and Repatriation Act
- Pollution Prevention Act

In addition, the BIA is committed to the principles of sustained yield management on Trust land, as required by Unit 25 of United States Code of Federal Regulations.

1.4 Plan Duration

This current plan is referred to as the KBIC Forest Stewardship Plan (FSP), and should be considered current for about 10 years. This plan is based on principles of adaptive management. New information, circumstances, and data arising should continually be collected (see section *7.0 Monitoring, Review, and Coordination* of this FMP) and considered in the context of the stewardship plan, and the best decision made according to the available information. It is recommended that the Tribe informally review the FMP on a periodic basis (e.g., every 10 years) and modify it to address any changes in tribal goals and forest policy.

Previous plans for KBIC forest lands were developed during the last fifty years (Vilican-Lehman, 1974; BIA, 1977; Mroz et al., 1996) and revised and updated when feasible with corresponding updated forest inventory data.

1.5 Scoping of Community Issues and Concerns

This FSP was made public on the KBIC website and at various Tribal service centers for a 30-day public comment period in the fall of 2018. Tribal members' and Community input was gathered and integrated into this plan. Another community input consultation was during the development of the KBIC Integrated Resource Management Plan (IRMP) in 2016. Community input on natural resource management was gathered through workshops. Below is a list of the issues and concerns expressed by the people of KBIC. Another survey, conducted in 2013, went out to approximately 900 Tribal Members and asked the Community about their objectives and concerns for natural resources and wildlife issues (KBIC Wildlife and NR Report, 2013). An

excerpt of this report is below in figure The issues and concerns that arose from the people guide forest stewardship goals and objectives below. The objectives define opportunities and actions to bring to fruition or rectify the issues.

- Protection and planning for forest lands
- Loss of habitat, wetlands, plants and trees of cultural significance
- Reducing carbon footprint
- Cultural changes with changing climate
- Natural disaster/emergency preparedness
- Environmental toxins on our land and ensuing health impacts
- Safe and available drinking water
- Traditional foods, how they are used or exploited and modified
- Native plant use and natural medicines
- Invasive plants taking over
- Educating youth about traditional and cultural resource use and protection
- Increasing and sharing knowledge of wild edible plants and medicines
- Concern for pollinators

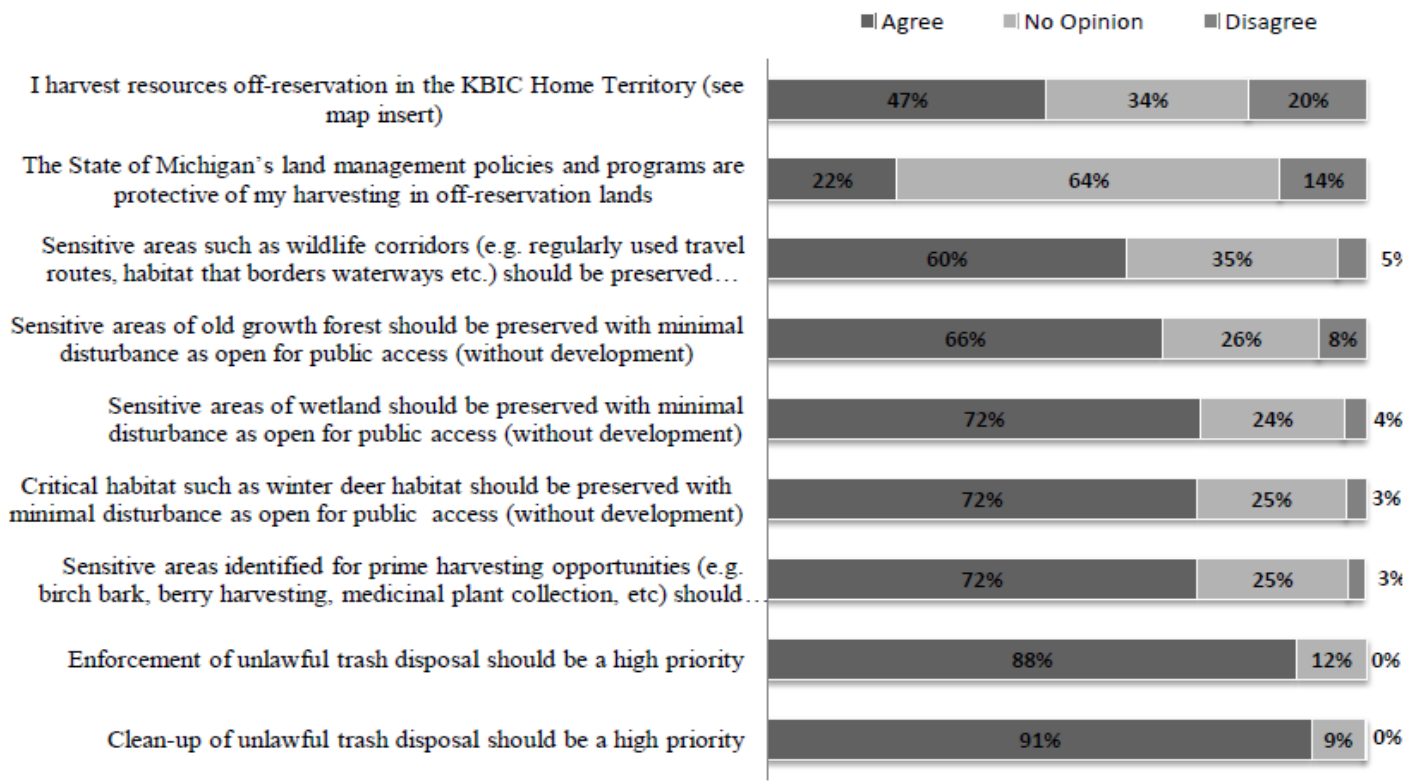


Figure i. KBIC Land Use Tribal Survey. Excerpt from KBIC Wildlife and NR Report, 2013.

1.6 Tribal Goals, Objectives and Actions

Community input and traditional knowledges, existing KBIC resource plans, and KBIC forest policy have all come together to define the Tribal goals and objectives of forest stewardship on the L'Anse Reservation.

Traditional knowledges (TKs) should help inform and guide forest management. Broadly defined, TKs are indigenous communities' ways of knowing that guide and result from their close relationship with the land, water, plants and animals that comprise their home (CTKW 2014). For KBIC, this knowledge of the forest was and still is integral for the people's well-being and survival. Seeking opportunities to share TKs is an important component of community education and involvement in their Reservation lands, and is targeted in the objectives below.

The goals below represent the three components of sustainability in natural resource management: ecological, social, and economic health. To help enhance and sustain diverse natural resources for Keweenaw Bay Indian Community's Seven Generations, the goals of this FSP include:

- Improve and promote forest health, diversity, wildlife habitat and clean water resources

- Ensure sustainable utilization of all timber and non-timber forest resources for the benefit of Tribal members
- Incorporate cultural knowledge, needs, and education into forest land stewardship
- Protect culturally sensitive areas on the Reservation

Specifically, KBIC objectives define the strategies to attain these forest management goals. The objectives are followed by specific actions:

Objective 1: Promote forest ecosystem health and resiliency with species diversity, wildlife habitat, and healthy soil and water resources; so that all values and uses of the forest may be sustained for Seven Generations

- Use timber sales as a tool to improve and restore ecosystem health, and achieve stand-level objectives (i.e., large game habitat, small mammal habitat, water quality protection, wild/natural features, cultural and recreational features, etc.)
- Use timber sale specifications and layout to maintain and promote retention tree species, retention patches, and snags
- Forestry practices should follow the best management practice (BMP) guidelines described in Michigan Department of Natural Resources and Michigan Department of Environmental Quality Sustainable Soil and Water Practices on Forest Land to protect water and soil resources
- Develop and implement Forest Development projects to plant, release, and perform site preparation to improve forest health and achieve forest stewardship objectives

Objective 2: Promote the ability for Tribal members to sustainably harvest forest (non-timber) and cultural products from Reservation land.

- Identify and develop/promote potential sugar bush areas
- Identify firewood gathering areas
- Identify potential areas of gathering (plants, boughs, berries, etc.)
- Revise and update KBIC's Timber Use Policy of 1993 to reflect current Tribal needs and values

Objective 3: Generate income from timber sales to economically diversify Tribal assets and support Tribal members

- Manage for healthy forests and diverse species and age classes across the landscape in order to promote ecological sustainability and economic returns for the Tribe

Objective 4: Preserve cultural and historic resources

- Work closely with Cultural Committee and THPO to identify and protect cultural and historical resources on the ground

- Ensure Phase 1 Archeological Survey and the report sent to Tribal Historic Preservation Officer is conducted before forestry projects on Trust Land.
- Ensure Tribal Historic Preservation Officer has identified no properties of interest regarding religious or cultural sites where forestry projects are located on Fee Land.

Objective 5: Provide Community members forest stewardship education and involvement

- Team up with education partners (KBIC Youth Program, L'Anse and Baraga public schools, etc.) for forest stewardship education opportunities.
- Create and promote opportunities to share Community traditional knowledges (TK) about its forestlands.
- Partner with Keweenaw Bay Ojibwa Community College to provide forestry education opportunities for natural resources students.

CHAPTER 2: FOREST DESCRIPTION

2.1 General Location

The Keweenaw Bay Indian Community's forestlands include locations in Ontonagon and Baraga Counties (see overview map below). The L'Anse Indian Reservation in Baraga County, the target of this forest stewardship plan, was established by the Treaty of 1854 between the Lake Superior Chippewa and the United States. It is the largest and oldest reservation in the state of Michigan. The L'Anse Indian Reservation covers portions of T50N R32W, T50N R33W, T51N R31W, T51N R32W, and T51N R33W. See the overview map below. The original Reservation area established by the Treaty of 1854 was 54,664 acres, and was allotted to individual Tribal members. Now in 2018, the total KBIC land ownership is 18,811 acres, and is divided into three general ownership types: 6,516 acres of Tribal Trust lands; 7,789 of Allotted lands, and 4,506 acres of Tribal-owned, Restricted Fee lands.

In this Forest Stewardship Plan, Allotted and Tribal Trust lands are referred to as "Trust" land, and Restricted Fee as "Fee" land. The number of reservation acres described in this FSP is according to values representative of the reservation at the time the FMP was prepared. However, these acres are subject to change as land is:

- Acquired and put into trust;
- Changed due to tribal decisions (forested acres); and
- Changed due to any other unforeseen reasons why acreages may increase or decrease.

Of the 18,811 total L'Anse Reservation acres, approximately 16,532 are forested. Approximately 17,027 acres are covered by this FMP. Non-forested, natural cover types such as wetlands, upland brush, beaver ponds, and grass openings comprise about 495 acres and are included in the total acreage covered by this FMP since the

forest surrounding these features is managed to protect, buffer, or enhance the feature. Non-forested, developed Reservation lands (1,783 acres) include housing, commercial, industrial park, and recreational uses, and are not included in this plan.

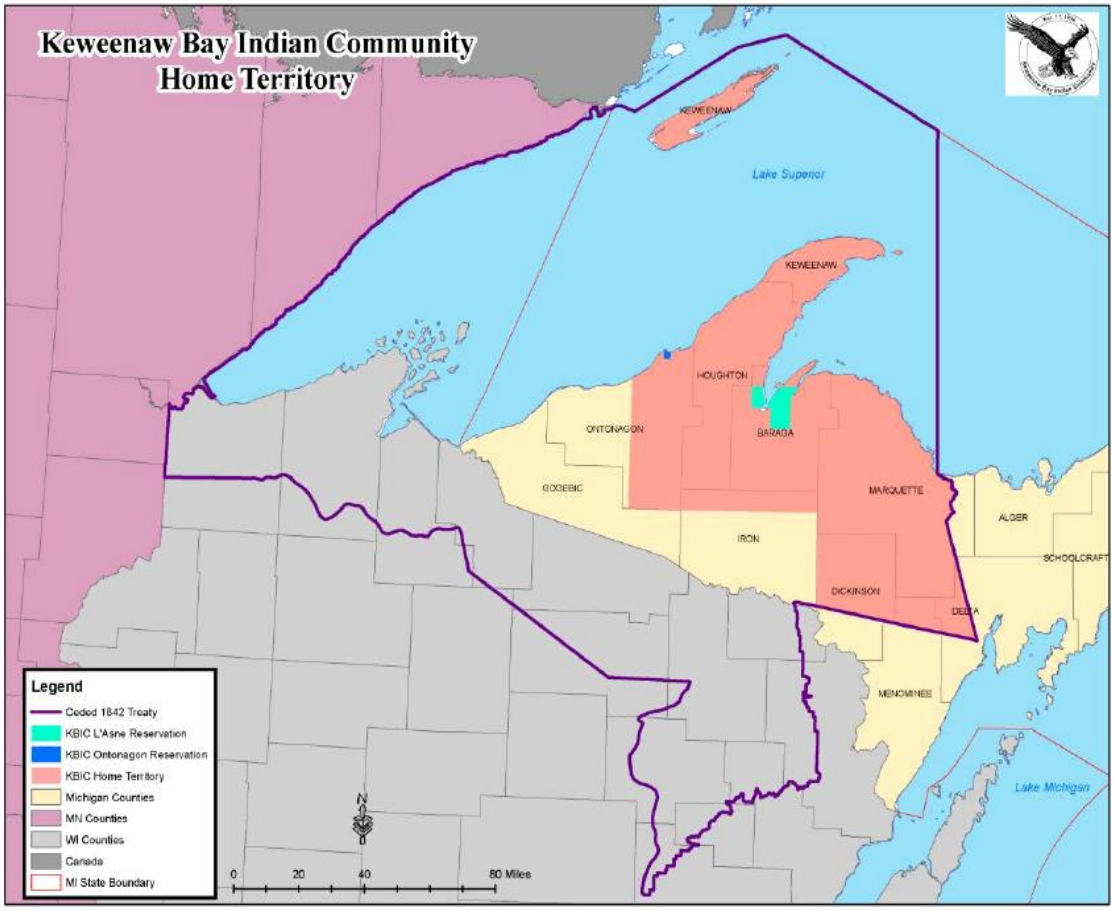


Figure 1. KBIC Home Territory. From *KBIC Wildlife and Natural Resources Report* (2013).

2.2 Forested Lands Maps

Below is an overview map of KBIC-owned land within the L'Anse Reservation. Colors indicate the ownership type ("Tribal" indicates Tribal Trust land). See Appendix 3.0 for KBIC Forest Stand Maps, and associated Forest Stand Map Index.

KBIC Forest Land Overview: Baraga County, L'Anse Reservation

T51N R33W to T50N R32W

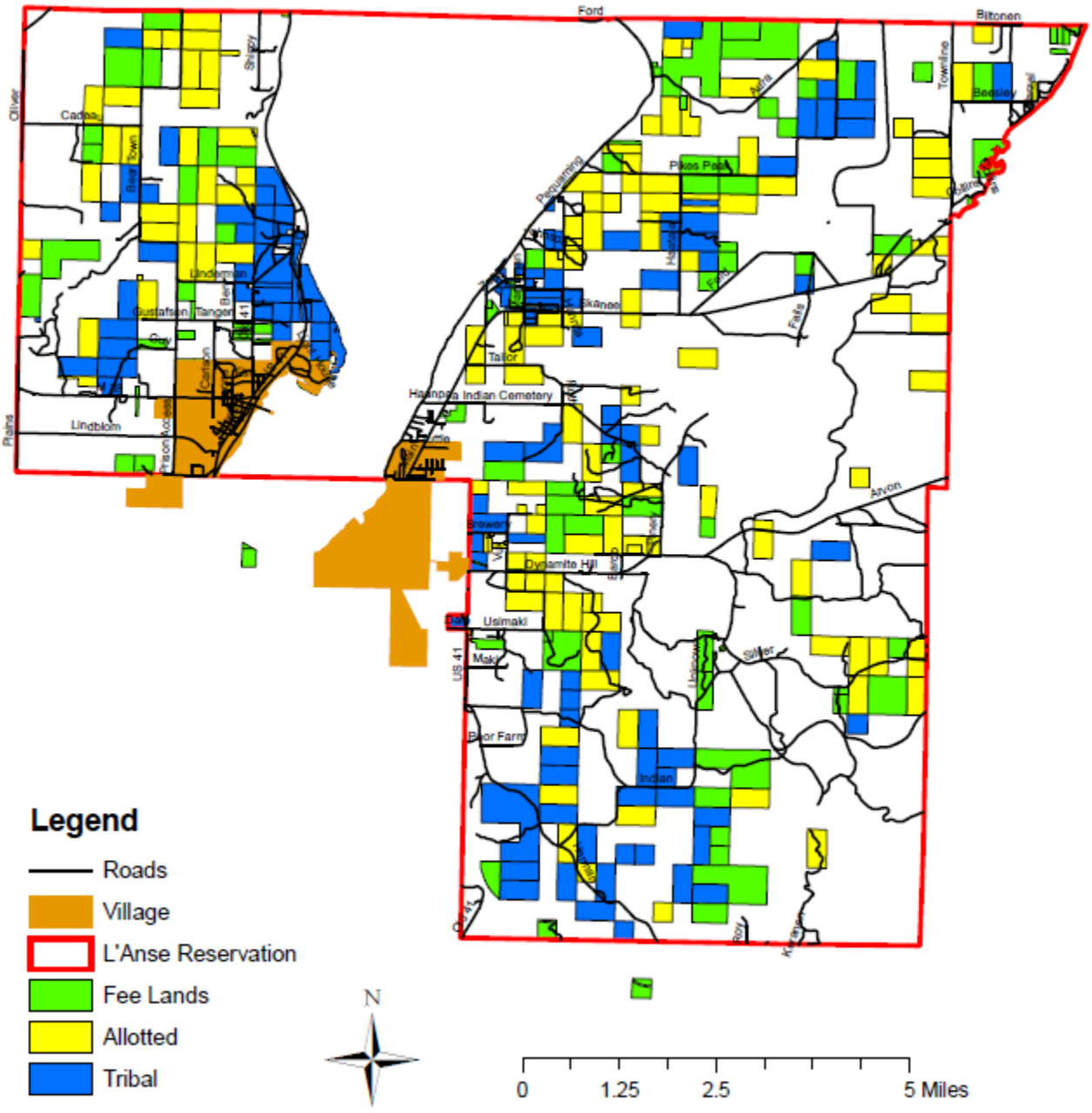


Figure 2. Land ownership and types in the L'Anse Reservation.

2.3 Forest History and Native Forest Management

About 200 years ago, much of what is now the L'Anse Reservation was dominated by sugar maple-hemlock forest, with hemlock-yellow birch being a significant forest type on the northeastern part of the Reservation (Comer and Albert, 1997). See map below for estimated historical forest cover.

Native American societies throughout eastern North America practiced silviculture and agriculture activities just as they do today, creating settlements, travel corridors, openings, and areas of managed woodland plants (Munoz et al., 2014). Trees that bore fruit, nuts, or sap were managed and maintained by pruning, planting, and protecting desirable trees for human and game consumption (Doolittle, 2000). Burning the forest understory, and burning to create openings was also commonly practiced (Wood, 1977; Day, 1953). Native populations used fire to encourage new browse for game, remove understory brush for ease of hunting, and drive game. Intuitively, more intensively managed forest areas were closer to native settlements. European settlement saw a drastic increase in the demand for timber and mineral resources in the area as the population grew exponentially.

Since the establishment of the L'Anse Indian Reservation in 1854, the forest has undergone many changes. Timber cutting in the area was intense following the Civil War in the mid 1860's. By 1910, the pine, northern white cedar and most of the hardwoods was cut. Destructive fire followed on much of the cleared land in the area. Since the early 1900's, fire suppression has been practiced to protect human settlements and interests. This practice has promoted the prevalence of northern hardwood and hemlock mesic forests. These events during the turn of the century and into the 1930's helped shape the forests of the Reservation today. KBIC members have historically used and continue to use the forests for timber, wildlife habitat, firewood, and gathering.

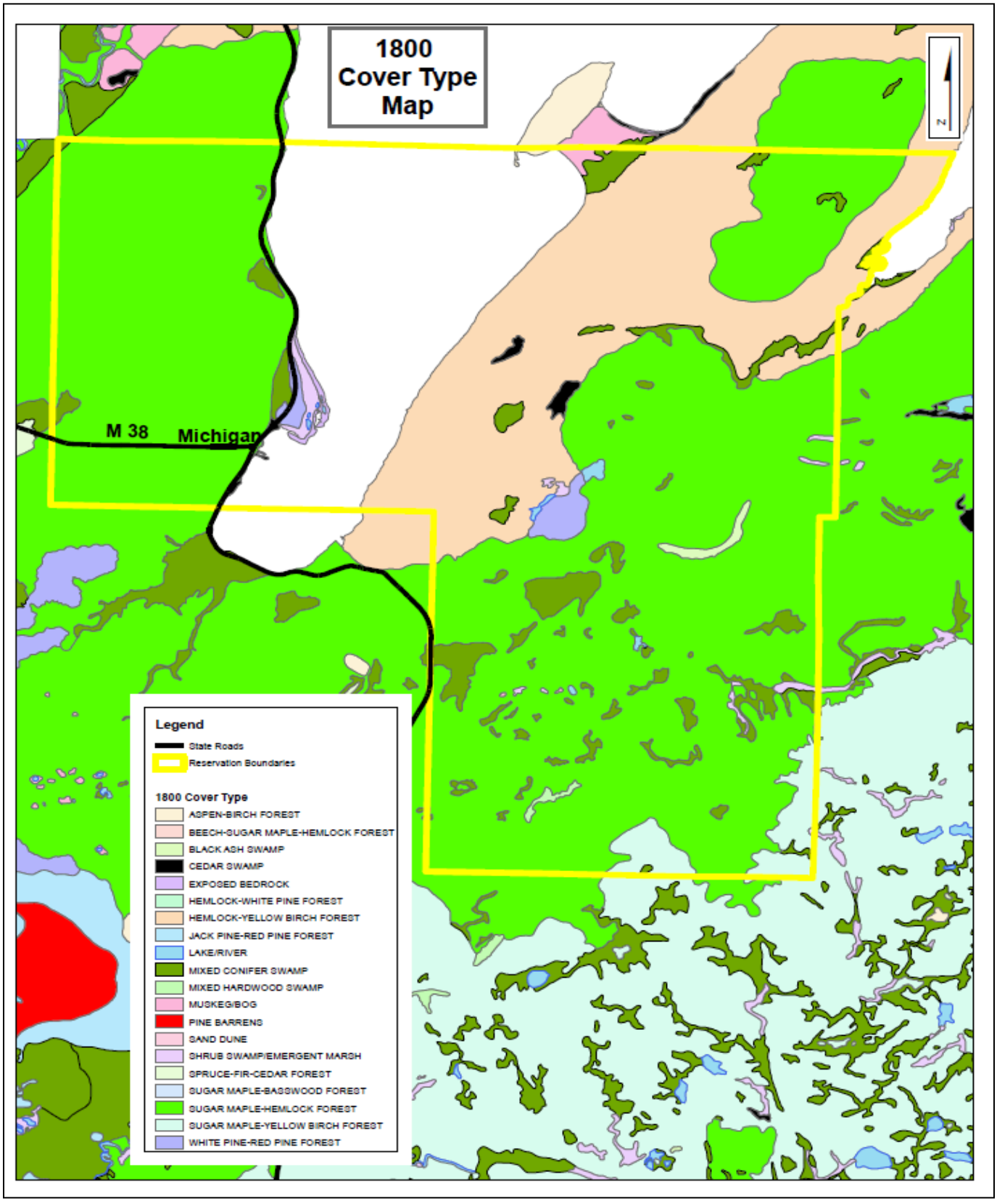


Figure 3. Historical forest cover on the L'Anse Reservation.

2.4 Climate

The climate of the reservation is humid continental climate, moderated by Lake Superior. The growing season is longer (averaging 107 frost free days) than areas to the south. Winters have heavy, lake-effect snowfall averaging 200 inches, or just over 5 meters. Total snowfall decreases slightly in the immediate vicinity of Lake Superior. Average annual precipitation is about 36 inches with approximately 20 inches during the growing season (May through September). Moisture deficits, even in the summer, are usually not severe and only rarely limit plant development. Baraga County has the possibility of very cold temperatures; minimums below -30^{o}F are known to occur. Average annual temperature is about 40^{o}F with growing season temperature averaging about 60^{o}F.

2.4.A Climate Change and Strategies for Resiliency

Climate change is observed and recorded during the last century by annual temperature increases (see line graph below; NOAA, 2017), more sporadic precipitation, and increased intensity of weather events (Janowiak et al., 2014). Climate change models predict the following changes are likely (if not already observed) for the Lake Superior region: milder winters, hotter and drier summers, more precipitation as rain and less as snow, and more frequent and intense rain events. These meteorological changes are then likely to incur changes in migration timing and patterns of wildlife, habitat changes such as less freezing of lake surfaces, change in abundance and distribution of wetlands, more infestations of diseases and non-native species, and reduction of some native species. Some native plant and animal species especially at risk include northern white cedar, paper birch, moose, snowshoe hare, brook trout, lake trout, and medicinal plants. A study completed by the Keweenaw Bay Ojibwa Community College (KBOCC) shows that local people are already noticing changes in the region, and are concerned. The loss of these traditional resources of the KBIC would negatively affect cultural traditions. KBIC passed a resolution in 2015 to establish a climate change adaptation initiative and is currently working on a climate change adaptation strategy and vulnerability assessment. Development of this action plan will address the community's natural and cultural resources affected by climate change.

The graph and maps below denote trends in changing climate in the northern Lake States, depicting 100-year and 50-year trends, respectively. While the maps below (Climate Wizard, 2017) may depict the L'Anse Reservation as more buffered from the effects of increased temperature in comparison to other areas, keep in mind the colors represent average **change per year.**

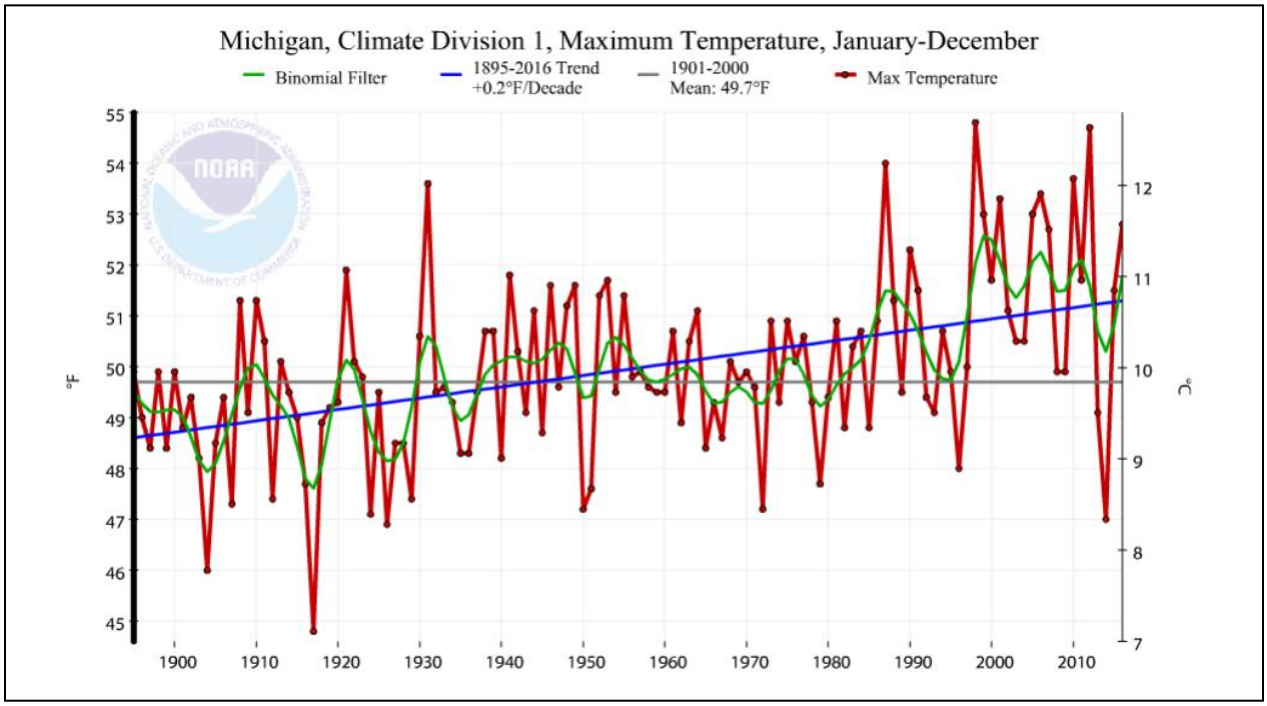


Figure 4. Michigan annual maximum temperature trends over the last 100 years. NOAA, 2017.

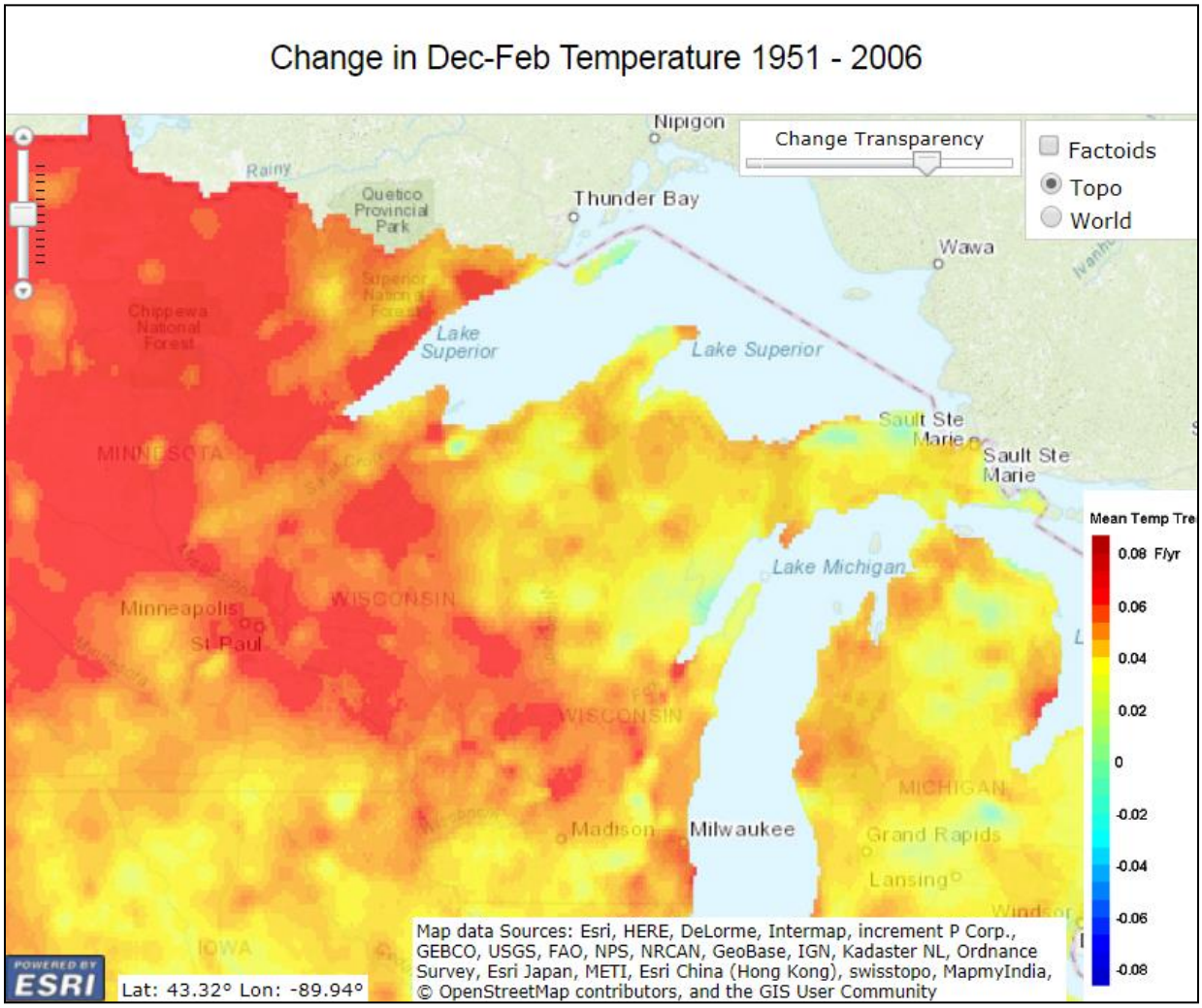


Figure 5. Changes in winter temperature per year, over the last 50+ years. Climate Wizard, 2017.

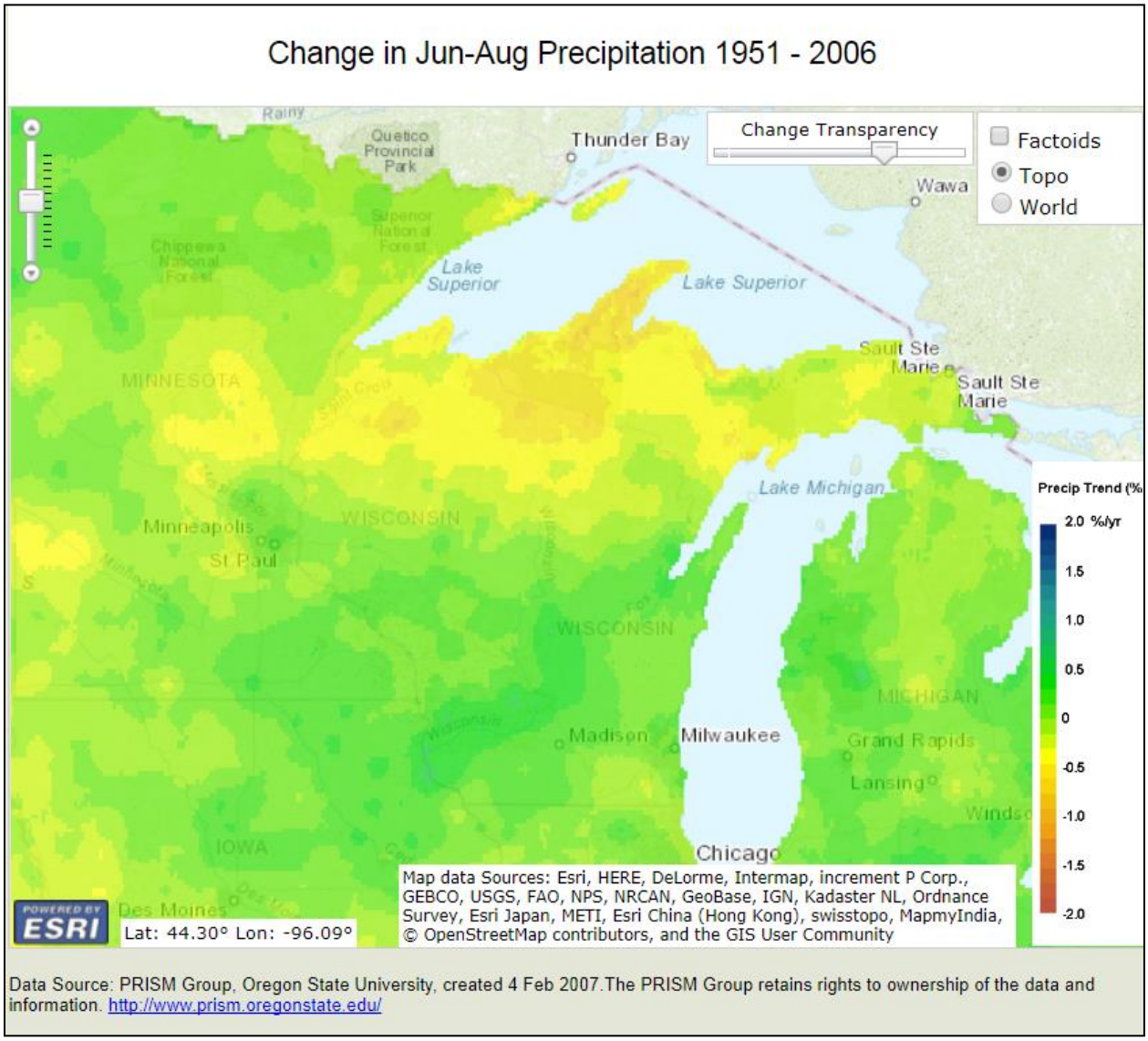


Figure 6. Changes in summer temperature per year, over the last 50+ years. Climate Wizard, 2017.

In summary, historical (last 50 years) trends that have been detected for the L'Anse Reservation area include the following:

- Increase in summer temperature
- Increase in winter temperature
- Increase in winter precipitation
- Decrease in spring and summer precipitation

Implications for these changes are wide-ranging for L'Anse Reservation forests. Predicted and realized changes include increased tree growth and productivity, changing range for existing species and increased

suitability for species to the south, decreased operability time for winter timber sales, increased fire activity during the spring fire season, and increased susceptibility to forest pests. Management prescriptions should be developed with considerations for climate change. KBIC objectives of increasing forest health and sustainability of timber, water, soil, and wildlife resources coincide directly with optimizing forest resiliency to climate change. This Forest Management Plan has integrated the following climate change strategies and the following approaches from *The Tribal Adaptation Menu* (Inter-Tribal Council, in publication) into its objectives and management guidelines:

Strategy 2: Learn through careful and respectful observation (gikinawaabi).

- Learn from beings and natural communities as they respond to changing conditions over time.
- Identify and maintain monitoring and inventory programs (invasive species, cultural plants, forest stand exam inventory)

Strategy 4: Sustain fundamental ecological and cultural functions.

- Protect soil and water resources.
- Maintain and revitalize cultural approaches to harvesting and caretaking.

Strategy 6: Reduce the risk and long-term impacts of disturbances.

- Diversify forests to mitigate the effects of devastating disease and pests.
- Manage herbivory to promote regeneration of impacted beings
- Plan harvest, gathering and collecting opportunities to reduce the risk and impacts of disturbances.

Strategy 8: Maintain and enhance community and structural diversity

- Promote diverse generations (both elder and younger beings)
- Retain biological and cultural legacies
- Identify and maintain protected areas to maintain ecosystem and cultural diversity

Strategy 9: Increase ecosystem redundancy and promote connectivity across the landscape

- Maintain and create habitat corridors

Strategy 10: Maintain and enhance genetic diversity

- Use seeds and other biological material from relatives of beings from across a greater geographic range.
- Favor local beings whose traits are better adapted to future conditions.

- Collect and preserve seeds from beings that are at-risk or of concern to the community.

The *Tribal Adaptation Menu* is a helpful tool to be used with the *Forest Adaptation Resources: Climate Change Tools and Approaches for Land Managers* (Swanston & Janowiak, 2012). These are great resources for navigating the effects and future of climate change in forests. The above strategies, and more strategies defined in the *Tribal Adaptation Menu*, are recommended ways to achieve and optimize forest resiliency.

2.5 Topography, Water, and Soils

Topography

The topography in and around the L'Anse Reservation is glacially formed, with some bedrock-controlled influences (see map below). Some dominant landforms include a till-floored lake plain on the northeast side of the Reservation that hosts finer soils than the glacial till or outwash deposits. Dissected moraines commonly underlie loamy sands and sandy loams, and often give rise to good quality northern hardwood stands. Lastly, bedrock-controlled ground moraine features are found on the east and southeast side of the Reservation, where elevations climb to 1250 feet. The highest point in the state, Mount Arvon, is not on the Reservation, but is on the same bedrock-controlled ground moraine feature and lies only a couple miles east of the Reservation. The lowest elevation occurs at Lake Superior (approximately 600 feet).

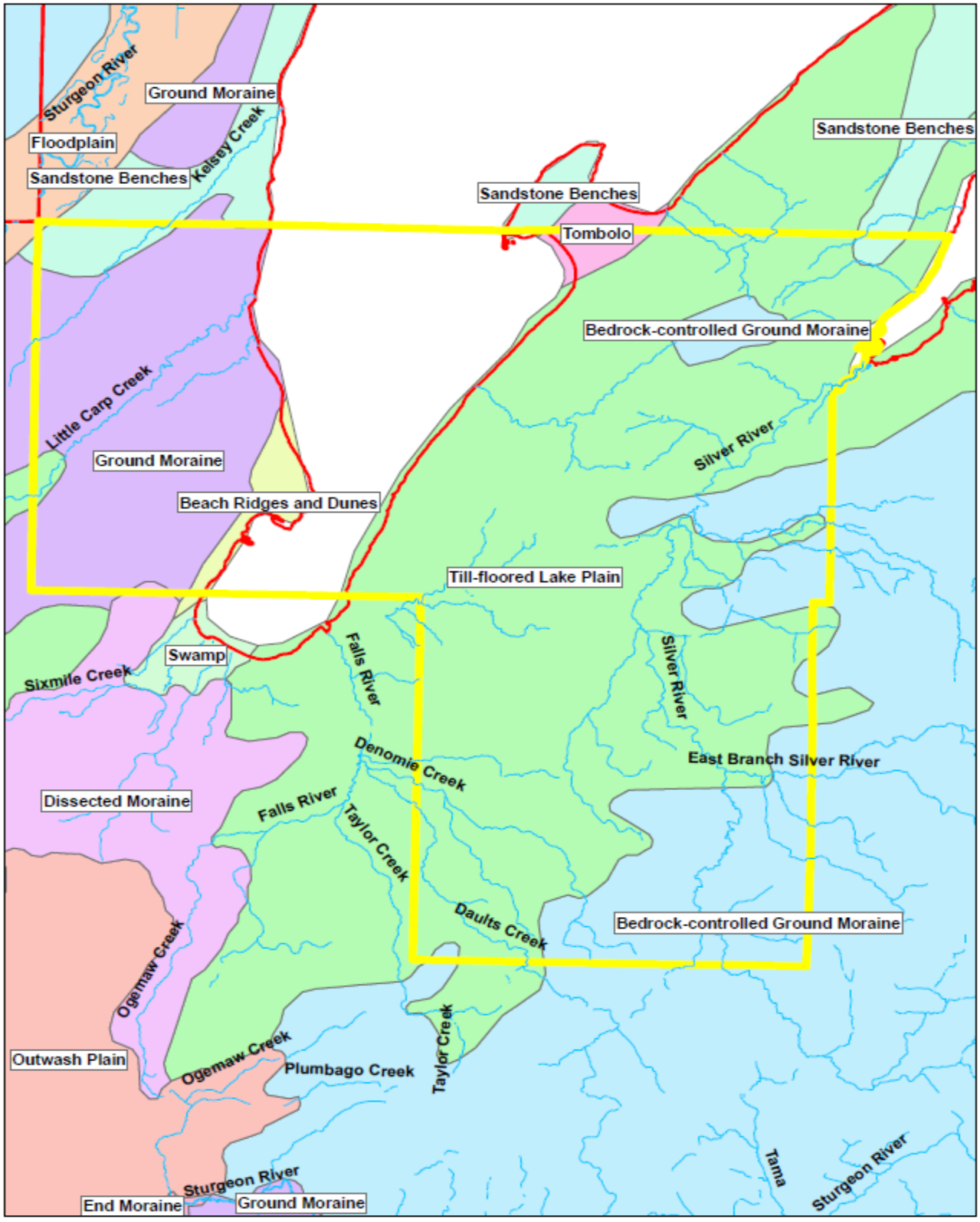


Figure 7: Geological Landforms and Major Streams within L'Anse Reservation

Water

The L'Anse Reservation is defined by the Big Lake, or Lake Superior, since the L'Anse Reservation lies on either side of Keweenaw Bay. For the Keweenaw Bay Indian Community (KBIC) water is the gift of life, water is sacred. The water resources of the Great Lakes Basin have provided subsistence, cultural, and spiritual benefits to many generations of Ojibwe people. Wetlands in particular are highly productive ecosystems that provide a number of services, including filtering toxins, providing nursery habitat for fish, flood control during storm events or spring snow melt, and providing habitat for rare and culturally significant plant species and wildlife. In the Ojibwe language the words for bog (mashkiig), swamp (waabashkiki) and medicine (mashkiki) are similar in origin suggesting a connection between these types of wetland ecosystems and the location that many medicinal plants are found (KBIC Cultural Teachings).

While no rivers with federal designations exist on the L'Anse Reservation, multiple streams and rivers pass through Reservation lands, including Kelsey Creek, Little Carp River, Linden Creek, Silver River, Denomie Creek, Pekkola Creek, Page Creek, Little Silver Creek, Dault Creek, and many supporting tributaries and drainages (see above map of major streams and landforms). The Little Carp River, Silver River, and Dault Creek are larger rivers that KBIC land supports through miles of waterway and thousands of acres of surrounding headwaters and tributaries. Third Lake is a small lake on the L'Anse Reservation that includes a Trust holding, and Loughs Lake is another small lake that is partially surrounded by Fee land. These lakes are important cultural, recreational, and ecological areas for the Tribe, and KBIC Natural Resources Department monitors many of these waterways for surface water quality information.

KBIC forests play a crucial role in supporting and providing clean water, habitat, and flood mitigation for the area. While forested wetlands obviously provide these benefits, upland forests also provide important water features, habitat and corridors as drainages, low pockets, and ephemeral ponds. Aquatic and riparian wildlife rely on habitat corridors and buffers that can mitigate seasonal snow-melt and high flow events. Recognizing that the quality of the waters reflect the quality of the lands adjacent to the waters, it is critical that protection strategies are coordinated to enhance the effectiveness of their outcomes. KBIC conducted a geospatial inventory of wetland resources in 2016-2018 (see map below), and is striving to gather more information about unique wetlands on the Reservation. The Wildlife Stewardship Plan also addresses riparian habitat in more detail (Nankervis and Hindelang, 2014).

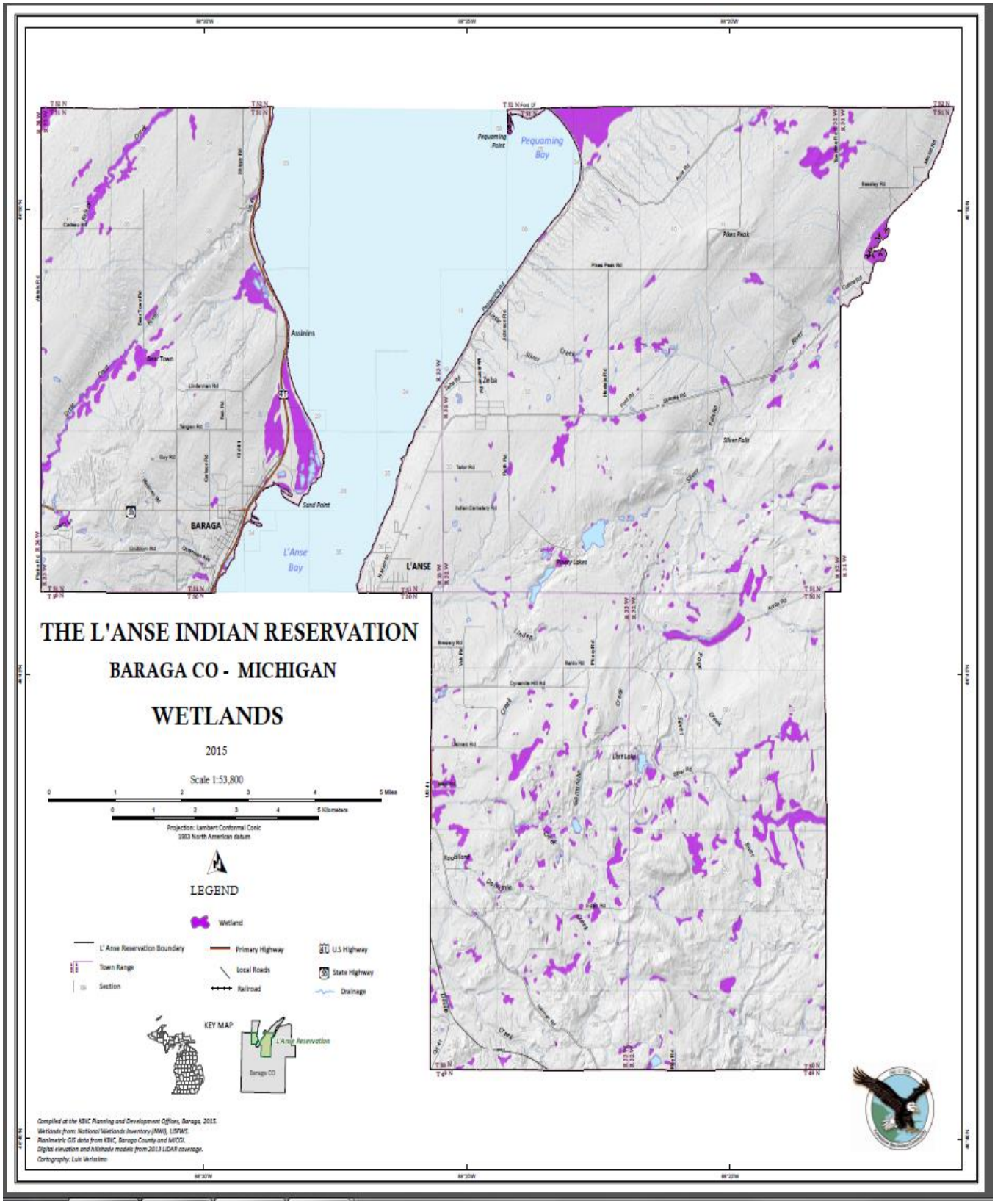


Figure 8: Wetlands identified on the L'Anse Reservation

Soils

The surface features of the Upper Peninsula of Michigan, including Baraga County, are the results of the underlying Archean and Precambrian bedrock features and unconsolidated glacial deposits overlying the bedrock. Landforms including glacially derived sediments, outwash plains, moraines, and till plains created by Pleistocene glacial advances and retreat, which occurred as recently as 9,900 years ago, are the predominant features. As the glacial lobes in Keweenaw Bay melted, a series of ponded-meltwater lakes and wetlands formed, including the area now known as the Baraga Plains. Topography of the area is rugged and the altitude ranges from about 600 feet at the lake level to about 1,979 feet at Mt. Arvon in the eastern part of the county, which is the highest point in Michigan. Upper Precambrian rocks composed of Jacobsville Sandstone are near the shore of Huron and Keweenaw Bays, with interbedded siltstones and shales. Outcrops are visible in many places on or near the shore of Lake Superior.

The soils throughout L'Anse Reservation vary widely in texture, natural drainage, slope, and other characteristics; about 20% of the forested soils area are poorly drained mineral soils and very poorly drained organic soils. The area has over 100 different kinds of soil and because of steep slopes, stoniness, and rockiness; many soils are best suited to woodlands. A few small areas of beach deposits are along Keweenaw and Huron Bays. The largest areas of lake plain sediments consist of stratified sand and clay and extensive deposits of stratified alluvium are in the valley of the Sturgeon River. Most large public water supplies are obtained from Lake Superior, but some smaller supplies are obtained from wells and springs (USDA Soil Survey).

Upland soils are typically well-moderately well-drained loamy sands or sandy loams, such as Munising, Yalmer, Zeba, Abbay, Keweenaw, Kalkaska, and Skanee soils. These well-drained soils typically support the Reservation's northern hardwood forests dominated by sugar maple. The Reservation also has a relatively small area of well-drained sands, which are dominated by mixed pine.

Poorly drained soils occur mostly in depressions, along drainages, and over fragipans or clay lenses. Mucks and peats over sands, fine sands, and loams (Carbondale, Tacoosh, Kinross, Gay, Dawson, Greenwood, Loxley soil types) are typical for the lowlands where cedar swamps, black spruce or tamarack bogs. These deep mucks often do not freeze in the winter, inhibiting heavy equipment for timber sales or road work.

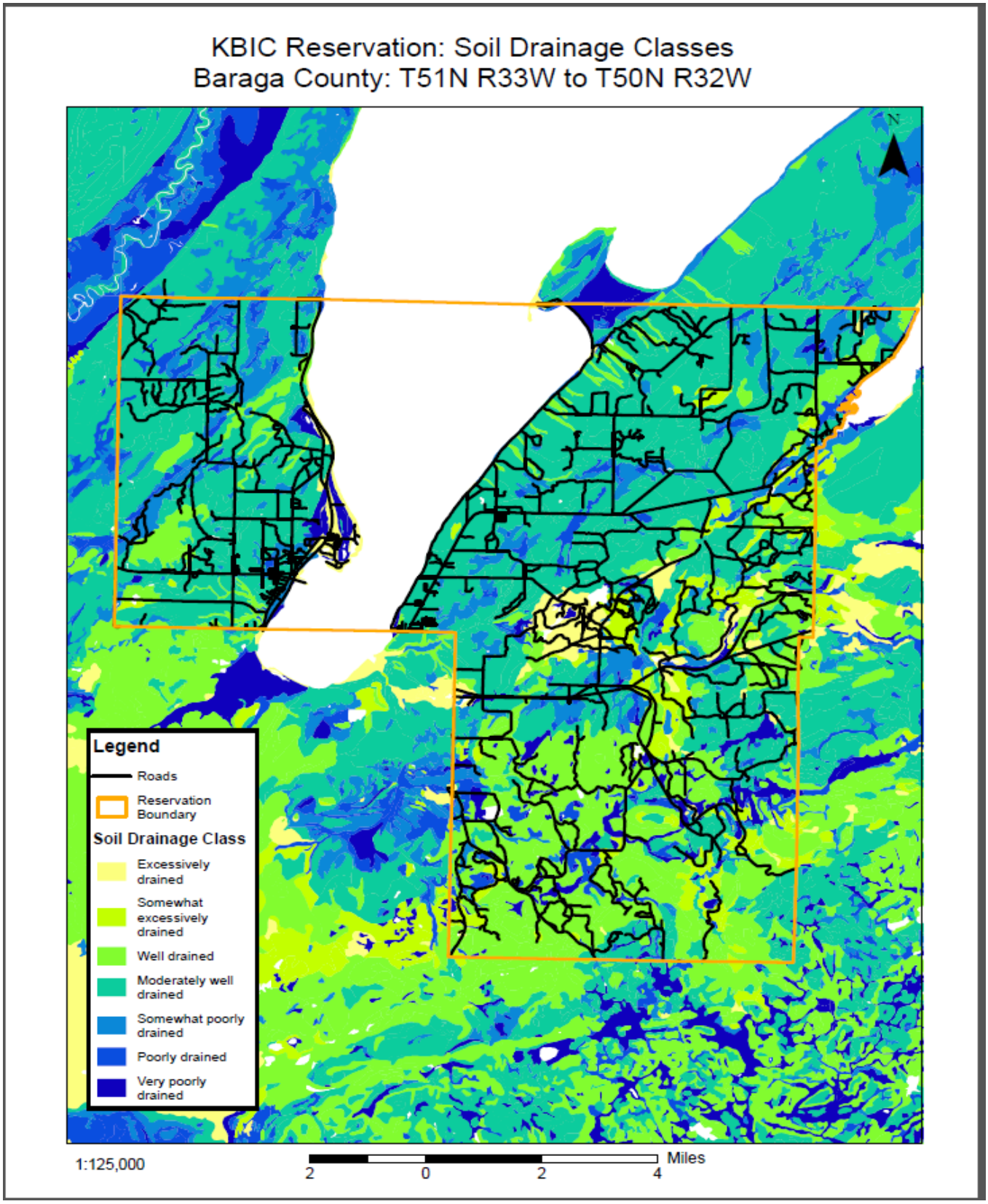


Figure 9: Soil drainage classes on the L'Anse Reservation

Some more minor soils occurring within the L'Anse Reservation include cobble silt loams that have a fragipan, or clay layer at 1-2 feet below the surface. These soils can be difficult to harvest summer or wet periods, and thus dry summer or winter timber harvesting is recommended. Organic soils are found in the wet lowland areas that typically do not freeze hard enough to support timber harvesting equipment. Organic soils are sensitive to impact and provide important wetland ecosystem functions such as carbon sequestration, natural acidification, and support unique bog and swamp habitats.

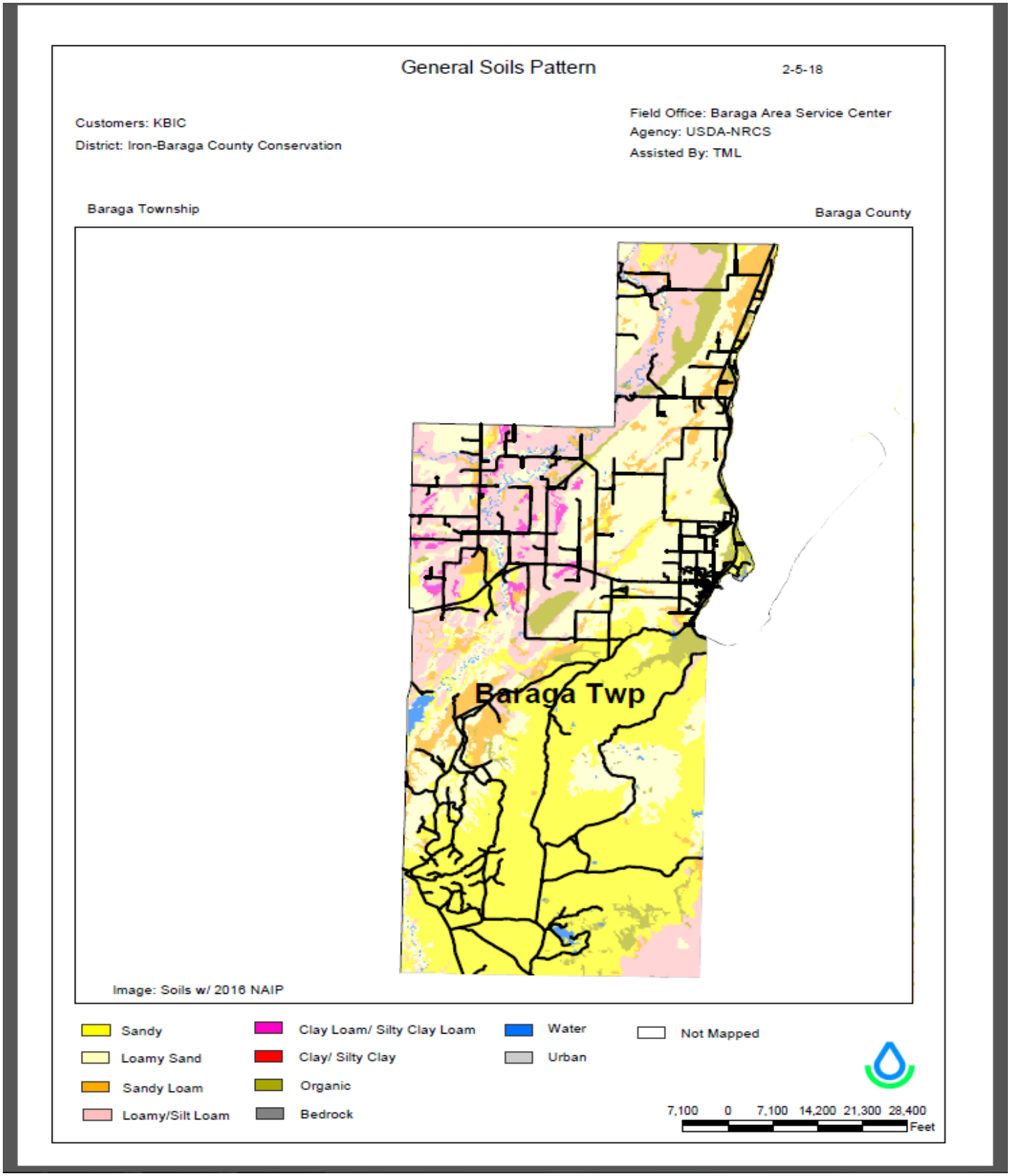


Figure 10. Soil texture pattern across Baraga Township (courtesy of Baraga County NRCS Office).

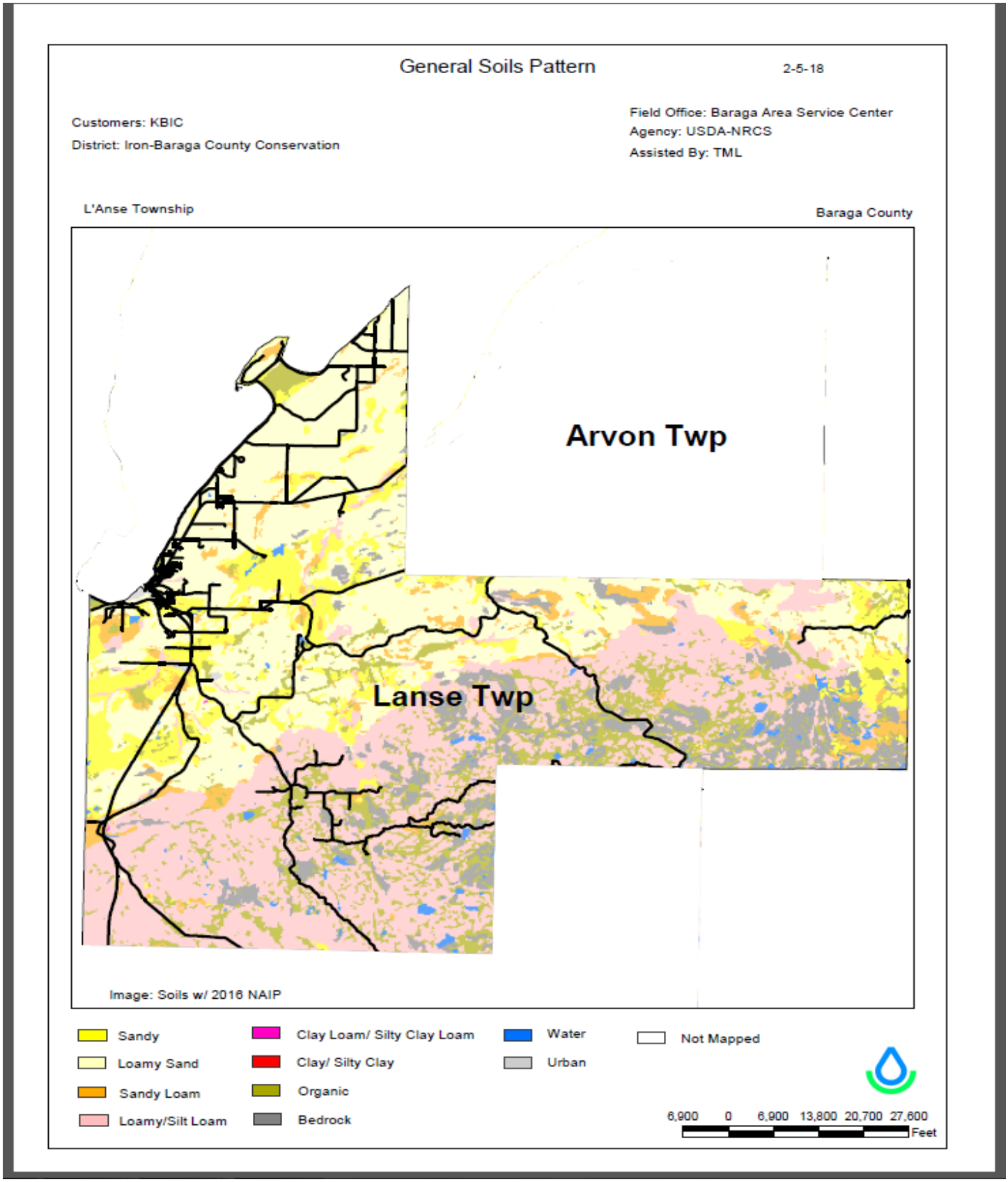


Figure 11. General soil texture pattern across L'Anse Township (courtesy of Baraga County NRCS Office).

2.6 Forest Cover Types

The following forest types are summarized by dominant forest cover. All Trust and Fee lands inventory data that is collected is stratified by the cover types in the table below, which are then grouped by dominant cover type. Cover types with less than 5% cover on the Reservation are considered minor cover types, and are described within their dominant cover type. Stocking charts within each cover type discussion show averages for each species across the cover type.

Dominant Cover Type	Percent of Total Trust Acres	Percent of Total Restricted	Average Basal Area (square feet per acre)	Average Cords per Acre	Average Board Feet per Acre
Northern Hardwoods	59%	31%	119	6.5	394
Aspen/Early Successional	15%	14%	103	8.4	246
Northern Hardwoods/Aspen mix	11%	18%	114	6.8	135
Lowland mix	6%	12%	112	6.5	239
Hemlock/Hemlock Hardwoods	4%	20%	138	8.8	390
Pine	3%	0.9%	120	8.4	632
Unforested: wetlands, water	0.01%	5%	N/A	N/A	N/A
Unforested: grass, brush, undeveloped	0.006%	0	N/A	N/A	N/A

Figure 12. KBIC Forest Cover Summary. Volume data is similar and averaged across ownerships

Northern Hardwood

Northern hardwood forest is by far the dominant forest cover type on the L'Anse Reservation. Northern hardwood forests cover much of the upland, more fertile and well-drained moraine slopes and ridges in the Reservation. Loamy sand and sandy loams are the dominant soils under northern hardwood stands in our area. Aninaatig (sugar maple), red maple, wiigob (basswood), hemlock, and yellow birch are the most common trees found in northern hardwood stands on the Reservation. White pine, giizhik (northern white cedar), and

white spruce occasionally occur, with black cherry, wiigwaas (paper birch), and red oak infrequently occurring in our northern hardwood stands. Maananoons (ironwood), hazelnut, and balsam fir are common in the shrub layer, and spring ephemeral communities occasionally occur on the forest floor.

Northern Hardwood Stocking			
Species	**Basal Area (sqft/ac)**	**Sawtimber Volume (BF/ac)**	**Pulpwood Volume (Cords/ac)**
Red Maple	22.9	440	6.6
Sugar Maple	29.7	395	3.7
Basswood	9.6	93	3.5
Hemlock	16.3	43	3.3
White Spruce	6.9	198	3.3
Yellow Birch	8.9	74	1.6
Red Oak	7.9	605	1.1
Total	119	1848	23.1

Figure 13. Northern hardwood stocking summary. Basal area per species represents average BA for stands in which that species occurs. Average BA per stand is overall average, and does not represent sum of species' averages.

Aspen/Early Successional Forests

The next dominant forest cover type on the L'Anse Reservation is early successional forests. The age of these stands ranges from newly regenerated to approximately 80 years old. These forests are called pioneer, or early-successional, because they result from large scale disturbance. These pioneer forests occupy a wide variety of soils and habitats, from xeric to very wet-mesic. Quaking aspen is the most common tree in this type, with frequent occurrence of bigtooth aspen, balsam poplar, and paper birch. These pioneer communities contain numerous hardwood and coniferous tree associates such as red maple, sugar maple, white spruce, and balsam fir. These species will often be found growing in the understory or sub-canopy, and in the absence of disturbance, will eventually will succeed the overstory pioneers.

Aspen Stocking			
Species	**Basal Area (sqft/ac)**	**Sawtimber Volume BF/ac**	**Pulpwood Volume Cords/ac**
Bigtooth Aspen	40.9	N/A	14.5
Quaking Aspen	32.3	N/A	10.7
Jack Pine	16.5	N/A	4.8
Red Maple	15.6	63	3.7
Red Pine	21.1	141	2.5
Sugar Maple	15.1	37	1.5
Total	103	241	37.7

Figure 14. Aspen stocking summary. Basal area per species represents average BA for stands in which that species occurs. Average BA per stand is overall average, and does not represent sum of species' averages.

Wiigwaas (Paper Birch)

White, or paper, birch is identified as a sacred tree of special cultural use to Tribal Members. Covering approximately 40ac of Trust lands, these stands comprise <1% of KBIC forests. It often occurs with aspen or as a component of an aspen stand. A map of stands with wiigwaas component is below. Commonly associated species in white birch stands are aspen, hemlock, red maple, white spruce, balsam fir, and northern red oak.

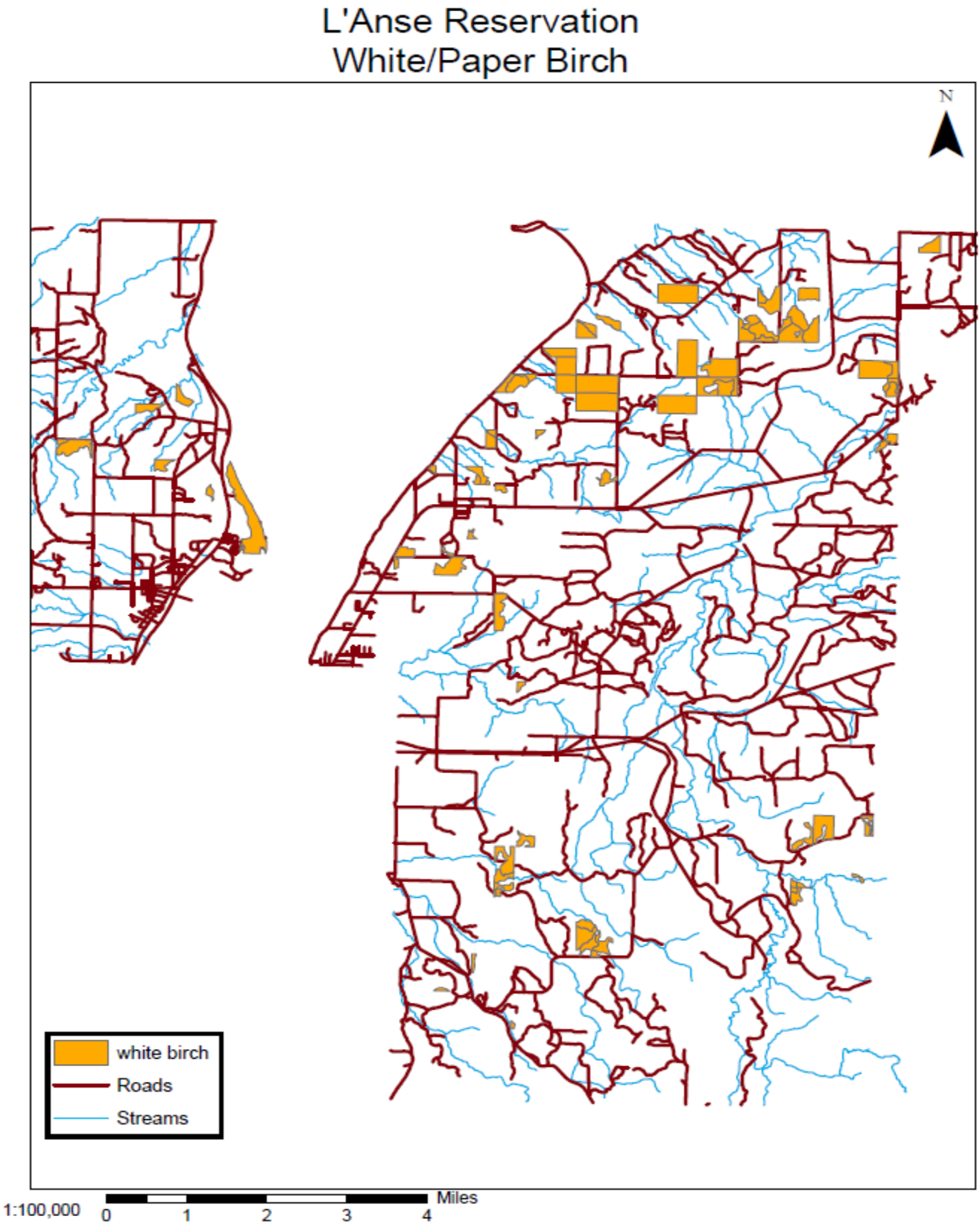


Figure 15. Wiigwaas (white birch) on the L'Anse Reservation.

Northern Hardwoods/Aspen Mix

The BIA Stand Exam Protocol recognizes two similar forest cover types as Aspen/Northern Hardwoods and Northern Hardwoods/Aspen. The difference between the two is the dominant (>50%) cover in the stand. We will combine the two forest types for this discussion, identifying them as Northern Hardwood/Aspen Mix. The ages of these stands range widely: some are two-aged, and the result of hardwood retention in a recent aspen harvest, while many of the older stands (80-100 years old) originated from clearcuts. The species composition found in these stands is very similar to the northern hardwood and aspen cover type descriptions above. Since the soils under these stands are typically not as rich, as well-drained, or excessively well-drained in comparison to northern hardwood stands, red maple and basswood are more common associates in these stands.

Northern Hardwoods/Aspen Mix Stocking			
Species	**Basal Area**	**BF/ac**	**Cords/ac**
Quaking Aspen	28.1	N/A	7.1
Red Maple	24.9	241	5.5
Bigtooth Aspen	29.8	N/A	3.7
Sugar Maple	11.7	90	2.8
Hemlock	13.9	45	3.2
Paper Birch	12.5	140	2.6
Total	114	516	24.9

Figure 16. Northern hardwood/aspen stocking summary. Basal area per species represents average BA for stands in which that species occurs. Average BA per stand is overall average, and does not represent sum of species' averages.

Lowland Forests

This cover type includes all of the lowland forested cover on the L'Anse Reservation, which is often a diverse mix of lowland conifer and hardwood species. This type includes northern white cedar swamps, bogs, and northern hardwood swamps, which are described in more detail below.

Lowland Forests Stocking			
Species	**Basal Area**	**BF/ac**	**Cords/ac**
Northern White Cedar	41.3	243	6.5
Hemlock	23.2	32	4.9
Quaking Aspen	11.7	N/A	4.5
Bigtooth Aspen	12.0	N/A	4.2
Red Maple	16.9	244	4.1
Yellow Birch	13.2	218	2.4
Total	112	737	26.6

Figure 17. Lowland forests stocking summary. Basal area per species represents average BA for stands in which that species occurs. Average BA per stand is overall average, and does not represent sum of species' averages.

Giizhik (Northern White Cedar) Swamps

These forests are found along streams and drainages, adjacent to inland lakes and inter-dunal swales along Lake Superior, and in wet depressions. Giizhik often occurs in the swamps in nearly pure stands. Associated trees include white pine, white spruce, black spruce, tamarack, balsam fir (often in the understory), hemlock, red maple, black ash, paper birch, yellow birch, American elm, quacking aspen, and balsam poplar. Cedar swamps cover a small portion of Reservation lands, but stands with cedar as a component is more common (see map below). Giizhik is a sacred plant to Ojibwa, and boughs are collected for medicinal and personal use. Cedar swamps can be important deer yard areas, but young cedar seedlings can be excessively browsed. Surface soils are acid, organic muck or peat, but subsurface soil layers may be neutral or slightly alkaline in pH. Forest structure and composition are strongly influenced by a constant flow of cold mineral-rich groundwater through the soil.

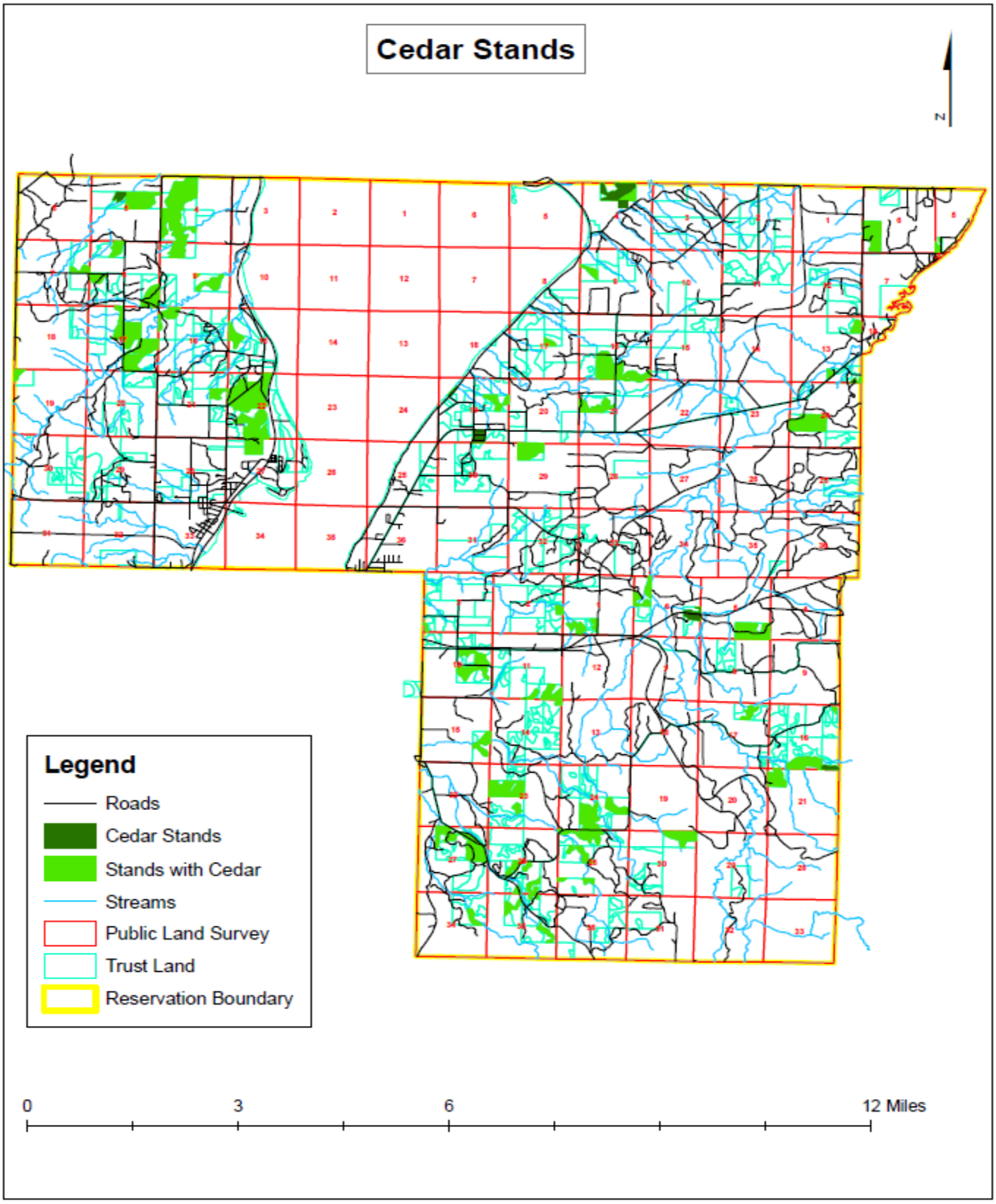


Figure 18. Giizhik (cedar) on the L'Anse Reservation.

Forested Bog

Spruce bogs are wet-mesic habitats and soils are somewhat poorly drained or poorly drained, acid to neutral, light sands to heavy clay loams. Black spruce usually dominates the overstory with occasional white spruce, tamarack, and balsam fir. Northern white cedar is also common in certain sites. Minor tree associates include paper birch, yellow birch, quacking aspen, red maple, white pine, and hemlock. Productivity can be limited by soil acidity and lack of drainage in these systems. Bogs are recognized on the L'Anse Reservation for their unique habitat and shrub and understory species, including the thick Sphagnum (sp.) moss layer that supports the ecosystem.

Northern Hardwood Swamps

Northern Hardwood Swamp describes poorly drained, seasonally inundated communities are found on northern floodplains, glacial lake plains, and moraine stream headwaters. Slightly acid to neutral soils are sandy to sandy loam in texture or muck over a mineral substrate, and support a majority cover of lowland hardwood species. The signature hardwood for KBIC is baapaagimaak (black ash), but white or green ash, yellow birch, American elm, red maple, and balsam poplar also occur. Scattered conifers – balsam fir, tamarack, northern white cedar, white pine, and hemlock – may be present. This forest cover type covers approximately 400 acres on the L'Anse Reservation. They are culturally important as hosts for baapaagimaak. See map below for the location of baapaagimaak stands on the Reservation.

Figure 19. Baapaagimaak swamp in north Beartown

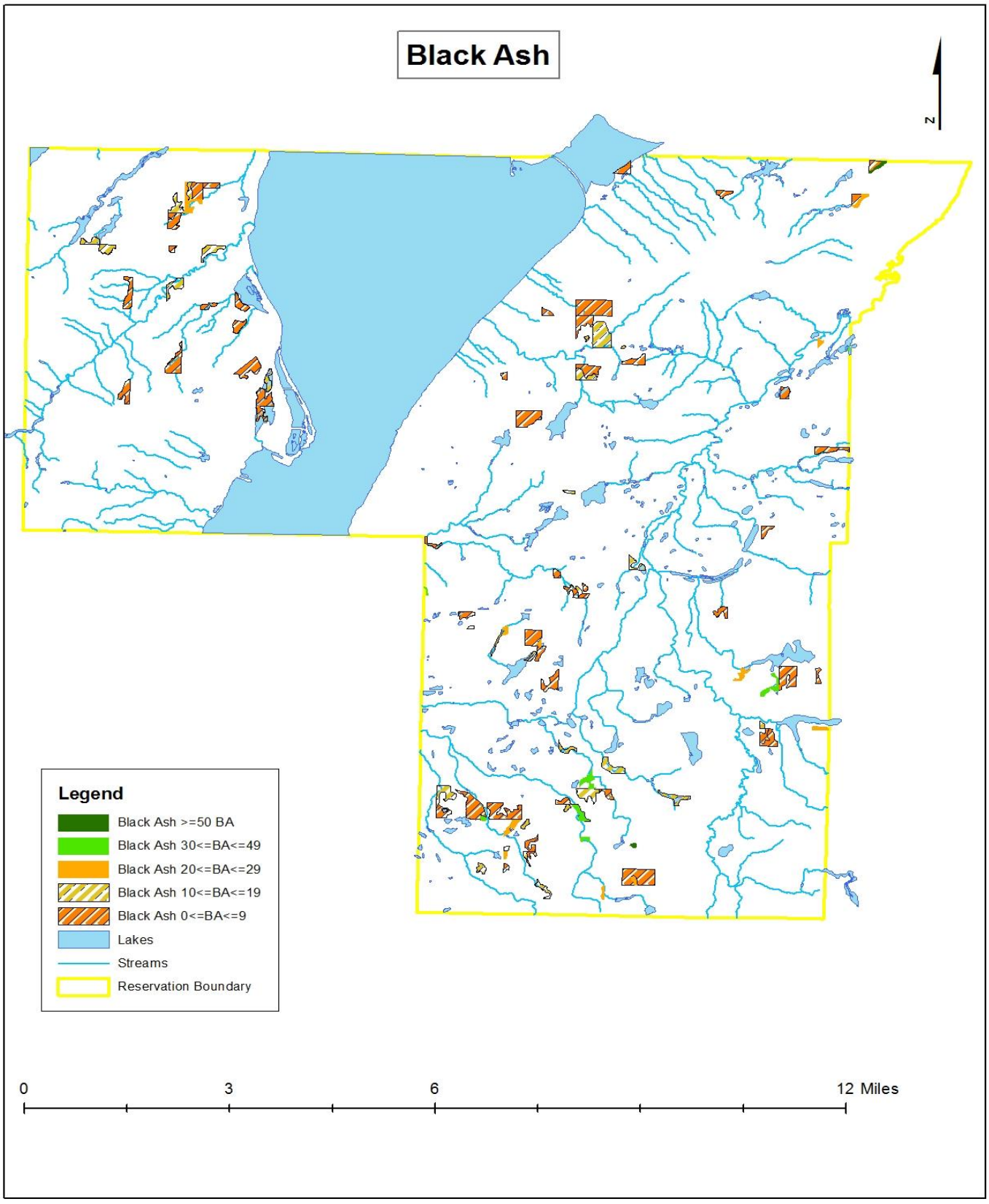


Figure 20. Baapaagimaak (black ash) distribution across the L'Anse Reservation

Hemlock Forests and Hemlock Hardwood Forests

Hemlock/hemlock hardwood forest comprises approximately 5% of L'Anse Reservation. These forests on the Reservation typically are diverse and have complex structure in comparison to other forest types. They are often transitional forests between upland and lowland, and feature species occurring in upland and lowlands: hemlock, aspen, red maple, yellow birch, northern white cedar, white spruce, balsam fir, white pine, and sugar maple are regularly found in this forest type. Since hemlock is often retained and not cut in recent management on the Reservation, most of the hemlock is older (100-150 years old). The soils in these forests are typically more acidic than hardwood-dominated stands, and they commonly occur on the north-facing slopes of ridges and ravines. This type is recognized as important deer wintering habitat, and small mammal habitat on the Reservation (Nankervis and Hindelang, 2014). Upland spruce/fir is discussed below since it a minor forest type and as a long-lived conifer has similar objectives to hemlock.

Upland Fir/Spruce

Upland Fir/Spruce forests comprise less than 1% of forest cover on the L'Anse Reservation. These are typically mid-seral stands that have over-mature aspen that is a minor component and falling out of the stand. Soils are well-drained to poorly drained and acidic. White spruce and balsam fir dominate, with red maple, yellow birch, white birch, hemlock, black spruce, and northern white cedar commonly occurring in the stand.

Hemlock Hardwoods Stocking			
Species	**Basal Area**	**BF/ac**	**Cords/ac**
Hemlock	46.2	141	10.7
Bigtooth Aspen	16.2	N/A	8.3
Quaking Aspen	13.6	N/A	5.4
Red Maple	25.6	386	5.1
Northern White Cedar	20.4	N/A	5.1
Balsam Fir	17.1	N/A	3.5
White Spruce	8.7	275	2.6
Sugar Maple	12.3	261	2.1
Total	138	1063	42.8

Figure 21. Hemlock hardwood stocking tables. Note that basal area per species represents average BA for stands in which that species occurs. Average BA per stand is overall average, and does not represent sum of species' averages.

Pine Forest

While red pine, white pine and mixed pine make up a relatively small component of the forested area, the L'Anse Reservation has two very culturally significant places, the Powwow Grounds and the Indian Cemetery east of L'Anse, that are dominated by pine. Red and jack pine occur on dry sandy soils, and red pine with white pine will predominate on more mesic sandy loams. Numerous hardwood and conifer trees can be associated with forest in our area: northern red oak, red maple, black cherry, bigtooth aspen, quacking aspen, paper birch, hemlock, balsam fir, and white spruce.

Pine Stocking			
Species	**Basal Area**	**BF/ac**	**Cords/ac**
Jack Pine	30.6	N/A	17.4
Red Pine	33.3	1738	8.0
White Pine	21.4	2367	2.1
Bigtooth Aspen	13.0	N/A	6.6
Quaking Aspen	12.0	N/A	6.0
Total	120	4105	40.1

Figure 22. Pine stocking tables. Note that basal area per species represents average BA for stands in which that species occurs. Average BA per stand is overall average, and does not represent sum of species' averages.

2.7 Wildlife

KBIC has a strong stewardship vision to respect all relationships between wildlife, plant, and human communities as guided by the Seven Generations principle and The First Treaty teaching. Wildlife hold special significance for the Anishinaabe because of the Odoodemiwag clan system. Anishinaabe recognize seven clans, each with different strengths and gifts to share with their people (Benton-Banai, 1988).

A thorough explanation of KBIC's approach to wildlife stewardship is presented in the KBIC Wildlife Stewardship Plan which guides wildlife decisions and activities on the Reservation (Nankervis and Hindelang, 2014). The WSP was developed with input from Tribal members through a Wildlife and Natural Resources Survey conducted in 2013. Survey results are presented in a report that articulates the interests, needs, and desires of the Tribal community for subsistence hunting, gathering, land use, and non-consumptive use

(Gagnon et al., 2013). Preservation of forested lands for large predators (ma'iingan), mooz (moose), and winter habitat for waawaashkeshi (white-tailed deer) received strong support from the Tribal community.

The KBIC Forestry Department implements forest management activities to benefit and enhance wildlife habitat. The Forestry Department works closely with the Natural Resources Department to improve wildlife habitat, identify key core habitat and corridors, and develop outreach to increase knowledge and use of Reservation lands for Tribal Members hunting areas. The KBIC Forest Inventory process has two primary management guidance groups, large game habitat, and small mammal habitat; to help guide stand-level objectives. See *2.2 Forest Inventory* section of this management plan for a list of Special Management Zone codes. Large game includes waawaashkeshi (white-tailed deer) and Mu-kwa (black bear). Small mammal species include waabooz (rabbit, snowshoe hare), waagosh (fox), wiisagi-ma'iingan (coyote), esiban (raccoon), ajidamoo (red squirrel), and other small mammals. Bine (grouse), gichi-bine (turkey), and woodcock, are also recognized as upland game birds, and share large game habitat practices. The silvicultural prescriptions developed in this management plan promote wildlife habitat with the following recommended management practices:

Large Game Habitat Management Practices	**Small Mammal Habitat Management Practices**
Irregular harvest boundary	Snag retention
Coarse woody debris retention	Coarse woody debris retention
Deer wintering conifer cover	Conifer/landscape connectivity
Conifer retention/cover	Riparian harvest buffers
Promote mast producing trees	Increase structural complexity (multiple size classes)

Figure 23. Stand-level wildlife habitat practices to implement with forestry actions.

Pollinators

In seeking to expand our commitment to pollinating insects, KBIC–NRD tends to three honeybee hives at the People's Garden Site. To assure health and survival of both the honeybees and native bumblebees, increased plantings of vegetation that are abundant in nectar are being grown in several locations on tribal lands. These include the seed orchards, fruit orchards and wildlife hedgerows at the Brewery Road Garden site, the Sandpoint restoration site and garden plantings at the NRD facility. The intent is for insects to have a continual food resource from the time snow melts in spring until the onset of winter. The KBIC Ecologist is developing a Pollinator Protection Plan, implementing pollinator plantings near the apiary, and coordinates with KBIC Forestry Department to retain and promote pollinator tree species such as basswood, oak, birch,

elm, and black cherry where they occur on the Reservation. Thus, the objective of diversifying KBIC forests to promote ecosystem health is important to many Departments and is accomplished through effective collaborations.

2.8 Conservation and Protection

2.8.A Listed Species

KBIC is a steward of its land and all the life that inhabits it. Thus the Tribal community strives to protect species that have been identified as threatened, endangered, sensitive, or otherwise imperiled. To keep updated on the location and condition of these species, KBIC uses the US Fish and Wildlife Service Midwest Listed Species service (USFWS, 2018). Another regional resource is Michigan Natural Features Inventory (MNFI) that conducts periodic surveys for listed species in the state of Michigan. The USFWS species sheets provides land use recommendations that protect habitat, nesting periods, or otherwise mitigate the effects of land use on any listed species.

Many animal and plant species have been "listed" by various federal and state agencies as Threatened, Endangered, and Species of Concern**.** An **Endangered** species is a population of organisms which is at risk of becoming extinct because it is either few in numbers or threatened by changing environmental or predation parameters. **Threatened** species are species which are vulnerable of becoming endangered in the near future. **Species of Concern** are those species about which federal agencies such as the National Marine Fisheries Service (NMFS) or state agencies have some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the Endangered Species Act (ESA). This designation is meant to draw proactive attention and conservation action to these species. Species of concern status does not carry any procedural or substantive protections under the ESA. Some of the protected terrestrial species identified within the range of KBIC land are listed below, with their status:

Federally Listed Species

- Canada Lynx- Threatened
- Gray wolf- Endangered
- Northern long-eared bat- Threatened
- Kirtland's Warbler- Endangered
- Rufa red knot- Threatened

State Listed Species

- Goblin moonwort- State threatened

- Floating marsh marigold-State threatened
- Pine drops- State threatened
- Canada rice grass- State threatened
- Big-leaf sandwort- State threatened
- Narrow-leaved gentian- State threatened
- Showy orchis- State threatened

Figure 24. Ma'iingan, or grey wolf. Photo by USFWS
https://www.fws.gov/midwest/wolf/aboutwolves/r3wolfrec.htm

Suitable habitat exists for these protected species exists on the Reservation. Consulting with KBIC and BIA Biologists and obtaining an Endangered Species Act Section 7 Consultation (ESA Sec 7 Review) is crucial information that will guide forestry activities to maintain and improve these species' habitat. More recommendations to aid and protect unique species are listed below:

- Implement at least the MI BMP recommended riparian management zone (100')
- Identify and maintain wildlife corridors
- Delineate retention, or refugia areas that are unique, from the timber sale area
- Promote long-lived conifer cover for deer-wintering and other wildlife habitat
- Operate within recommended timing windows

- Do not harvest in fragile or wetland soils unless minimal damage is incurred

Due to the number of Species of Concern in the area, they are not listed here. For a complete list of species of various listing status in Baraga County, please see the interactive MNFI table . Since the condition and location of many species changes, this list can be used as a reference for current and historical species of concern that are found in the local area. By following the above recommendations and those provided by KBIC and BIA Biologists and ESA guidelines, KBIC is ensuring protection of listed species. Since KBIC practices sustainable forest stewardship, forest management actions are not typically changed because of ESA.

Every time the Tribe decides to alter the land in any way, for example forest management, building, or other development, a site assessment is first required and documented. On Trust land, the BIA Biologist or Environmental Specialist provides a NEPA (National Environmental Policy Act) analysis detailing what potential threatened species may be affected, and mitigation to minimize the effects. On KBIC Fee land, the same process is completed by the KBIC Environmental Specialist. By completing the assessment, the Forester or land manager becomes aware of the presence of any listed species on or near the affected area. Specific management recommendations are outlined in the Environmental Specialist's assessment, to best protect the listed species.

2.8.B Cultural and Conservation Areas of Interest

The L'Anse Reservation holds some forested sites that are of cultural, ecological or conservation importance to the Tribe. For this discussion, they are called Cultural and Conservation Interest Areas. We also use the designation Forests of Recognized Importance (FORI) in this management plan, which are recognized by many organizations. FORI are defined as "globally, regionally and nationally significant large landscape areas of exceptional ecological, social, cultural or biological values" (MI Tree Farm Committee, 2017). According to this definition, L'Anse Reservation has FORI in the following areas: Lakes Coastal Shoreline (Sand Point), Great Lakes Marshes (Sand Point and Mud Lake), and Old-Growth Hemlock FORI (which includes Potential Old Growth (POG) Hemlock and Little Carp Conservation Areas discussed below). These areas may have management objectives (such as recreation, preservation, and cultural use) that may differ from the larger forest cover type, because of their significance and/or current use. Timber is not regularly scheduled to be harvested in these areas. For this reason, the acreage is not included in the Annual Allowable Cut development. Please see the Cultural and Conservation Areas of Interest map below for each site and its following discussion.

Figure 25. Cultural and Conservation Interest Areas in western L'Anse Reservation

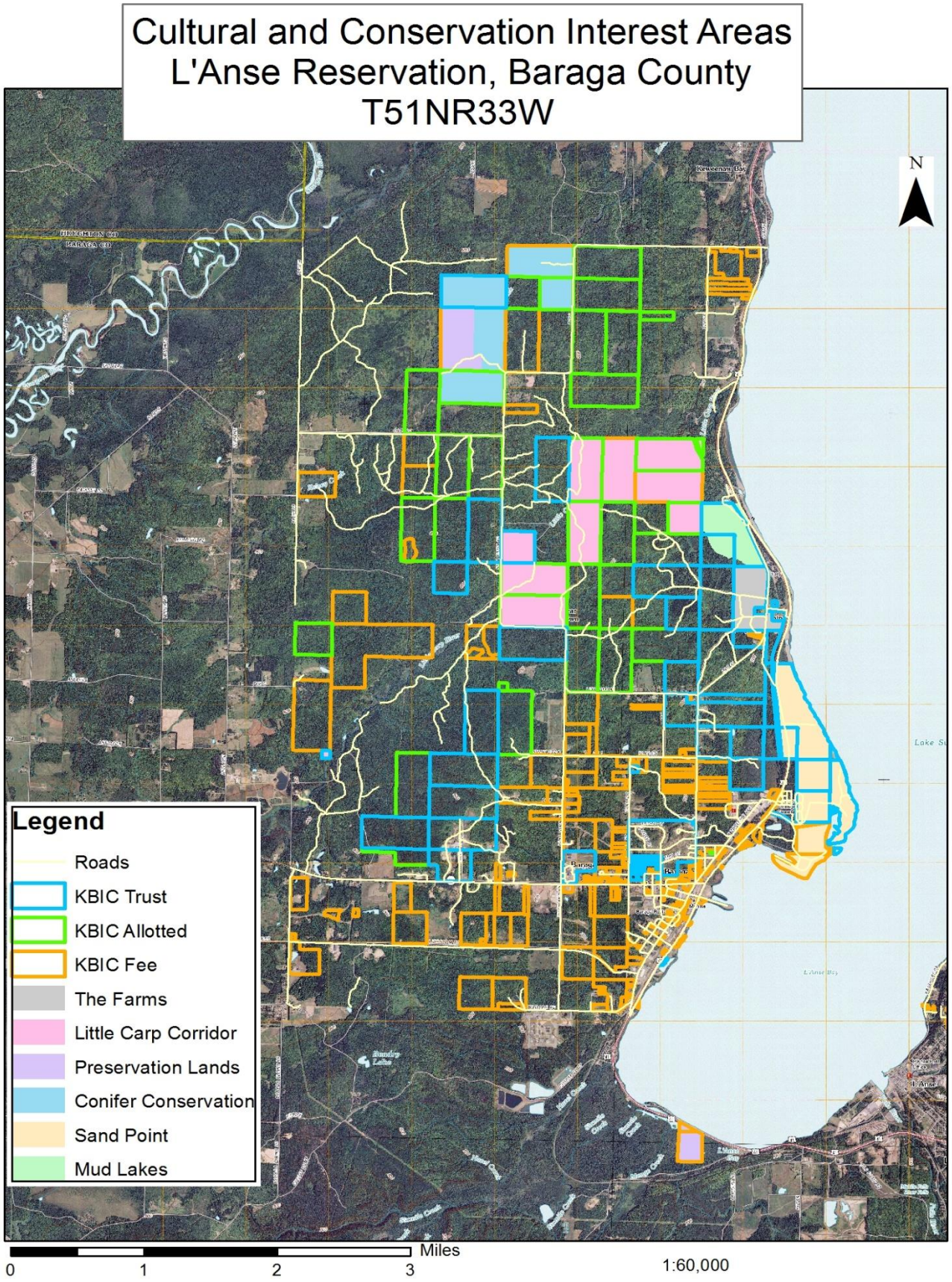
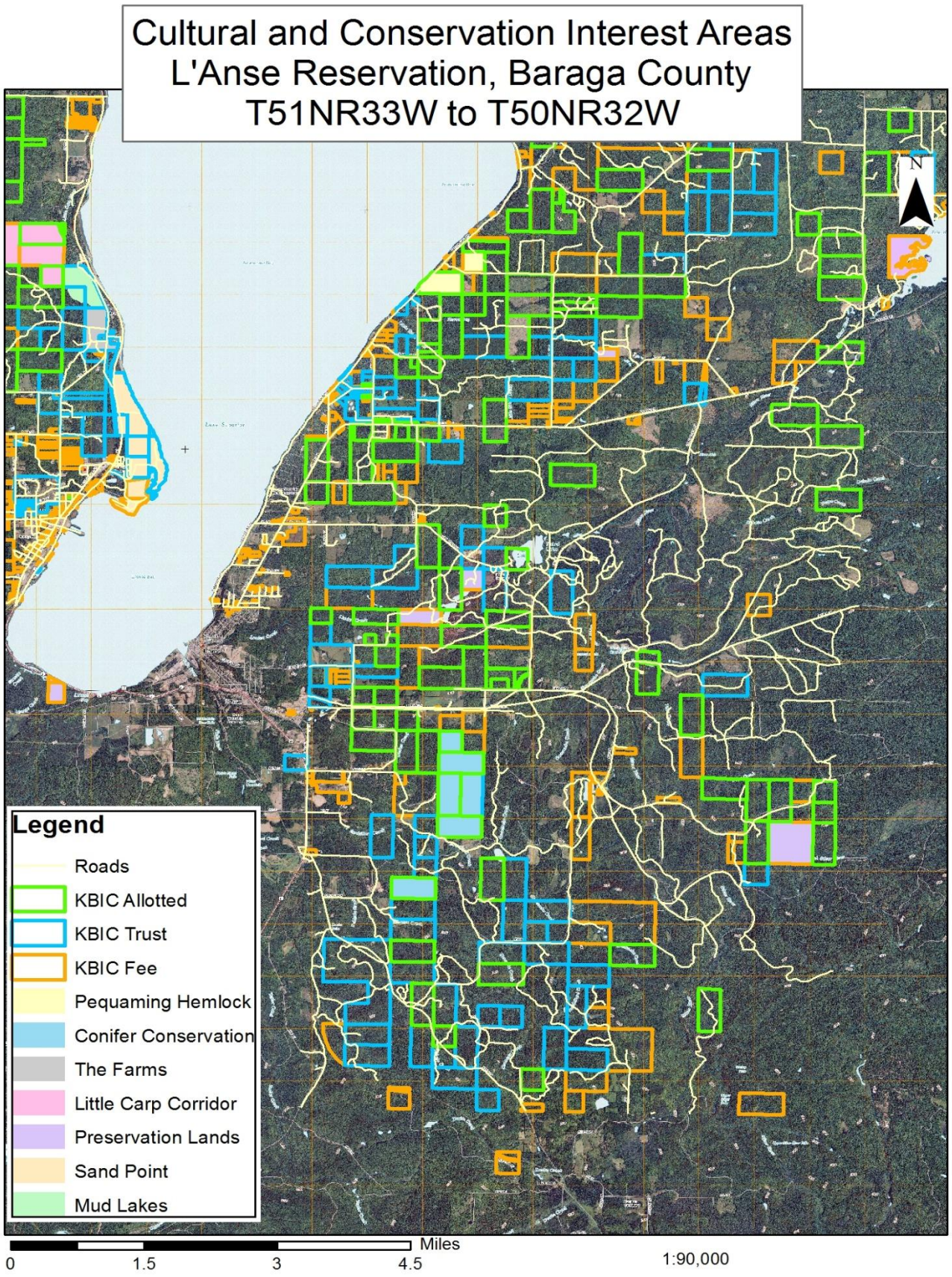


Figure 26. Cultural and Conservation Interest Areas in eastern L'Anse Reservation



Sand Point: Great Lakes Coastal Shoreline

KBIC holds land directly along Lake Superior shoreline, on both sides of Keweenaw Bay. The largest landholding is the Ojibwa Recreation Area, just northeast of Baraga. The entire area of "Sand Point" as discussed here (approximately defined on the map above) includes Sand Point, Ojibwa Recreation Area, Pow-wow Grounds, and Great Lakes Marshes. Sand Point is a coastal sand beach bordering Great Lakes Marshes within the Ojibwa Recreation Area. The majority of the area is sand beach and wetland. Small areas of sand spits are dominated by white and red pine, and blueberries. A brief history of the Sand Point Restoration and Environmental Health Project is below, from KBIC Natural Resources Department Sand Point Restoration Project Summary:

"Mass Mill mining efforts from 1902-1919 unloaded over 6 billion pounds of stamp sands into Lake Superior north of the L'Anse Indian Reservation. Stamp sands have moved with currents, wind and wave action and along with the lake bottom, cover shoreline beaches south of the original mill site, including our tribal property at Sand Point. Without assistance, it is estimated that it would take over 850 years to naturally recover this area. Stamp sands are detrimental to health as they contain heavy metals and are toxic to plant life. In addition, the physical nature of stamp sands with their sharp edges and dark coloring combined with the wind and heat make it very difficult to establish any vegetation in this area to support a healthy ecosystem. This legacy pollution is a concern for our Community as it is part of a large property which is widely used by the public for recreation, is a wildlife conservation area, and a culturally significant place for our Tribe.

In 2010, with the Great Lakes Restoration Initiative, opportunities presented themselves to begin restoration at this site. Since this time, over 2.5 miles of shoreline and 34 acres have been covered with topsoil and native plantings. Sand Point now hosts a pollinator friendly demonstration garden and walking/fitness trails next to Lake Superior as well as wetland trails nearby. This cap not only protects shoreline life but provides a buffer to protect nearby wetlands which hold our wild rice and cranberry beds as well as numerous other medicinal plants. Other life protected includes the numerous wildlife species which have been documented using this area through game camera, waterfowl, and amphibian studies. This area provides unique educational opportunities for community, schools, and organizations on the

importance of legacy pollution restoration to the health of the environment."

Figure 27a. Stamp sand migration onto the south end of Sand Point.

Figure 27b. Sand Point native plantings on restoration site.

Figure 28. Recreational beach on Sand Point and the Ojibwa Recreation Area

Great Lakes Marshes

The largest continuous Great Lake Marsh on KBIC land is within Ojibwa Recreation Area, which is primarily Trust land. It is dominated by ericaceous shrubs, spits of white pine, and a stunted tamarack bog. Due to the cultural, ecological, and recreational uniqueness of the Ojibwa Recreational Area, the goal is to maintain the Great Lakes Shoreline and Marshes. Another Great Lakes Marsh is Mud Lake, described below after the Ojibwa Recreation Area.

Figure 29. White pine spits in Great Lakes Marsh within the Ojibwa Recreation Area.

Ojibwa Recreational Area and Pow Wow Grounds

KBIC owns and manages the Ojibwa Recreational Area, an area of special recreational and cultural importance just north of the Village of Baraga. Recreational amenities include a campground, boat launch, park, ponds, light house, walking paths, ecologically unique wetlands, and beautiful Lake Superior beaches. In the winter Sand Point is used heavily as a launch for ice fishing activities on the Keweenaw Bay. Summertime sees even more traffic in the park with campers, and non-motorized and motorized day-users fishing, biking, hiking, and recreating.

The west side of the Recreational Area is known as the Pow Wow Grounds, a site of cultural significance to the Tribe. KBIC holds public cultural events and celebrations in an outdoor amphitheater within the park. Tribal leadership would like to thin the overstocked red pine stand just west of the Pow Wow Grounds. See section

5.3 *Silvicultural Guidelines, Pine* of this FSP for more guidelines for thinning red pine. Hand cutting and low-impact harvesting is recommended since this is a recreation area of high visibility and traffic.

Finally, the Ojibwa Recreational Area holds special importance because of archeological burial mounds within the park. A cultural maintenance plan is under development to keep the mounds protected. This may include preventing tree tip-ups, and cutting declining trees or trees that may damage the cultural resources.

Mud Lake

Mud Lake is another Great Lake Marsh under KBIC Trust ownership. It was originally a wetland connected to Lake Superior, prior to the building of old US41 (Mission Rd). Wild rice has been seeded and grown here in past years and there was an attempt made to have some control of drainage with a stop log structure near the culvert to Lake Superior. Since then, there has been additional building in the area of the stop log structure; both by property owners and beaver. There have been attempts to clear culvert and stop log structure to assist drainage. The current access road on the east end of the upper lakes is actually lower than the lake water level. USDA-NRCS had suggestions on road repair but it was decided to wait on a more holistic plan. This wetland is a waterfowl index station with wood duck boxes, turtle platforms, a viewing tower, and floating boardwalks.

This area also has recreation elements such as plank boardwalks and an observatory tower. Plans are under development for restoring and maintaining recreation paths to Mud Lake. Cedar plantings have occurred within this area to reestablish flooded cedar within the last two years, and the Forestry Department plans to continue to plant and maintain cedar seedlings to re-establish young cedar on the Reservation. KBIC NRD and Forestry Department are working to learn more about the area (disturbance history, hydrology, etc.) in order to better understand and work to restore the health of this area.

Figure 30. Mud Lake, a Great Lakes Coastal Wetland

Little Carp River Corridor

KBIC land along the Little Carp River corridor has been noted by KBIC Natural Resources and Forestry Departments as containing notable stands of hemlock, white pine, and northern hardwoods that have old-growth characteristics. This is also known as Potential Old Growth (POG). The tree species diversity is quite high, with multiple long-lived conifer species and a significant representation of yellow birch in the hardwood component. The "old-growth" areas are identified by their high species diversity and structural (including age, size, and spatial strata) complexity. These areas typically regenerate a variety of species, display excellent ecosystem function in riparian protection and connectivity, provide ample wildlife habitat in snags and coarse woody debris, and have marginal timber quality. Average diameter for the stand is also higher than typical stands in the region. White pine exceeding 35" diameters were found throughout the river corridor. For these reasons the Little Carp River corridor is recommended to be recognized and protected by the Community for its ecological uniqueness.

Long-lived conifers like hemlock and white pine historically dominated much more of the landscape (Kost et al., 2007), and provide critical wildlife habitat on KBIC land including deer yards and small carnivore habitat (Nankervis and Hindelang, 2014). KBIC's objective for remnant groves of hemlock and white pine found in the Little Carp Conservation Area is to conserve and preserve these small areas, so that they can be observed and learned from as ecological references. Surrounding stands that don't include the special conservation areas but are managed should have their management objectives include enhancing the ecological and wildlife functions of the Conservation Area. For example, northern hardwood uplands south of the Conservation Area can be targeted for species diversification, protecting and expanding conifer cover (i.e., conifer planting).

Figure 31. Species diversity and structural complexity in the Little Carp River Corridor

Pequaming Hemlock

Several areas have been identified on the Reservation for their large groves of hemlock and valuable wildlife habitat. These areas of healthy hemlock regeneration and structure, such as Pequaming Hemlock, should be protected as ecological reference areas. Using gikinawaabi, careful and respectful observation, we can learn from these areas and apply the knowledge to other areas on the Reservation where hemlock regeneration is struggling. KBIC Forestry is gathering site information on hemlock stands to apply to promoting and supplementing hemlock regeneration.

The Farms

The Farms is an area on the west side of the Reservation that historically was settled, farmed, grazed, and is now reverting to forest. Many old foundations and cultural resources are present and should be preserved. This area is currently used by hunters and motorized recreationalists, and has much potential for cultural plant education, gathering, and hiking trails. Traditional knowledges (TK) on native plants, their locations, and cultural uses have been shared here, and it is an excellent location to continue to foster community involvement. If community and financial support exists, adding more established and maintained trails and interpretive signs may add to the educational impact of the area. Commercial harvesting may occur in areas where the historical and cultural resources are not impacted. Patches of pine plantation and historically managed northern hardwood forests indicate a history of on-going forest management. Low-impact techniques like hand-felling and brushing can be used to control encroaching aspen on some of the old openings and building areas, or hazard trees that exist near trails. In summary, the cultural, recreational, and wildlife value of this area is great, and should take precedent when establishing stand-level objectives.

Preservation Lands

Several Restricted Fee areas on the Reservation have been purchased with funds that restrict development and management activities. KBIC identifies them as Preservation Lands, and plans no management actions on these lands. They are monitored at least every inventory cycle, and if the need for action arises (i.e., fire, disaster salvage, altered hydrology) the Forester should consult with NRD and propose the action to Tribal Council for Community approval.

Conifer Conservation

Two main areas of conifer conservation interest exist on L'Anse Reservation: one is north Kelsey Creek, and the second is near Dynamite Hill. The north portion of Kelsey Creek is largely inaccessible due to beaver flooding. This area is of great interest to KBIC Natural Resources Department and wildlife survey and

inventory efforts. The objective in Kelsey Creek is to maintain core wildlife habitat. The Dynamite Hill area has unique conifer habitat and wildlife corridors. Although long-lived conifer conservation is included in the overall objectives and silvicultural recommendations of this plan for the L'Anse Reservation, these areas were identified by NRD and the Tribe as having unique wildlife habitat and conifer conservation potential that should be a priority in the stand-level objectives.

CHAPTER 3: FOREST INVENTORY AND ANALYSIS

Forest inventory is critically important because it is the process of collecting forest condition and health data on the ground and it informs stewardship recommendations and actions. It is an intensive gikinawaabi, or observation, that shapes managers' understanding. In 1964 a complete inventory of the L'Anse Reservation was conducted and used as the basis of resource use and management for the next 15 years (Steinhilb and Hesterberg, 1964; Vilican-Lehman, 1974; BIA, 1977). Inventory was updated in 1992, 2006, and the most recent inventory began early 2017. It is scheduled to be completed by 2019. The current inventory and the last inventory collected in 2006 use the field data collection methods outlined in the KBIC Stand Exam Specifications (Osmak, 2017). All KBIC (Fee and Trust) stand maps are in Appendix 3.0 of this document, Trust stand records sample for the last complete inventory (2006) are in Appendix 3.1, and the Fee stand records are in Appendix 3.2. Complete Trust stand records are housed in the Department of Interior's Operations Inventory software program, which can be accessed by the KBIC Forester and Michigan Agency Forester. Since they comprise approximately 1,000 printed pages, an abbreviated version of the stand records is found in Appendix 3.1. More records are available upon request; please contact the KBIC Forester.

The current KBIC Stand Exam Specifications require point sampling of variable radius plots, taken approximately every 2-10 acres, depending on stand size. At each plot, the following data is gathered: tree species, 2" DBH class, number of sawlog (8') sticks, sawlog grade, saw defect, number of pulp sticks, insect and disease type and percent affected, stand structure, understory tree species, size, and abundance, and prescription recommendations. This plot data is entered and stored into a Microsoft Access-based database. Stand-level data is also summarized and includes road access, management access, stand structure, land use, forest cover, stand condition, special management zones, insect and disease, and prescription recommendations. Stand-level objectives are also determined and summarized from inventory data, and used to inform management recommendations and implementation. The following Special Management Zones are used to guide stand-level forestry actions.

Special Management Zone Code Headings	Special Management Zone Code Definitions
General Forest	No special considerations
Travel Influence	Major roads border stand and buffer zones may be necessary.
Water Influence	Stand borders a river, stream, or lake. Special management for erosion or scenic values may be necessary.
Erosion	Erosion problems will need to be addressed before treatment.
Small Game	Management for small game should be considered in management plan. This may call for leaving certain trees for game habitat.
Big Game	Management for large game should be considered in management plan. This may call for leaving certain trees for game habitat.
Wild or Natural	Special wild or natural features occur within stand. Special management should be considered to protect or maintain features.
Recreation	Stand heavily used for recreation purposes.
Developed	Some type of development (e.g. residential, etc.) occurs on or near the stand.
Cultural	Stand may either contain culturally significant sites or be currently used for cultural or traditional practices by local tribal members.

Figure 32. Special Management Zone designations and their meaning

Historically KBIC updated the forest inventory very ten years using the Stand Exam Specifications summarized above. To better manage the workload, it is recommended to distribute the acreage more evenly across the 10-year cycle. For example, update 10% every year; or 50% of the inventory should be updated every 5 years. Realty records should update the Forestry Department every 1-5 years in the form of an updated shapefile to

reflect new forest acquisition or sale of forested land. Whenever a significant change in forest composition or structure occurs, such as completion of a timber harvest, planting, windstorm, or extensive pest damage, the inventory database should be updated as soon as possible to reflect that significant change. In this way, the inventory is continually being updated to reflect our knowledge of current forest conditions.

CHAPTER 4: FOREST PROTECTION

4.1 Fire Protection

While the BIA has the responsibility for wildfire protection on Indian trust lands in Michigan, a Cooperative Agreement is in place between the BIA and with the Michigan Department of Natural Resources (MI DNR) for wildfire protection on Trust lands. KBIC has a new Fire Management program that is working to increase its capacity and responsibility for fire protection on the Reservation.

In September of 2004, the Fire Management Plan for Keweenaw Bay Indian Community was approved and signed. The Fire Management Plan includes goals and objectives consistent with the Tribe's 2002-12 Integrated Resource Management Plan. It also acts as a guide to the planning and execution of the fire management program, and directs the field operations toward goals, objectives and standards that meet the management objectives of the Tribe. The Fire Management Plan includes detailed information on wildland fire suppression, prescribed fire, non-fire fuel applications, such as mechanical treatments for hazard fuel reductions, and emergency rehabilitation and restoration. For more information or a copy of the Fire Management Plan, please contact the BIA Fire Management Fuels Specialist at 906-353-7289.

Historically, large fires followed heavy timber harvest from 1860 through 1910. Since that time there is little documented wildfire history for KBIC lands. Most recent wildfires have been small and human caused. Most recently, the Pinery Fire (2009) occurred on L'Anse Reservation lands, burning in mixed pine and damaging retaining walls in the cemetery, a culturally important place for KBIC. A BIA BAER (Burned Area Emergency Response) team and assessment helped initiate rehabilitation efforts, including replacing the retaining wall with fire-proof materials, and a wood chipping project on steep, burnt slopes to prevent erosion.

KBIC has performed WUI and prescribed burn projects to mitigate fire hazard and create wildlife habitat. Wildland urban interface (WUI) mechanical projects have occurred in six different housing locations on the Reservation, to reduce potential fire hazard to homes in the last decade. KBIC Fire Management Plan also provides guidelines for documenting emergency response and rehabilitation, the organization and funding for forest protection, and prescribed fire management objectives for habitat improvement and fuel reduction.

4.2 Insect and Disease Protection

Insects and diseases pose a potential threat to the forests across KBIC lands. The Tribe and BIA work cooperatively with the United States Forest Service, State and Private Forestry to provide forest health assistance as needed, for identification, monitoring, and management objectives. Policies regarding forest pest management are included in 25 CFR 16.3 and 53 IAM Chapter 6.

While there are native insects and diseases that help maintain ecosystem function, non-native species pose threats to individual species and entire forested ecosystems. KBIC has a Terrestrial Invasive Species Management Plan (KBIC, 2018) developed by the Natural Resource Department. This plan contains details on the invasive species found on the L'Anse Reservation, potential problem pests, monitoring programs, and recommended actions taken to prevent the spread of invasive species. Invasive species of concern that have been found on or near the L'Anse Reservation include the following:

- Japanese barberry
- Purple loosestrife
- Spotted knapweed
- Exotic honeysuckle
- Marsh thistle
- Giant knotweed
- Common and glossy buckthorn
- Common reed
- Garlic mustard

Forest pest management on the Reservation should be guided by Integrated Pest Management (IPM), an approach to pest management that emphasizes prevention of infestation and ecosystem resilience. Since KBIC forests are managed on a broader timescale and extensive, yet within a fragmented ownership landscape, IPM is a recommended approach to insect and pest protection. Two main themes arise in IPM that are simple and wise to implement into forest management practices: species diversification, and reducing tree stress:

IPM: Species Diversification

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

IPM: Reducing Tree Stress

Trees experience stress when resources are limited. Pests and disease are much more likely to attack and kill stressed trees. In contrast, healthy trees may be able to compartmentalize an infection and survive. Foresters can prevent tree stress and disease by managing for the best tree for the site, within the framework of this plan. In areas where trees are stressed and declining, harvesting trees can prevent further mortality and loss.

Being aware of up-coming possible insect and disease issues can help minimize losses too. Michigan DNR has updated forest health information from which the following insects and diseases are highlighted, based on the tree species present or likely to occur in the near future on KBIC lands. Additional information on forest health can be at: http://Michigan.gov/foresthealth. Another resource is the Natural Resources Conservation Service. The NRCS Conservation Practice Pest Management (595) is based on IPM principles, and contains helpful guidelines for implementing ecological pest management.

Several diseases and pests are of local and current importance to the L'Anse Reservation. While not all of the potential and current pests are addressed here, and new pests are continually being discovered, the following are priority pests identified because of their threat to forest and cultural resources for KBIC.

Emerald Ash Borer

Emerald Ash Borer (*Agrilis planipennis*) is a native to eastern Russia, China, Japan and Korea, and was first found in North America, near Detroit, MI in 2002. It was likely introduced through packaging or crating materials. Being a non-native species, there are few native competitors, and EAB has been spreading with very little competition. EAB is being considered the most destructive forest pest ever seen in North America.

At this time, it is considered a widespread pest in the Great Lakes region, and has been identified in almost every county in Michigan, including Baraga (MDARD, 2016). So far, in North America, EAB has only been found in ash trees. Ash is not a dominant species on KBIC lands, but black ash can occur in wet pockets of northern white cedar swamp, lowland conifer or lowland hardwood. White and green ash can occur in more upland soils with northern hardwood ecosystems. At this time EAB has not been positively identified on the L'Anse Reservation, likely due to the small patches of scattered ash.

A tree infested with EAB will usually die within a couple of years of initial infestation. The larvae bore through the bark and feed on the cambium, killing the living tissue of the tree, and preventing water and nutrients from being transported up and down the tree, eventually killing the tree.

EAB adults can spread up to ½ mile per year, but can spread further distances in nursery trees, logs or firewood transported by humans. As of October 2018, the transport quarantine has been lifted in the state of

Michigan, since EAB is largely widespread throughout the state. These actions are still recommended to limit the spread of EAB:

- Don't transport firewood and other hardwood materials that could harbor EAB.
- Plant a variety of trees and use proper planting techniques
- Avoid removal of ash branches, trees or stumps from May through September. If removal is necessary:
    - Chip any infested wood. If the chips will be leaving the quarantine area, they must be less than 1" on two sides.
    - If chipping between May 1st and September 30th, chip on site.
    - If chipping between October 1st and April 30th, the wood may be moved within the quarantine prior to chipping.

Additional information on Emerald Ash Borer in Michigan can be found at: http://www.michigan.gov/mdard/0,4610,7-125-2390_18298---,00.html

EAB Mitigation

Black ash is a culturally important tree to the Tribe. KBIC has been working with GLIFWC (Great Lakes Indian Fish and Wildlife Commission) to explore EAB biocontrol options. KBIC Natural Resources and Forestry staff have been working to geospatially identify the ash resources on the Reservation, and have annually collected black, green, and white ash seed for a national repository. Thus the genotypes of ash in this area will be perpetuated beyond the effects of EAB. KBIC Forestry Department is also under-planting swamp hardwood trees in ash swamps, to mitigate the loss of ash trees. Most commonly, ash occurs as a component of the swamp hardwoods, occurring with yellow birch, red maple, and occasionally elm. According to forest inventory data, in most KBIC stands that have black ash, black ash comprises 1-19% of the total basal area. Less than 10% of the stands have 30-49% black ash, and no stands have over 50% black ash. Thus the diversity of existing ash swamps will help the resiliency of these ecosystems. Currently US Forest Service research is propagating ash trees that exhibit EAB-resilient traits (WOSU, 2018). Planting and seed collection will help mitigate the future ash loss from EAB, and facilitate a quicker response if more actions will be implemented in the future.

Gypsy Moth

Gypsy moth (*Lymantria dispar*) was introduced to the United States through Massachusetts in 1800s. It has been spreading to the south and westward since. Gypsy moths are a defoliator and feed on more than 300 species of both deciduous and evergreen plants. Primary species they feed on are oaks, crabapples, lindens, willow, birch and aspen.

There are a variety of options for addressing gypsy moth outbreaks in the forests. No management activity may allow for natural processes to take over, and ideally resilient trees will survive the infestations. Active forest management can promote the health and vigor of trees, and promote non-preferred species for the moths. Since KBIC oak resource is small but treasured, vigilance should be taken in monitoring oak stands to ensure and maintain oak vigor. Stand exams and inventory should carefully monitor and document oak health.

Forest Tent Caterpillar

Forest tent caterpillar (*Malacosoma disstria*) is a native caterpillar with very cyclic outbreaks that affect northern hardwood tree species. Since the forest tent caterpillars are native, there are native competitors, and the effects from an outbreak are not as damaging to the trees as many non-native species are. However, like gypsy moths, forest tent caterpillars are also a defoliator, so the combined effects of repeated defoliations can considerably stress trees when combined with other forest pest issues. Keeping trees healthy and not stressed, with enough light, water, and nutrient resources is recommended as a preventative measure for many forest pest and disease infestations.

Oak Wilt

Oak wilt is a disease (*Ceratocystis fagacearum*) caused by a fungus that affects the vascular system of trees in the Red Oak family, causing the leaves to wilt, brown, and fall off of the tree. The disease progresses rapidly, and trees often die within 1 to 2 months from the onset of the symptoms. The disease is spread through root grafts, or above ground the fungus is transported by insects.

There is no control for oak wilt, but prevention can help maintain healthy forested stands. Root grafts can be broken mechanically or chemically as barriers between healthy and infected trees. Diseased trees should be removed, but avoid cutting (including pruning) in oak from April 15- July 15 when the beetles are the most active. This management plan recommends not harvesting in stands with >15 BA oak and within a 6-mile radius of known oak wilt from April 15-July 15. Currently no oak wilt is found within 6 miles of the L'Anse Reservation (see map below). The Wisconsin DNR Oak Wilt Guide (2017) recommends applying a tree wound product to the last three growth rings of a cut oak stump, when in a stand with less than 15 BA and harvesting during April 15-July 15. Since oak is not common on the Reservation, this could be a useful preventative measure if oak wilt migrates into the area.

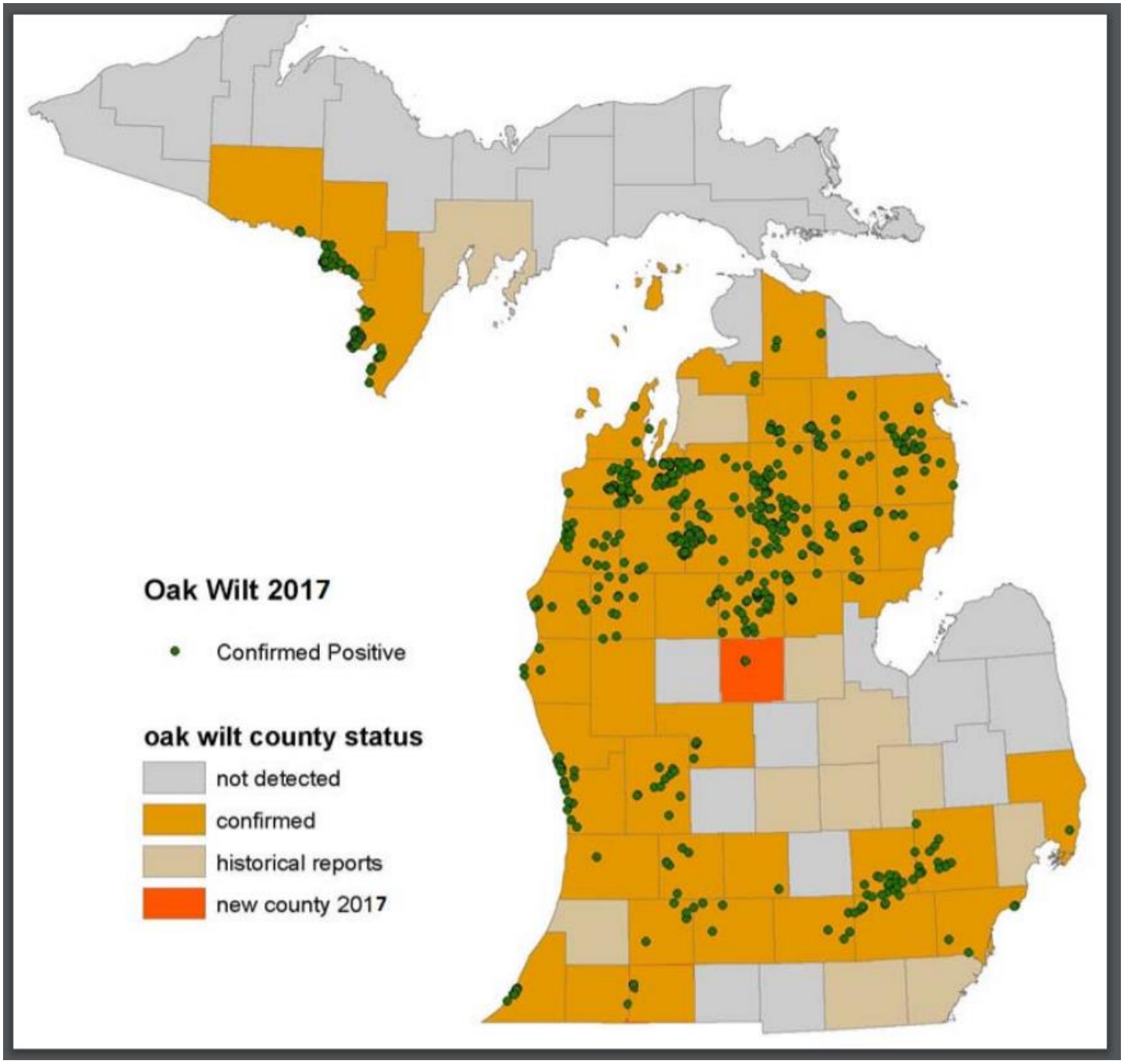


Figure 33. Oak wilt occurrence throughout Michigan confirmed by MI DNR. Map courtesy of Michiganoakwilt.org

Hemlock Wooly Adelgid (HWA)

The hemlock woolly adelgid (*Adelges tsugae*) is a small, aphid-like insect that parasitizes and kills hemlock within 4-6 years of colonizing a tree. It has been found in the western portion of the lower peninsula of Michigan. Cold winters have shown to cause high mortality in the pest. Thus HWA threatens to expand its range northward, especially under the influence of climate change. This pest was transported to Michigan from nursery stock. Mitigation actions taken by Forestry Department include hand-planting and protecting long-lived conifers such as cedar, hemlock, and white pine. The KBIC Forestry Department and Natural Resources Department should know the source of all of the nursery stock it orders for plantings, and buy disease-free stock.

Heterobasidion Root Disease (HRD)

HRD is a fungal disease affecting mostly managed conifer stands. It was confirmed to be in Michigan's Upper Peninsula (UP) in 2016, when it was found in the eastern UP in Luce County. HRD is spread by root grafts, or the spores can spread through the air. Treatment by cut stump application is fairly common in the timber industry. An applicator head on the harvesting processor applies products labeled for HRD control to the newly cut stump, killing the roots and preventing the fungal spread by root or cut stump.

KBIC should keep up to date on the spread of HRD in the UP. When an infestation site is within 25 miles of a KBIC conifer stand, it is recommended that KBIC (and BIA, when applicable) work to ensure the Tribe's pine resource is protected, and implement the cut stump treatment described above.

4.3 Timber Trespass

A timber trespass occurs with the removal of forest products from, or damage to forest products on, Indian forest land without approval from the Secretary of the Interior on Trust land, and without approval of the Tribal President on Fee land. Trespass not only includes damage to trees through timber theft, but also through fire or arson. Timber Trespass violates KBIC Tribal Code Title 10: Hunting, Fishing, Trapping and Gathering (KBIC Tribal Code of Law Title 10, 2003). A person violating Title 10, Chapter 6, namely the collecting trees or plants on Tribal lands without a permit, may be found guilty of a civil offense. In the event that a trespass is identified on Tribal land, it should be reported to the Tribal Police and to the BIA, Midwest Region Branch of Forestry for assistance with investigation and assessment of damages.

Punishment and prosecution can be as important as recovery of damages to serve as a deterrent. Education and active patrol can also inform people of the regulations and act as a deterrent. Well defined and signed property boundaries can also help limit trespass. When forest management activities take place, timber sales

should be clearly defined and marked. In addition, a site visit or office meeting with the operator should take place prior to implementation.

Additional policies and direction on Trespass can be found in the Bureau of Indian Affairs Manual, 53 IAM Chapter 7, and the Indian Forest Management Handbook on Trespass 53 IAM 7-H in accordance with 25 CFR 163.29. Enforcement of trespass actions on Indian Lands is to ensure that the assets associated with those lands are protected for the owners.

CHAPTER 5: FOREST LAND STEWARDSHIP

5.1 Subsistence

The abundance of food, firewood, plants, medicine, fish, and wildlife harvested from the forest is of great importance to the social benefits of the Tribe. These forest resources are used by Tribal members in every aspect of life: subsistence hunting, fishing, and gathering, harvesting for economic livelihood, cultural and religious ceremonies, recreation, and more. To ensure the wise use and sustained gathering of these non-timber forest resources, Title 10 of KBIC Tribal Code of Law (KBIC, 2003) outlines the gathering rights for Tribal members. The "Code," or Title 10, requires a Free-Use Permit, obtained through KBIC Forestry, for gathering firewood, land clearing, fence posts, and sap collection. Anyone found not following the harvesting guidelines outlined in the Code may be guilty of civil offense. The guidelines protect forest health and wildlife habitat, help ensure sustainable harvesting, and protect against timber trespass and wanton waste of wild plants.

Tree species such as baapaagimaak (black ash), wiigwaas (paper birch), zhingob (balsam fir), and giizhik (northern white cedar), maanazaadi (balsam poplar) and wiigob (basswood) are valued to the Tribe for non-timber product use. Forest inventory procedures collect location information for these species. When a Free-Use Permit is issued by the KBIC Forester for harvesting non-timber products, the Forester should take the opportunity to share maps and location information. The Forester should also encourage Tribal members cutting firewood with a Free Use Permit to visit stands with an abundance of slash and cut material, namely, those stands recently cut for timber harvest or timber stand improvement.

5.1.A Sugarbush

Harvesting ziinzibaakwadwaaboo, or maple sap, is integral to the cultural lifeways for the Anishinaabe. The identity and livelihoods of the Anishinaabe is tied to sugarbushing and fishing in this region for as long as people have known. Many Tribal members tell their personal stories of iskigamizigan (sugarbush or camp) on the Reservation with their family, or larger groups during the onaabani-giizis (March a/k/a hard crust on the snow moon) thru the end of the iskigamizige-giizis (April a/k/a maple sugar moon).

The teaching of aninaatig zhiiwaagamizigan tells of a being visiting the people and finding a camp of families during the iskigamizige-giizis moon time. The camp was very messy: the fishing nets were tangled, fires were dwindling or gone out, children and dogs were playing and making messes, and no one was cleaning up. He looked and looked and could not find the men and women. Finally, he found them lying under the aninaatig trees. The twigs were broken and people were letting the very rich, very sweet syrup drop into their mouths. Their bellies were engorged from the rich syrup and laziness. He got angry, walked to the stream, and scooped up water. He poured it again and again into the trees and announced "There! Now you will have to work forty times for your sweet anishinaabe-zhiiwaagamizigan." In this way people were taught that hard work is rewarded.

The Reservation location and local prevalence of sugar maple creates a unique opportunity for Tribal members to harvest syrup. Historically, certain areas around the Reservation were frequently used as sugarbushes. Some evidence, such as old sapping equipment, is occasionally found on the Reservation. These are recognized as cultural and archaeological sites, and are protected from disturbance.

To date, the Tribe holds commercial permits on approximately 200 acres for KBIC members to harvest maple sap for commercial purposes. Tribal members also can get annual Free Use permits to harvest sap in areas approved by the KBIC Forester. While most sugaring leases are to individual Tribal members, sugarbushes are historically communal in nature. A communal KBIC iskigamizigan has been established on Fee land near Loughs Lake, and KBIC Cultural Committee, Youth Group, and the Forestry Department have all been involved in sugarbush activities. Sugarbushing presents a great opportunity for community engagement, volunteer activities, cultural learning, food sovereignty, and commercial endeavors.

Sugarbush Silviculture and Desired Future Conditions

KBIC seeks to utilize the existing sugarbush areas it already has established, and work with the Tribal Forester to identify potential sugarbush areas. Ideally, sugarbush activities should occur in areas that have easy access, and support open-growing trees: namely, along roads or trails, or in stands that have been historically cut-over, and the basal area is drastically reduced. Trees with full crowns and open-growth habit have more abundant and sweeter syrup (USDA, 1974). This type of growth habit is not desirable for timber management, but timber harvesting should be used as a tool to increase sugar production. Timber harvesting, especially crop tree release to promote high sugar-producing trees, is encouraged in sugarbush areas to increase productivity.

Sugarbush Rules of Thumb (USDA, 1974)

1. Adequate stocking of a sugarbush is about 80-100 trees per acre
2. Sap from four tapholes will yield about 1 gallon of syrup per year

3. Normal sap yield per tap will range from 5-20 gallons per season
4. Number of tapholes safely made in a tree:

Tree Diameter	Tapholes per tree
<10”	**0**
10-14	**1**
15-19	**2**
20-24	**3***
25	**4***

***Reduce to 2 taps per tree maximum for stressed or aesthetically valuable trees**

If the Tribe decides to start new sugarbush areas and leases, it is recommended that KBIC works with KBIC Forester to identify sugarbush areas based on access, existing and potential sap production, and other forest resource utilization and potential. The existing leases contain guidance about the number of trees harvested to support the sugarbush, and it is recommended that Lessees use the Tribal Forester as a local resource when managing the forest for sap production. Any land use change or management activities would then be approved by the Tribal Council. The photo below depicts open-growing maple ideal for a sugarbush.

Figure 34. Open-growing, larger diameter aninaatig ideal for tapping.

5.2 Recreation

The Ojibwa Recreation Area and Pow Wow Grounds is the primary public and community recreation area. It is described above in *section 2.8.B Cultural and Conservation Areas of Interest*. KBIC Tribal members enjoy recreating and hunting on Tribal land, and it is encouraged as a cultural, subsistence, and family activity. There are currently 10-acre parcels of recreational leases throughout the L'Anse Reservation, the majority of them being hunting camps. KBIC retains timber rights on these recreational leases, and seeks to provide leases to Tribal members into the future. Forest management should buffer the 1-acre designated locations for camps with a recommended minimum 50' buffer.

5.3 Silvicultural Guidelines and Desired Future Conditions

A silvicultural prescription is a planned series of treatments to change the current stand structure to meet the landowner goals and objectives. This can include timber harvest, commercial or pre-commercial thinning, timber stand improvement, and regeneration. ***For stand-level prescriptions, harvest history, and desired conditions, or please refer to Appendix 3.1, which lists the last Stand Exam results.***

Guided by the objectives, stated previously, to promote a healthy ecosystem for wildlife habitat, water quality, non-timber and timber products, cultural and recreational use, the desired future conditions and silvicultural prescriptions for each major forest cover type are discussed below. These ecosystem-based objectives coincide directly with ecological forestry; namely, prioritizing forest ecosystem health with every management action to ensure sustainable use of the forest for generations to come (Frost 2006; Franklin et al. 2007). Some key recommendations from ecological forestry practices are described below:

- **Extended rotations:** regenerate aspen on a 60+ year harvest rotation for even-aged management, and northern hardwoods 20+ year rotation for uneven-aged management.
    - Increases species and structural diversity (Franklin et al., 2007)
    - Increases recovery time from disturbance
- **Retention of long-lived conifers:** retain cedar, hemlock, and white pine from timber harvest, and promote regeneration. Deer browse on these species is intense in our area, and successful regeneration is scarce.
    - Maintain critical deer wintering habitat
    - Plant these species when feasible to help next generations succeed
- **Retention patches and trees:** reserve a legacy patch from harvest area; at least 2 snags per acre, and ideal genetic seed trees.
    - Increases structural complexity, diversity, and mychorrizal inoculation to seedlings.
    - Retention areas can be wildlife or riparian corridors, or connect these features on the landscape.
- **Landscape connectivity:** recognize and manage for wildlife corridors and buffer water features with recommended riparian management zone BMPs (MI DEQ & DNR, 2018)
    - Maintaining forest cover on BMP buffers reduces erosion and sedimentation for higher water quality
    - Promotes wildlife habitat and regular and migratory movements

Northern Hardwood

The most common forest type on KBIC lands is northern hardwoods, covering approximately half of all KBIC forested land. Most of the northern hardwood cover on the Reservation has been harvested in the past, and much of that has been cut-over or high-graded. The result is mostly even-aged stands, with a higher basal area and smaller diameter trees that are competing for resources. Many of these stands have suppressed and dying trees. Resource concerns and mitigation strategies for northern hardwood forests are outlined in the table below.

Resource Concerns for Northern Hardwoods	**Mitigation**
Invasive Species: barberry, honeysuckle, buckthorn, hemlock wooly adelgid	Promptly communicate infestation locations of terrestrial invasive species on KBIC priority list to KBIC NRD Invasive Species Crew for treatment. Inspect and monitor sites.
Heavy deer browse of tree seedlings	Promote diversity of tree species, consider special hunting (pest) permits at sites experiencing heavy browse. Consider planting and protecting diverse seedlings.
Climate change: sugar maple, yellow birch, balsam fir, white spruce projected to decline; basswood, red maple, red oak, black cherry projected to increase.	Promote diversity of tree species to mitigate loss. Consider planting species to increase resilience.

Figure 35. Resource concerns and mitigation strategies for northern hardwood on the L'Anse Reservation forests.

Desired Future Condition of Northern Hardwood: Healthy, resilient, and diverse northern hardwood forests are desired. KBIC wants to maintain the cover of northern hardwood, or slightly decrease it if an under-represented forest cover type (i.e., red oak, hemlock) is more appropriate for the site. To achieve this future condition, the northern hardwood resource should be improved by promoting species diversity and enhancing

structural complexity. It is recommended to promote minor tree species such as red oak, paper birch, yellow birch, basswood, and hemlock if they occur within northern hardwood stands. Retaining coarse woody debris and promoting large-diameter trees enhance structural diversity, which is typically lacking in northern hardwood forests in the region (Janowiak et al. 2014). Harvests should improve the residual forest by removing the worst and leaving the best trees. This can be achieved through different silvicultural methods. The forester should consider different site factors when deciding which silvicultural method to use, such as quality of the standing timber, existing regeneration, and forest health.

Recommended Silvicultural Prescriptions and Conservation Practices for Northern Hardwood:

- Improvement Cut: Defined by BIA Stand Exam Protocol, this is a cut in an even-aged or two-aged stand that is designed to convert the stand structure to uneven-aged over multiple entries. The emphasis is on removal of less desirable trees to improve composition and establishment of a new age class through the creation of canopy gaps. This function is applicable to many KBIC northern hardwood stands. Improvement cuts are used in stands of moderate-high quality stems that will perpetuate better phenotypes for successive generations. Target residual basal area is 80-90 square feet per acre.

- Single Tree Selection Cut: This is very similar to the Improvement Cut above, but occurs in a system that is already uneven-aged. It removes undesirable or declining trees and promotes and/or releases regeneration in the canopy gaps. Selection cut is also used in moderate-high quality stands that are successfully recruiting advanced regeneration. Target residual basal area is 80-90 BA.

- Patch Cut: In low-quality northern hardwood stands with significant disease or decline, patch cuts can be used to regenerate portions of the stand and increase diversity. Intolerant and mid-tolerant tree species such as yellow birch, white birch, basswood, cherry, white ash, and red oak all respond well to patch cuts. Increasing diversity and structural complexity on the ground is often desirable for wildlife habitat. Patch cuts are ¼- 2 acres in size, and typically cover 10-30% of the stand area. Patch cuts can be combined with selection/improvement cuts in between the patches, to capture mortality of stems that will not survive to the next rotation.

Conservation Practice Standards

All of the prescriptions above fit the criteria for Forest Stand Improvement Conservation Practice, as defined in the Conservation Practice Standard 666-CPS, and Figure X. below (USDA NRCS, 2017). KBIC strives to meet these Conservation Practice criteria and thus be supported for conducting ecologically sound management practices on the Reservation. Not every prescription has to meet the Conservation Practice Standard (CPS) criteria, but it is encouraged in order to receive Environmental Quality Improvement Program (EQIP) support

and reimbursement for a stand's management activity. Prescriptions should not be limited to the list above, and developing site-specific prescriptions is strongly encouraged, as long as they are silviculturally sound, comply with the objectives and desired conditions described in this Forest Management Plan, and adhere to the NRCS guidelines for CPS criteria, if desired. Every silvicultural prescription applied on the Reservation should favor tree species diversity while maintaining at least 2 den trees per acre. This will promote ecosystem resilience and function and improve timber quality. Long-lived conifers in this cover type (hemlock, cedar, white pine, white spruce) should be retained for wildlife cover.

The following NRCS Conservation Practices are recommended for northern hardwood forests in L'Anse Reservation. For more guidance, please refer to NRCS 666, 655, and 647--CPS. For a detailed list of stands scheduled for each Conservation Practice, refer to the Harvest Schedule section in this plan.

Conservation Practice	Criteria Guidelines	Considerations
Forest Stand Improvement (666)	• Retain 2 active den trees/acre, where feasible • Limit damage to site (i.e., trails <15% of site, appropriate season for harvest) • Protect stands from grazing • Do not harvest in stands containing oak April 15-July 15 to limit spread of oak wilt (if stand is within 6 miles of known oak wilt).	• Retain 25-33% of slash, tops, and limbs to improve site productivity • Promote species expected to do better with climate change • Consider gap creation to promote understory species diversity and pollinator species

Figure 36. Conservation Practices recommended for northern hardwood forests in L'Anse Reservation.

Aspen and Early Successional Hardwood

Aspen and paper birch forests are the next dominant forest cover type, covering 17% of forested Reservation lands. A typical rotation age for healthy aspen is 50-70 years old. The average age for KBIC aspen stands is approximately 49 years old. The prior KBIC Forest Management Plan noted the prevalence of declining aspen stands, and the last two decades of timber sales have attempted to capture this declining aspen. Resource concerns and mitigation strategies for aspen forests are listed below.

Aspen/Early Successional Resource Concern	Mitigation
Loss of aspen resource due to overmature stems dying	Prioritize aspen stands for harvest that are 70-80 years old. Allow succession in some

	(target 20%) stands that are successfully converting/ regenerating to under-represented cover types (i.e., long-lived conifer).
Climate change: aspen and paper birch is projected to decline	Retain/promote diversity of tree species in aspen stands to mitigate loss. Promote winter harvest to increase chances of successful regeneration. Consider Forest Development planting and promotion of species (oak, white pine, cherry, etc.) for diversification where aspen is declining or lower quality.
Paper birch regeneration difficult	Use site preparation techniques (scarification), planting, and crop tree release in Forest Development projects to promote paper birch when feasible.

Figure 37. Resource concerns and mitigation for aspen and early successional forests on the L'Anse Reservation.

Desired Future Condition of Aspen: KBIC wants to slightly decrease the current acreage of aspen, and maintain and/or grow its paper birch component and prevalence where birch occurs. According to the inventory data of 2007, the largest age class of aspen is 80 years and older. The last 20 years of cutting has established younger age classes, as recommended in the previous forest management plan, and thus the age distribution is becoming more stabilized. To achieve the objectives of diverse forest and decrease the acreage of aspen, the oldest aspen stands may be targeted to move into the next succession/seral type. For example, if an 80-year old aspen stand has very little standing aspen, and is successfully regenerating into a spruce-fir or hemlock stand, it is recommended to identify the stand as the dominant cover type and manage accordingly. Foresters should also reserve some aspen stands (recommended 20% of total aspen stands) into extended rotation (60-80 years old) on better growing sites, to achieve wildlife habitat objectives and increase structural and compositional complexity.

Recommended Silvicultural Prescriptions and Conservation Practices for Aspen

- Aspen Removal/Regeneration with Retention: Healthy aspen regenerates well to even-aged management and cutting; it typically root sprouts within a year of harvest. Retain/promote minor species in the stand such as birch, hemlock, and long-lived conifers. Residual basal area should not

exceed 25 square feet per acre since aspen regeneration will dominate after cutting, but suffer if they are shaded. Leave standing snags for wildlife, especially large trees with potential for cavity habitat.

- Forest Stand Improvement Practices: retain a minimum of 2 active den trees, where feasible. Retain 25-33% of slash, tops, and limbs to improve site productivity. See Figure 38 below for more details.
- Early Successional Habitat: regenerating aspen and birch provides a structural diversity and increases intolerant tree species such as birch, cherry, aspen, and oak, which encourages upland game wildlife species such as grouse and turkey.

The following NRCS Conservation Practices are recommended for early successional forests in L'Anse Reservation. For more guidance, please refer to NRCS 666, 655, and 647--CPS. For a detailed list of stands scheduled for each Conservation Practice, refer to Figure 50 in Harvest Schedule.

Conservation Practice	**Criteria Guidelines**	**Considerations**
Forest Stand Improvement (666)	• Retain 2 active den trees/acre, where feasible • Limit damage to site (i.e., trails <15% of site, appropriate season for harvest) • Protect stands from grazing • Do not harvest in stands containing oak April 15-July 15 to limit spread of oak wilt (if stand is within 6 miles of known oak wilt).	• Retain 25-33% of slash, tops, and limbs to improve site productivity • Promote species expected to do better with climate change
Early Successional Habitat Development (647)	• Irregular shape edge to clearcuts for deer and woodcock • Cut in small blocks for ruffed grouse (1-10 ac) • Retain clumps of conifers and snags (<20% cover) for wildlife shelter	• Maintain a target 20% aspen stands at extended rotation age (60-80 years) to provide habitat with increased conifer cover, diverse seed bed, snags, coarse woody debris

Figure 38. Conservation Practices recommended for aspen and early successional forests in L'Anse Reservation.

Northern Hardwood/Aspen and Aspen/Northern Hardwood

This mix of hardwood comprises approximately 12% of L'Anse Reservation. This cover type is 80 years old and younger, averaging 50 years old. Since the soil and past history of the site allow both cover types to exist, one of the cover types may be struggling. For example, if the aspen on the site is healthy and flourishing, but the hardwood is defective, highly branching, and diseased, the site may not be optimal for growing northern hardwood. If this is the case, conversion to the healthier cover type would be an appropriate and recommended prescription. These forests can also have thriving patches of one forest cover type within the dominant cover type. This provides an opportunity for structural diversity in the stand. To maintain this diversity, vary the silvicultural prescription based on the cover type. For example, a regeneration (clearcut) can be applied to the aspen, and a hardwood selection cut be prescribed to the smaller inclusions of northern hardwood cover. Thus, as always, the stand condition and objectives should dictate the silvicultural prescription in these forests.

Resource Concerns: The same resource concerns exist for this type as Aspen and Northern Hardwood Cover Types described above, within this section.

Conservation Practices: The same conservation practices are recommended for this type as Aspen and Northern Hardwood Cover Types described above, within this section.

Desired Future Condition of Northern Hardwood/Aspen, Aspen/Northern Hardwood: KBIC would like to convert these stands where one cover type is struggling (i.e., convert to northern hardwood if the stand is high quality northern hardwood, and promote aspen if it is healthy and the northern hardwood component is poor quality). If both northern hardwoods and aspen are thriving together, KBIC wants to maintain these stands. A plausible scenario is a northern hardwood stand with 1-5-acre patches of aspen within. Aesthetically, Tribal members value mature tree retention in an aspen regeneration cut. The objective of increased species diversity is also met with this cover type. The recommended NRCS Conservation Practices are the same as aspen and northern hardwood cover types, and are listed below. For more guidance, please refer to NRCS 666, 655, and 647--CPS. For a detailed list of stands scheduled for each Conservation Practice, refer to Figure X. in Harvest Schedule.

Recommended Prescriptions for the Aspen Component, or Conversion to Aspen:

- Aspen Removal/Clearcut with Retention: Aspen regenerates well to cutting, and typically root-sprouts or suckers within a year of harvest. Retain/promote minor species in the stand such as birch, hemlock, and long-lived conifers. Residual basal area should not exceed 30 square feet per acre since aspen saplings will dominate after cutting, but suffer if they are shaded. Leave standing snags for wildlife, or

consider girdling large trees with potential for cavity habitat. See the *Early Successional Habitat* Criteria above in *Recommended Prescriptions and Conservation Practices for Aspen.*

- Patch Cut: In northern hardwood/aspen mixed stands with low quality northern hardwoods, or with significant disease or decline, patch cuts can be used to regenerate the stand and increase diversity. Intolerant and mid-tolerant tree species such as yellow birch, white birch, basswood, cherry, white ash, red oak and red maple all respond well to patch cuts. Increasing diversity and structural complexity on the ground may be desirable for wildlife habitat. Patch cuts are ¼- 1 acre in size, and cover 1/3-2/3 of the stand area. Patch cuts can be combined with selection/improvement cuts in between the patches, to capture mortality of stems that will not survive to the next rotation.

Recommended Prescriptions for the Northern Hardwood Component, or Conversion to Northern Hardwood:

- Improvement Cut: This is a cut in an even-aged or two-aged stand that is designed to convert the stand structure to uneven-aged over multiple entries. The emphasis is on crop tree release and establishment of a new age class through the creation of canopy gaps. Improvement cuts are used in stands of moderate-high quality stems that will perpetuate better phenotypes for successive generations. Target residual basal area is 80-90 square feet per acre. See the *Forest Stand Improvement* Criteria above in *Recommended Prescriptions and Conservation Practices for Northern Hardwoods*

- Single Tree Selection Cut: This is very similar to the Improvement Cut above, but occurs in a system that is already uneven-aged. It removes undesirable or declining trees and promotes and/or releases regeneration in the canopy gaps. Selection cut is also used in moderate-high quality stands that are successfully recruiting advanced regeneration. Target residual basal area is 80-90 BA.

Hemlock/Hemlock Hardwood Forest

Hemlock forests are defined here as having >50% hemlock basal area, and hemlock hardwood forests contain approximately 10-50% hemlock BA. The L'Anse Reservation contains hemlock stands that provide valuable deer wintering habitat, and the Tribe wants to continue providing important winter habitat in these areas. These areas often have over-browsed hemlock regeneration, and thus present a challenge to manage. Browse intensity is currently noted in forest inventory data collection, and should be considered when planning silvicultural treatments, such as planting and protecting conifer regeneration. Currently KBIC is working with the USFS to identify successful silvicultural techniques for hemlock regeneration in our area.

Resource Concerns for Hemlock and Hemlock Hardwood	**Mitigation**
Hemlock regeneration not successfully recruiting due to deer browse	Recommend hunting areas on Reservation based on high browse levels. Protect natural hemlock regeneration. Consider under-planting and protecting hemlock and other long-lived conifers, and crop tree release of saplings.
Hemlock regeneration can be scarce	Work with partners (USFS) to explore hemlock regeneration methods
Invasive Species: hemlock wooly adelgid	Maintain or increase species diversity, especially long-lived conifers
Climate change: conflicting projections on hemlock response. Sugar maple, yellow birch projected decline.	Retain hemlock for seed production and encouraging regeneration. Promote winter harvest to increase chances of successful regeneration.

Figure 39. Resource concerns and mitigation strategies for hemlock and hemlock hardwood forests.

Desired Future Condition of Hemlock/Hemlock Hardwood Forests: KBIC would like to maintain and increase this cover type, as it serves important functions for deer wintering, small mammal habitat, and water quality protection. Goals for this forest type are to promote long-lived conifers, large-diameter trees, and older age classes; successfully regenerate hemlock, increase species diversity, and promote all-aged structure. The recommended NRCS Conservation Practices are listed below. For more guidance, please refer to NRCS 666, 655, and 647--CPS. For a detailed list of stands scheduled for each Conservation Practice, refer to Figure X. in Harvest Schedule.

Recommended Prescriptions and Conservation Practices for Hemlock/Hemlock Hardwood:

Timber harvesting in this type should retain hemlock and long-lived conifer, especially when regeneration is lacking or difficult to establish. Hemlock stands often lack effective advanced regeneration levels where high deer populations exist and over-winter (Frelich and Lorimer, 1985). Hemlock can be difficult to regenerate with silvicultural methods: shelterwood and group selection methods have not proven to be reliable, and while scarification has promoted hemlock regeneration establishment, it can also encourage hardwood competition (Kelty, 2000). Eastern hemlock should be sapling sized before it is released with a silvicultural

treatment, since it is susceptible to over-exposure and being out-competed by more aggressive hardwood species (Kelty, 1987 & 1988). Thus local and regional testing of silvicultural methods (i.e., scarification, higher BA retention, timing of harvest) to regenerate hemlock is occurring on federal, state, and private industrial lands and can provide crucial information. KBIC Forestry and local USFS managers are collaborating to explore successful hemlock regeneration methods.

Managers should note that increased (30-70%) sunlight has been shown to decrease hemlock woolly adelgid (HWA) prevalence on hemlock regeneration (Brantley et al., 2016). As always, the stand condition and objectives should dictate the silvicultural prescription in these forests.

- Improvement Cut: This is a cut in an even-aged or two-aged stand that is designed to convert the stand structure to uneven-aged over multiple entries. In hemlock hardwood stands, lower quality hardwood stems are targeted for removal. The emphasis is on crop tree release and establishment of a new age class through the creation of canopy gaps. Improvement cuts are used in stands of moderate-high quality stems that will perpetuate better phenotypes for successive generations. Target residual basal area in hemlock stands is 110-130 square feet per acre, and 90-110 square feet per acre in hemlock inclusions in hardwood/hemlock stands, as has been locally recommended for deer wintering habitat maintenance (Scullon and Stabins, 2017). Retaining hemlock stems may increase the basal area of the stand. See the *Forest Stand Improvement* Criteria above in *Recommended Prescriptions and Conservation Practices for Northern Hardwoods*

- Single Tree Selection Cut: This is very similar to the Improvement Cut above, but occurs in a system that is already uneven-aged. It removes undesirable or declining trees and promotes and/or releases regeneration in the canopy gaps. Release hemlock advanced regeneration where it exists with canopy gaps. Gaps or small groups (<1/10 ac) offer structural diversity. This type of cut promotes mature forest for wildlife and well-distributed age and size classes. Selection cut is also used in moderate-high quality stands that are successfully recruiting advanced regeneration. Target residual basal area is 110-130 square feet per acre in hemlock stands, and 90-110 square feet per acre in hemlock inclusions in hardwood/hemlock stands.

The following NRCS Conservation Practices are recommended for hemlock/hemlock hardwood forests in L'Anse Reservation. For more guidance, please refer to NRCS 666, 655, and 647--CPS. For a detailed list of stands scheduled for each Conservation Practice, refer to the Harvest Schedule section in this plan.

Conservation Practice	**Criteria Guidelines**	**Considerations**

Forest Stand Improvement (666)	• Retain 2 active den trees/acre, where feasible • Limit damage to site (i.e., trails <15% of site, appropriate season for harvest) • Protect stands from grazing • Do not harvest in stands containing oak April 15-July 15 to limit spread of oak wilt (stands within 6-mile radius of known oak wilt)	• Retain 25-33% of slash, tops, and limbs to improve site productivity • Promote species expected to do better with climate change • Consider gap creation to promote understory species diversity and pollinator species

Figure 40. Conservation Practices recommended for hemlock and hemlock hardwood forests

Minor Forest Cover Types

Forest types that cover less than 5% of total KBIC land are classified here as "minor" forest types. These include lowland mixed forests (3%), as well as pine (4%). These types are not less important, on the contrary they provide important species and structural complexity on the landscape.

Lowland Forests (Swamp Conifer and Swamp Hardwood)

Swamp conifers include northern white cedar (134 ac), forested bog (143 ac), and a mix of other conifers dominating the forest cover in lowlands such as hemlock, balsam fir, black spruce, white spruce. Swamp hardwoods have red maple, yellow birch, paper birch, black ash, green ash, elm, and sugar maple dominating the forest cover. These lowlands feature fragile soils, from organic mucks to sphagnum mats. Since soils rarely freeze under the heavy and quickly accumulating snowfalls in the region, these soils are often inoperable for heavy equipment.

Resource Concern for Lowland Forests	**Mitigation**
Northern white cedar regeneration not successfully recruiting due to deer browse	Recommend hunting areas on Reservation based on high browse levels. Plant and protect seedlings if natural regeneration not successful.
Climate change: hotter and drier conditions are projected to cause northern	Retain cedar and hemlock for seed production and encouraging regeneration. Promote species diversity.

white cedar, hemlock, fir, spruce, and ash to decline.	
Invasive species: emerald ash borer, hemlock wooly adelgid	Promote hardwood diversity in ash swamps. Plant hardwood swamp trees to mitigate ash loss.

Figure 41. Resource concerns and mitigation strategies for lowland forests

Desired Future Condition of Lowland Forests:

KBIC's objective is to maintain the lowland forests on the Reservation. Lowland forests provide critical wildlife habitat and ensure a high standard of water quality to the many water resources the Tribe utilizes. Swamp conifer stands provide giizhik (cedar) and zhigob (balsam) boughs that are culturally significant and gathered by Tribal members. Swamp hardwood forests often harbor baapaagimaak (black ash), another culturally important tree. Other hardwood species such as yellow birch, paper birch, red maple, elm reside in lowland hardwood swamps across the Reservation.

Recommended Prescriptions and Conservation Practices for Lowland Forests:

Cultural and ecological functions of lowland forests are the priority to the Tribe. Due to the inaccessible and fragile nature of KBIC's lowland forests, timber harvesting is not a management objective at this time and lowland forests were not included in the AAC development. Harvesting can be considered if it maintains the desired forest cover, or unplanned opportunities arise such as storm/disease salvage, or high flotation/low-impact logging equipment becomes prevalent. Timber harvest should be a tool to achieve the desirable regeneration and forest cover.

Pine Forest

L'Anse Reservation has less than 500 acres of pine classified as red pine, mixed pine, and white pine. KBIC land features culturally significant pine forests, including Pinery Road, the Indian Cemetery, and the Pow Wow ceremonial and recreational grounds. Pine is culturally and ecologically significant and provides important diversity on the landscape. Pine forests, especially naturally established (not plantations) are somewhat rare locally on the landscape, primarily due to decades of fire suppression.

Resource Concern for Pine	**Mitigation**
Unreliable pine regeneration: natural regeneration lacking, not recruiting, or out-competed by aspen	Prevent hardwood succession with under-burning. Conduct management activities to regenerate pine (plant, site prep, brushing)
Climate change: jack pine projected decline; white and red no change	Diversify pine and oak species as appropriate for site. Promote natural pine regeneration
Disease: Diplodia canker and Siroccocus shoot blight	Avoid growing young red pine under RP overstory. Promote diverse regeneration
Heterobasidion Root Disease (HRD)	Harvest in winter. Treat cut stumps with borax when cutting in affected stand.

Figure 42. Resource concerns and mitigation strategies for pine forests

Desired Future Condition: KBIC has the objective to maintain and if possible increase acreage of pine-dominated forest. Goals for this forest type are to promote extended rotation and large-diameter trees on appropriate sites for white and red pine, since they are long-lived species (150+ year old), and increase species diversity. The recommended NRCS Conservation Practices are listed below. For more guidance, please refer to NRCS 666, 655, and 647--CPS. For a detailed list of stands scheduled for each Conservation Practice, refer to Figure X. in Harvest Schedule.

Recommended Prescriptions and Conservation Practices for Pine Forests:

- Pre-commercial Thinning: thinning dense (>160 BA) sapling stands (2-5" DBH) to a target basal area of 110 square feet/acre is recommended to improve individual tree growth and prevent mortality.

- Commercial Thinning: Red, white, and mixed pine stands often benefit from a commercial cut in the main stand designed to enhance the growth, disease resistance, and quality of crop trees. When pole-sized (5-9" diameter) stands reach 140 BA or more, thin to approximately 90-110 BA. Periodic thinning every 15-20 years can enhance growth even in 100+ year old trees (Ek et al. 2014), but trees with less than 10% live crown ratio will likely not respond positively to thinning. See the *Forest Stand Improvement Criteria* below in *Recommended Prescriptions and Conservation Practices for Pine Forests*

- Seed Tree or Retention Harvest: Red pine regenerates well in even-aged systems, since seedlings are very susceptible to disease if grown under a red pine overstory. Seed tree cuts remove all merchantable trees except those designated as healthy, desirable seed trees. Seed tree harvests may be accompanied by scarification to prepare the seedbed, which is often achieved with a summer harvest. Retention harvesting is similar to seed tree method, because it retains some mature pine for one or more rotations. This retention of legacy trees can serve ecological functions such as soil mychorrhizal retention, snags, coarse woody debris, wildlife habitat improvement, and populating the seed bed. Recommended basal area retention in pine is <20 BA, to prevent the spread of disease to regenerating pine. Consider varying the spatial pattern of retention from dispersed to clumps or patches within the harvest area.

- Group Selection: harvesting groups of trees and creating openings, typically 1/4-2 acres in size, or 1 to 2 times the height of a mature tree. This may be the best regeneration method for a site, especially when releasing natural regeneration and planting seedlings in the openings.

Other harvest methods can also be considered. For more information on pine management and regeneration method selection, refer to USFS red pine management guides. (Ek et al. 2014, Gilmore and Palik, 2006). Patch harvests with under-planting and brushing of pine and oak (pictured below) has been conducted and is continuing as a successful project. The following Conservation Practices may be implemented for certain desired wildlife and ecological results. For more guidance, please refer to NRCS 666, 655, and 647 CPS. For a detailed list of stands scheduled for each Conservation Practice, refer to the Harvest Schedule section 6.2 in this plan.

Conservation Practice	**Criteria Guidelines**	**Considerations**
Forest Stand Improvement (666)	• Retain 2 large (>12”) snag or den trees/acre, where feasible • Create/maintain adequate down woody material for wildlife • Limit damage to site (i.e., trails <15% of site, appropriate season for harvest) • Protect stands from grazing • Do not harvest in stands containing oak April 15-July 15 to limit spread of oak wilt (stands within 6-mile radius of known oak wilt)	• Retain 25-33% of slash, tops, and limbs to improve site productivity. • Consider piling slash for added wildlife habitat • Promote species expected to do better with climate change • Consider gap creation to promote understory species diversity and pollinator species

	• Intermediate thinning treatments when crown is less than one third of total tree height.	
Prescribed Burning Conservation Practice Standard (338)	• Where feasible and desired, prescribed under-burning may be used to control invasive or undesirable woody competition (shrubs, red maple); and promote pine and oak natural regeneration • Use prescribed fire to reduce wildfire hazards	• Do not burn where heavy ladder fuels exist • Consider wildlife and pollinator nesting, feeding, and cover needs
Tree/Shrub Establishment (612)	• If natural regeneration is not likely or not present two years after harvest, initiate reforestation. • Use site-appropriate, high quality stock or seed. Maintain 36" weed-free diameter around seedlings • Protect planting from animal pests and fire	• Consider using diverse species combinations to best meet locally native wildlife and pollinator needs

Figure 43. Conservation practices recommended for pine forests on the L'Anse Reservation

Figure 44. Wildlife (white pine and oak) planting in a harvested opening in the Pinery, L'Anse Reservation.

Figure 45. KBIC planting crew in the Pinery, L'Anse Reservation.

5.4 Best Management Practices (BMPs) for Soil and Water

Below are recommended BMPs for L'Anse Reservation. Further guidance can be obtained from the handbook *Sustainable Soil and Water Quality Practices on Forest Land* (MI DNR & DEQ, 2018). All management activities on Trust lands follow MI DNR & Department of Environmental Quality (DEQ) BMPs, which is stated in KBIC's 2011 Timber Use Policy. Management activities on Fee Lands should follow the same guidelines.

BMP Practice	Time of Application	Active Partners
Lake/stream/pond buffer: 100' minimum Riparian Management Zone	Timber sale preparation	BIA/KBIC/Contracting Forester
Frozen/dry ground harvests in areas with vernal pools, seeps, and intermittent streams. Or buffer these features >30' no equipment or harvest	Specify operation period in timber sale contract. Timber sale preparation	BIA/KBIC/Contracting Forester and staff
Frozen/dry soil harvests in stands with heavier soils	Specify operation period in timber sale contract	BIA/KBIC/Contracting Forester
Minimize roads, decking, and landing size	Timber sale preparation and road layout	BIA/KBIC/Contracting Forester, Tribal logger
Close temporary logging roads to vehicular traffic for approximately 1-2 years post-harvest to allow for revegetation	Specify road closure in timber sale contract. Block road prior to closure of timber sale.	BIA/KBIC/Contracting Forester, Tribal logger
Use appropriate size and type of drainage structure (i.e., culvert, water bars) and water crossing to prevent and minimize erosion	Timber sale preparation and road layout	BIA/KBIC/Contracting Forester, Tribal logger

Figure 46. Recommended BMPs for L'Anse Reservation

5.5 Forest Aesthetics

Forest aesthetics are important to KBIC, but forest conservation education is also critical to explain the importance of diversification and the multiple values of the forest to the Community. Below are recommended practices to enhance forest aesthetics on L'Anse Reservation. It may not be practical to implement all or any of these practices in certain timber sales, but the following can be used as suggested practices to enhance or maintain aesthetics.

Aesthetic Practice	**Time of Application**	**Active Partners**
Minimize landing and decking footprint	Timber sale preparation and road layout	BIA/KBIC/Contracting Forester, Tribal logger
Contour temporary logging roads to minimize view of landing from mainline roads	Timber sale preparation and road layout	BIA/KBIC/Contracting Forester, Tribal logger
Retain leave/green trees near road in low density retention cuts	Timber sale preparation	BIA/KBIC/Contracting Forester and staff
Retain legacy trees (< 10% canopy cover)comprised mostly of long-lived conifers and minor species, if feasible) on aspen removal/regeneration cuts	Timber sale preparation	BIA/KBIC/Contracting Forester and staff

Figure 47. Recommended aesthetic practices for L'Anse Reservation.

CHAPTER 6: TIMBER HARVEST PLAN

The process for determining and implementing a silvicultural treatment for a stand is outlined below:

1. Forest inventory gathers data on the ground for each stand (see *section 3.0 Forest Inventory and Analysis*).
2. Stand objectives are determined based on inventory data and Forest Management Plan guidance
3. Stand-level, general prescriptions are determined and documented by a forester in the inventory data (timber harvest or forest development detail, Appendices 3.1 and 3.2)
4. The 5-Year Harvesting Plan is developed: a query of the inventory database and the annual allowable/implemented cut determines which stands are the highest priorities to treat based on stand objectives, stand age, basal area, and accessibility.
5. The 5-Year Harvesting Plan is reviewed by internal partners
6. The 5-Year Harvesting Plan is brought before Tribal Council for approval
7. Timber harvest preparation for the 5-Year Harvesting Plan implementation commences

8. A detailed Forest Officer's Report (FOR) is developed by a forester (BIA Forester for Trust, Tribal Forester for Fee), specifying the stand-level prescription and timber harvest specifications
9. Timber sale contract is developed
10. Review of FOR: The Tribal Forester and BIA Superintendent reviews the FOR on Trust harvests
11. Timber Harvest contract is reviewed and approved by Tribal Council, and FOR is implemented
12. Timber harvest is advertised, sold

6.1 Annual Allowable Cut

The Annual Allowable Cut (AAC) is a volume of timber considered the maximum annual harvest level allowed during an operational planning period. It is determined based on the data collected during forest inventories, and is established to ensure harvests do not exceed a sustained yield level or growth rate. The AAC is an estimate based upon the following factors: acres of lands available and accessible for timber harvest, forest growth rate (Leak and Gove, 2008) and other land uses and objectives described in this FMP. As previously described (section 2.8.B), the AAC does not include the identified Cultural and Conservation Areas of Interest, since the objectives for these areas do not include regular timber harvests. The annual allowable cut can differ from the approved and implemented allowable cut (IAC).

The Annual Allowable Cut (AAC) on Trust lands at the Keweenaw Bay Indian Community (KBIC) Reservation is recommended as approximately 2,725 MBF per year. The Implemented Allowable Cut (IAC) is estimated at 2,180 MBF. This IAC is a 20% reduction of the AAC, and allows for prioritization of non-timber objectives such as preservation, recreation, and cultural uses and sites excluded from harvest, as well as riparian and wildlife corridors and legacy/retention patches reserved from the harvest area. A table listing the last 28 years of volume and acres harvested is below.

Year	Trust Acres Harvested	Trust MBF Harvested (includes cords converted to MBF)
1990	120	106.77
1991	80	196.39
1992	120	349.87
1993	160	1412.29
1994	40	774
1995	120	1049.25
1996	0	0
1997	160	2003.5
1998	80	173.45

1999	200	1416.03
2000	440	4719.6
2001	210	2064.43
2002	0	0
2003	120	2206.07
2004	130	1210.43
2005	60	1710
2006	20	308
2007	60	869
2008	160	2103
2009	113	1515
2010	315	1985
2011	197	1534
2012	40	1708
2013	50	1279
2014	0	0
2015	20	508
2016	50	782
2017	100	1741
Average	**113**	**1204**

Figure 48. Historical timber volume and acres harvested on KBIC Trust land.

The Branch of Forest Resource Planning (BOFRP) within the Bureau of Indian Affairs in 2017 formulated and recommended an AAC of 2,866 MBF/year average on Trust lands over the next 5 years in the KBIC Five-Year Timber Harvesting Plan (2018-2023). A total of 1,719 Trust acres are planned for harvest in this plan. This Harvesting Plan and estimated 2,866 MBF AAC has been reviewed and approved by KBIC Tribal Council (Resolution KB-011-2018). After 2023, another Timber Harvesting Plan will be proposed, using the most up-to-date inventory data and this approved FSP as guidance.

The AAC and IAC on Fee lands were calculated in a similar manner as Trust lands. Approximately 17% Fee lands are water or lowland and are limited by sensitive soil. An additional 20% of Fee lands are estimated to be limited by accessibility and objectives such as recreation, cultural, and ecological sites. The Annual Allowable Cut is estimated at 709 MBF, and Implemented Allowable Cut at about 567 MBF per year. Once the inventory on Fee land has been completed, the Fee AAC and IAC should be updated and calculated using these criteria and brought before Tribal Council for review as a harvest plan.

6.2 Harvest Schedule

BIA Michigan Agency develops five-year harvesting schedules for Trust lands which KBIC reviews, amends, and accepts by Tribal Resolution. The current report, *KBIC 5-Year Timber Harvesting Plan 2018-2023*, details the stand selection process, development of the Forest Officer's Report for individual timber sales, and more relevant information. The map and table below summarizes the Trust land 5-year Timber Harvest Plan. Stand-level details can be found in *Appendix 4.0: KBIC 5-Year Timber Harvest Plan Stand Detail*. The BIA Forester selects the stands recommended for harvest based on the following Inventory information: basal area (square feet per acre of trees), road access, stand operability, treatment recommended and year, and stand condition (Table 9 in Appendix Inventory Table).

On Tribal Fee lands, it is recommended that the KBIC Forester implements a similar timeframe for planning timber sales. Stand selection for harvest should be made based upon stand objectives, recommendations made during field inventory, forest condition (i.e., high risk or overstocked), forest health risk, and stocking level. A 5-year timber harvest plan that gets developed, reviewed, and approved by the Tribal Council will coincide with the 5-Year Timber Harvesting Plan for Allotted and Trust lands that the Tribe currently oversees and implements. This policy would require Tribal Resolution for Fee lands planning and management.

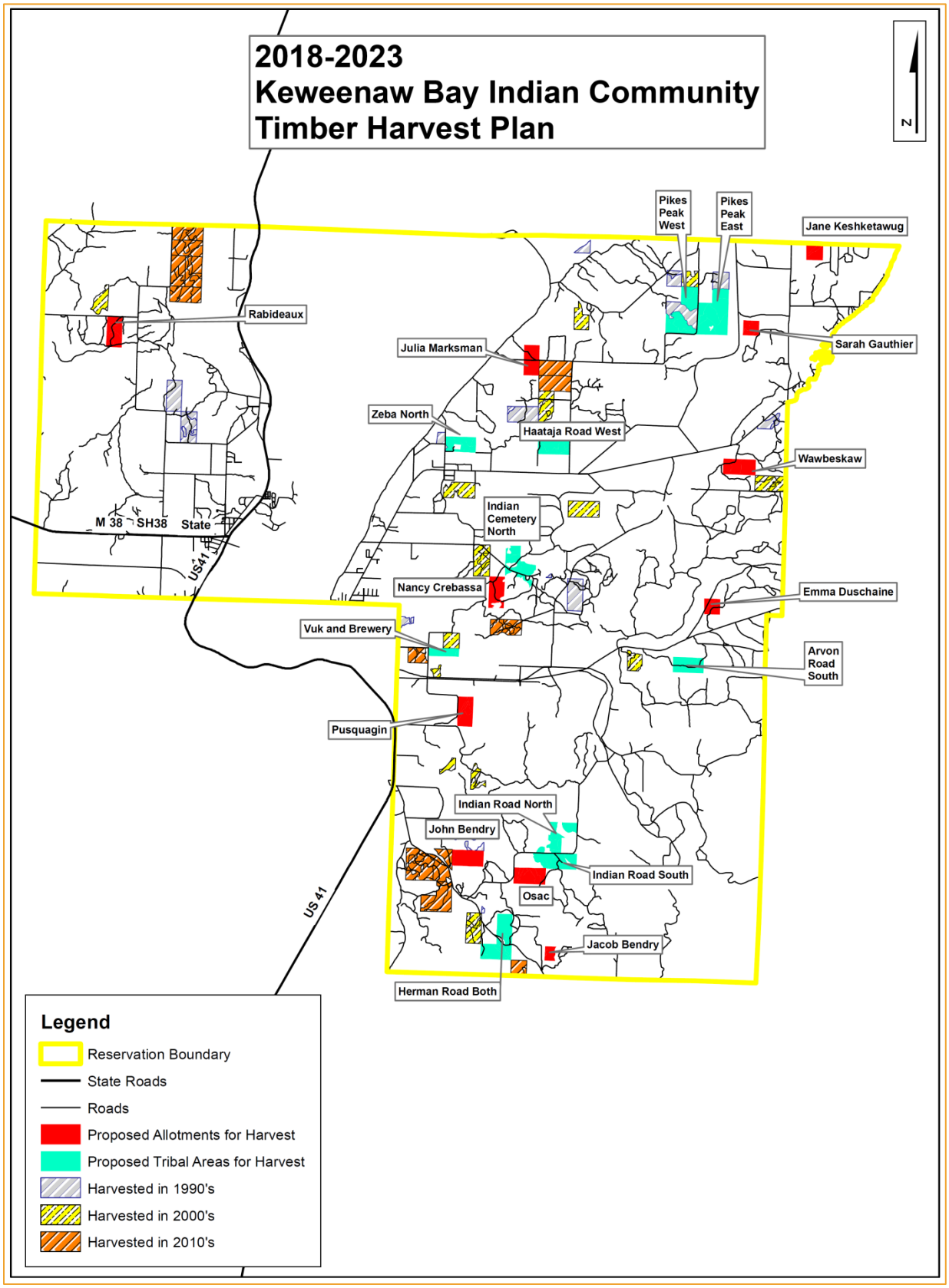

2018-2023
Keweenaw Bay Indian Community
Timber Harvest Plan
N
Pikes Peak West
Pikes Peak East
Jane Keshketawug
Rabideaux
Julia Marksman
Sarah Gauthier
Zeba North
Haataja Road West
Wawbeskaw
Indian Cemetery North
M 38
SH38
State
US41
Nancy Crebassa
Emma Duschaine
Vuk and Brewery
Arvon Road South
Pusquagin
Indian Road North
John Bendry
Indian Road South
Osac
US 41
Jacob Bendry
Herman Road Both
Legend
Reservation Boundary
State Roads
Roads
Proposed Allotments for Harvest
Proposed Tribal Areas for Harvest
Harvested in 1990's
Harvested in 2000's
Harvested in 2010's

Figure 49. Trust land Timber Harvest Plan Map

Name	Year Setup	Harvested	Type	Prescription	Practice	Stand Acres	Total Sale Volume in MBF
HAATAJA ROAD WEST	2018	2019	NH	Aspen Removal / Hardwood Thinning	Forest Stand Improvement	83	648
ZEBA NORTH	2018	2019	AN	Aspen Removal / Hardwood Thinning	Forest Stand Improvement	70	467
INDIAN CEMETERY NORTH	2018	2019	AN	Aspen Removal / Hardwood Thinning	Forest Stand Improvement	102	1655
VUK and BREWERY	2018	2019	NH	Aspen Removal / Hardwood Selection	Forest Stand Improvement	40	321
RABIDEAUX	2019	2020	NH	Aspen Removal / Hardwood Selection	Forest Stand Improvement	80	389
PIKES PEAK WEST	2019	2020	AN	Aspen Removal / Hardwood Thinning	Forest Stand Improvement	138	1209
JULIA MARKSMAN	2019	2020	NA	Aspen Removal / Hardwood Thinning	Forest Stand Improvement	77	725
PIKES PEAK EAST	2019	2020	NA	Aspen Removal / Hardwood Thinning	Forest Stand Improvement	161	818
NANCY CREBASSA	2020	2021	A	Aspen Removal / Hardwood Thinning	Forest Stand Improvement	70	1400
JACOB BENDRY	2020	2021	NH	Aspen Removal / Hardwood Selection	Forest Stand Improvement	30	176

ARVON ROAD SOUTH	2020	2021	NH	Aspen Removal / Hardwood Selection	Forest Stand Improvement	80	381
EMMA DUSCHAINE	2020	2021	NH	Aspen Removal / Hardwood Thinning	Forest Stand Improvement	40	370
JANE KESHKETAWUG	2020	2021	A	Aspen Removal / Hardwood Thinning	Forest Stand Improvement	46	514
PUSQUAGIN	2020	2021	NH	Aspen Removal / Hardwood Selection	Forest Stand Improvement	76	547
SARAH GAUTHIER	2021	2022	A	Aspen Removal / Hardwood Thinning	Forest Stand Improvement	39	494
INDIAN ROAD NORTH	2021	2022	NH	Aspen Removal / Hardwood Selection	Forest Stand Improvement	84	448
INDIAN ROAD SOUTH	2021	2022	NH	Aspen Removal / Hardwood Selection	Forest Stand Improvement	99	507
WAWBESKAW	2022	2023	NH	Aspen Removal / Hardwood Selection	Forest Stand Improvement	84	281
JOHN BENDRY	2022	2023	A	Aspen Removal / Hardwood Thinning	Forest Stand Improvement	82	1350
HERMAN ROAD BOTH	2022	2023	NH	Aspen Removal / Hardwood Selection	Forest Stand Improvement	153	936

OSAC	2022	2023	NH	Aspen Removal / Hardwood Selection	Forest Stand Improvement	85	576
FIVE-YEAR TOTALS						**1719 acres**	**14,212 MBF**
Projected Harvest per Year	2,842						
Annual Allowable Cut	2,878						

Figure 50. Trust land Timber Harvest Plan Summary

6.3 Forest Development and Non-Commercial Forest Improvement

KBIC utilizes a program entitled Forest Development on Trust lands, which is a BIA program that helps implement non-commercial forest management activities. Qualifying activities include timber stand improvement thinning, crop tree release, and planting; working toward the goal of improving the sustainable productivity of commercial forest land and achieving KBIC forest management objectives. Non-commercial forest improvement projects are greatly encouraged on Fee land as well, and may be assisted financially by NRCS programs or other grant sources. The associated Conservation Practice Planning schedule is below.

Forest Development (FD) projects are widely supported by the KBIC Tribal Community. Community members see these projects as an opportunity to take an active role in forest health improvement, since Tribal members are hired as contractors in timber stand improvement (TSI) in hardwood stands. KBIC Firefighters have also built upon their skills with crop tree release (CTR), planting, and brushing projects that promote species diversity. A table of planned Forest Development projects is below. This list is not extensive, but includes the proposals that are currently submitted to BIA for funding, or have been funded.

Project Name	**Conservation Practice**	**Year**	**Primary Type**	**Location: Compartment and Stand**	**Next Step (2-5 years)**
Cedar Plantings	Tree/Shrub Establishment (612)	2018 complete	WC KB	302009 308503	Tree/Shrub Establishment (612): maintenance

Conifer Climate Change Planting	Tree/Shrub Establishment (612)	2018 complete	HH	302857 308011	Forest Stand Improvement (666) to control competition
Climate Change Planting	Tree/Shrub Establishment (612)	2018 complete	PM A/AN	306866 306870 303814 304818	Forest Stand Improvement (666) to control competition
Ash Mitigation Planting	Tree/Shrub Establishment (612)	2018 complete	LH	301802 307006	Tree/Shrub Establishment (612): planting and maintenance
Paw. Mongoose TSI	Forest Stand Improvement (666)	2018 under completion	NH	301827 301830 301831 301832	Forest Stand Improvement (666): crop tree release for species diversity
Cedar Plantings II	Tree/Shrub Establishment (612)	2020	WC SC KB	303001 306522 309002	Tree/Shrub Establishment (612): maintenance
Asa Spruce CTR	Forest Stand Improvement (666)	2020	AB	306826	Forest Stand Improvement (666): birch crop tree release
Red Oak Restoration	Prescribed Burning (338) and Forest Stand Improvement (666)	2020	NH	303815 303816	Forest Stand Improvement (666) to control competition
Hemlock Planting	Tree/Shrub Establishment (612)	2022	NH/NA	302809	Forest Stand Improvement (666) to control competition

Figure 51. Planned KBIC Forest Development Projects

KBIC plans to continue with these projects into the future. Currently the KBIC and/or BIA Forester submit proposals for a few FD projects each year, resulting approximately 80-270 acres a year being improved. Many supplemental plantings are irregular in shape, covering ridges, riparian areas, or open gaps throughout the

site. Follow-up maintenance is planned 2-5 years after the initial planting, and includes brushing, survival plantings, and replacing tree protectors as needed. Community involvement in these projects results in Community members benefitting financially, and taking ownership and responsibility for the improvement of their forest. Funding, planning and implementation for Forest Development projects on Tribal Trust lands or with support from the BIA will follow existing guidelines (IAM Part 53 Chapter 5, the Indian Forest Management Handbook Volume 5).

CHAPTER 7: MONITORING, REVIEW, COORDINATION

7.1 Monitoring

Gikinawaabi, careful and respectful observation, is crucial to learn more about forests, understand human impact on forests, monitor forest health, and ensure that management objectives are being achieved through management actions. A summary of recommended monitoring activities is below. Monitoring and documentation should inform changes and amendments to forest management operations planning.

Timeframe	Monitoring Activity		
As Needed	Inspection of timber harvest by administering forester	Geospatial data collection during normal field work activities	Share location data of found cultural sites, cultural plants, invasive plant data to Cultural Resources, NRD
Annually	Complete 10% of forest inventory cycle	Planted seedling survival check (up to 5 years)	Forest Development activity planning and preparation
Every 5 years	Trust land Timber Harvest Plan proposed to Tribe	Site inspection and review for proposed Timber Harvest Plan	Review and update KBIC forest policy if needed
Every 10 years	Review and update forest management plan to reflect updated objectives		

Figure 52. Planned forest monitoring schedule

Reviewing and monitoring this Forest Stewardship Plan with the most current goals and objectives for KBIC is important for the maintenance of this FSP. In the event that the goals and objectives change in relation to forest stewardship, the FSP should be revised to reflect those changes. Revisions are also encouraged as forest stewardship policies change and the state or condition of the forest resources change.

7.2 Planning, Coordination, and Communication

Coordination between KBIC personnel, the Tribal Council, and the BIA (for Trust land) is crucial throughout the planning and implementation phases of this Forest Management Plan. The following planning and coordination process, in roughly the following order, is currently exercised for Trust lands:

1. The Forester (BIA or KBIC) requests a site review by a BIA Archeologist and Wildlife Biologist to ensure that consultation is completed as necessary for Section 106 of the National Historic Preservation Act, and Section 7 of the Endangered Species Act.

2. KBIC Tribal Historic Preservation Office is notified and assists with the site review as needed. Any additional resource specialists may be incorporated into the project on a case-by-case basis.

3. With final site reviews complete, landowners are notified of the proposed management action and their approval is solicited. On Allotted Lands this requires the BIA Forester contacting Allottees for their input. Then the proposed management is brought to Tribal Council for approval.

4. Management action commences, and once completed a final completion report is submitted by the BIA or KBIC Forester to the Regional Office.

The process for planning, coordinating and communicating forest management is recommended to be similar on Tribal Fee lands, except for the primary difference of not involving the BIA. KBIC has its own Forester, THPO, and Wildlife, Water, and Fish staff to perform the site review, and the Tribal Council to make management decisions as Tribal elected officials.

7.3 Organization and Funding

The BIA regularly funds non-commercial forest management activities through the Forest Development Fund, as described above (section 6.3). The BIA also contracts work out to the Tribe through 638 Contracts. These sources of funding have been crucial to the stability of the KBIC Forestry Department. The NRCS also provides cost-sharing for management activities through the Environmental Quality Improvement Program (EQIP). Thus this Forest Stewardship Plan is meeting the requirements for an EQIP FMP, so that funds can be received for the forest stewardship activities that KBIC plans and completes on its land. A significant opportunity for KBIC is participation in carbon markets. Since KBIC practices sustainable forest management, which promotes carbon sequestration, it is eligible for carbon market exchange. This forest management plan documents KBIC commitment to sustainable forest management. KBIC Forestry is currently working with National Indian Carbon Coalition (indiancarbon.org) to pursue carbon credit opportunities. Another opportunity is the establishment of an Indian Forest Land Assistance Account (NIFRMA, 1990) for the Tribe. Upon request, the BIA will help Tribes establish a special fund to conduct and support forest land management activities on the Indian forest lands of the Tribe. This fund will provide the opportunity for donors and partners to support local environmental stewardship and possibly special forestry projects. Other partners, such as US Forest Service and the Great Lakes Restoration Initiative regularly cooperate with KBIC and can offer grant information, technical, or financial support. These funding sources and partnerships will help strengthen the KBIC Forestry Department towards financial independence.

CHAPTER 8: SOCIAL and ECONOMIC BENEFIT ASSESSMENT

8.1 Income

As a landowner, KBIC benefits from the regular income from planned timber sales on Trust and Fee Lands. KBIC Timber Use Policy Addendum (KBIC, 2011) mandates that Tribal loggers may only purchase timber sales, and thus the Tribal members directly benefit from these sales. An average of approximately $56,000 is generated per year from Trust timber sales. See table below for details.

Year	Acres Trust Land Harvested	MBF Harvested Trust Land	Net Income $
1990	120	106.77	11299
1991	80	196.39	2806
1992	120	349.87	4460
1993	160	1412.29	26514
1994	40	774	21162
1995	120	1049.25	32506
1996	0	0	0
1997	160	2003.5	64816
1998	80	173.45	11892
1999	200	1416.03	36784
2000	440	4719.6	196610
2001	210	2064.43	89954
2002	0	0	0
2003	120	2206.07	122360
2004	130	1210.43	61522
2005	60	1710	102180
2006	20	308	24194
2007	60	869	77029
2008	160	2103	144666
2009	113	1515	91690
2010	315	1985	97640
2011	197	1534	82633
2012	40	1708	92743
2013	50	1279	52742
2014	0	0	0
2015	20	508	16045
2016	50	782	26288
2017	100	1741	62302
Average	**113**	**1204**	**$ 55,458.46**

Figure 53. Annual harvest summary and income from KBIC Trust timber sales

Fiscal Year of Harvest	Projected Total Trust Volume in MBF
2019	3,091
2020	3,141
2021	3,388
2022	1,449
2023	3,143
Total	**14,212**
Average per Year	**2,842**
Annual Allowable Cut	**2,878**

Figure 54. Projected annual volume from Trust timber sales

8.2 Indian Benefits

Besides direct economic benefit to the Tribal loggers, allottees, and KBIC government, which provides numerous services to its members, Tribal members benefit from their forests and forest management in many ways:

- Forest Development projects on Trust lands provide work and income for approximately 20 KBIC members annually
- Recreational Leases on forested Trust and Fee lands, authorized by the Constitution.
- Forest Management Deduction Account, sourced from timber sale revenue, that can be used to provide scholarships to two Keweenaw Bay Ojibwa Community College (KBOCC) natural resources students annually (KB-032- 2018).
- Forestry Department provides KBIC members with Free-Use Permits for gathering non-timber forest products, and information on where to find specific products
  Enhance forest ecosystem health and habitat for all creatures living in the ecosystem

8.3 Local and Regional Benefits

As a steward of the land and water, KBIC is a benefit to the region. Many of the benefits from sustainable forest management that benefit Tribal members, like those discussed above, also benefit the surrounding area. KBIC Forestry ensures that the three components of sustainability; economic, social, and environmental, are all benefitting from forest management, and thus improves the surrounding area by practicing sustainable forestry. For example, improving forest health, protecting waterways, enhancing wildlife habitat, attracting

outdoor recreationalists, and producing timber and non-timber forest products all enhance the local community and economy.

KBIC has progressed in building partnerships with local and regional partners to promote forest stewardship in the area. These partnerships are critical for technical and financial support, education and outreach efforts, project development, and overall program longevity and success. These partners include Baraga Schools, Baraga Iron Conservation District, Keweenaw Invasive Species Management Area, Natural Resources Conservation Service, US Forest Service, and Michigan DNR. KBIC also partners with local forestry professionals to get specific project work completed when it is beyond the capacity of the KBIC Forestry Department and BIA. Tribal loggers also sub-contract with local loggers to complete timber sales. In this regard KBIC provides key economic benefits to the Tribe and local area.

8.4 Regional Economic Impacts and Trends

National trends have seen a slow but steady decline in the total volume of forest products produced in the Great Lakes region in the recent past (USDA USFS, 2012). Over the past 20 years, timber products volumes in the north-central region of the United States have declined by 12%. Within Michigan, the forest industry has seen this same trend, except a slight increase in softwood products (Figure 55). Regional economic activity for forest products has remained relatively steady in the past decade (Haugen 2016). In the western Upper Peninsula region, where hardwood is the dominant roundwood harvested, sawlog production has increased. The L'Anse/Baraga area supports several small-medium sized sawmills (Figure 56). Pulp production, on the other hand, has been in steady slow decline in the region. There are several pulp mills in the western Upper Peninsula region, but they are 75-130 miles from the Reservation. An active industrial pulp yard exists south of L'Anse to gather and transport pulp to regional pulp mills. Tribal loggers often have local demands for firewood within the KBIC community, which can help offset the declining pulp demand or high cost of transport. Firewood sales and transport for home heating is a niche that is generally under-utilized on the Reservation, and coordination and collaboration within KBIC Forestry and partners is encouraged to promote local employment opportunities, sustainable firewood cutting, Tribal economic activity, and sustainable energy.

Regional trends from the Forest Service in north-central US show the total volume of roundwood products decreasing by 12% in the last five years (USDA USFS, 2012). Annual industrial roundwood production in Michigan by softwood and hardwood products is depicted in the bar graph below (Haugen, 2016). A map showing mills across Michigan in 2010 is also depicted below (Haugen, 2016).

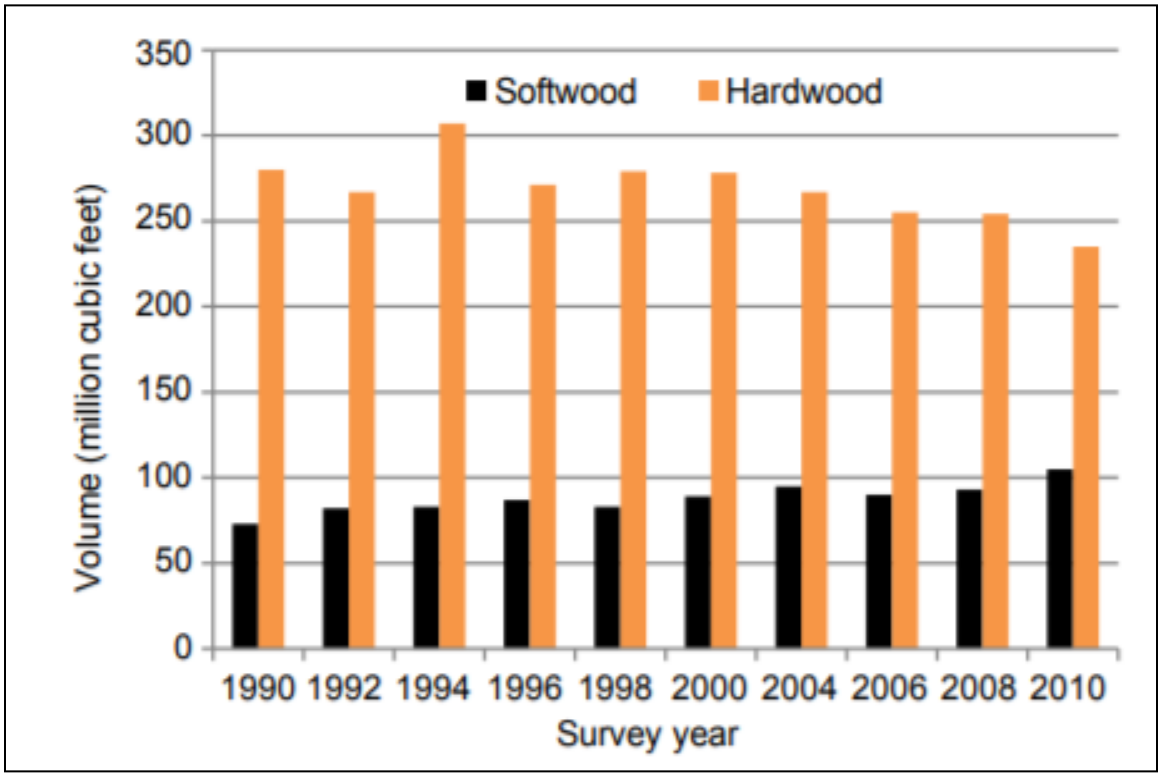


Figure 55. Annual industrial roundwood production in Michigan by softwood and hardwood products

Figure 56. Regional mills in 2010 (Haugen, 2016)

Appendix 1.1 Forestry Definitions

Basal Area- is a surface area measurement used to measure tree density, or stocking. It is measured in square feet per acre.

MBF- is one thousand board feet, the standard metric of volume for sawtimber in our region. A board foot is 1'x1'x1," or 144 cubic inches. For simplicity, this report and many KBIC Forestry transactions estimate all timber volume (even pulp which is typically measured in cords) in MBF. One thousand board feet is approximately 0.65 cords.

Roundwood-logs, pulp sticks, bolts, or other round sections harvested from trees (including chipped roundwood)

Silviculture- according to USDA Forest Service, it is the "art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society…"

Appendix 1.2 Anishinaabemowin Index

For audio pronunciations and more information, visit the Ojibwe people's dictionary: https://ojibwe.lib.umn.edu/

Aninaatig-maple

Anishinaabe-ziinzibaakwad-maple sugar

Anishinaabe-zhiiwaagamizigan-maple syrup

Baapaagimaak-black ash

Bine- ruffed grouse

Bigiwizigan-maple taffy

Gichi-bine -turkey

Giizhik- northern white cedar

Gikinawaabi- careful and respectful observation

Iskigamizigan-sugarbush or camp

Iskigamizige-giizis -maple sugar moon; approximately the month of April.

Maananoons-ironwood

Maanazaadi-balsam poplar

Mu-kwa - bear

Odoodemiwag- Ojibwe clan system

Onaabani-giizis -hard crust on the snow moon

Waabooz - rabbit, snowshoe hare

Waagosh - fox

Waawaashkeshi –whitetailed deer

Wiigob-basswood

Wiigwaas- birch

Zhingob-balsam fir

Ziinzibaakwadwaaboo- maple sap

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Appendix 1.5 List of Figures and Tables

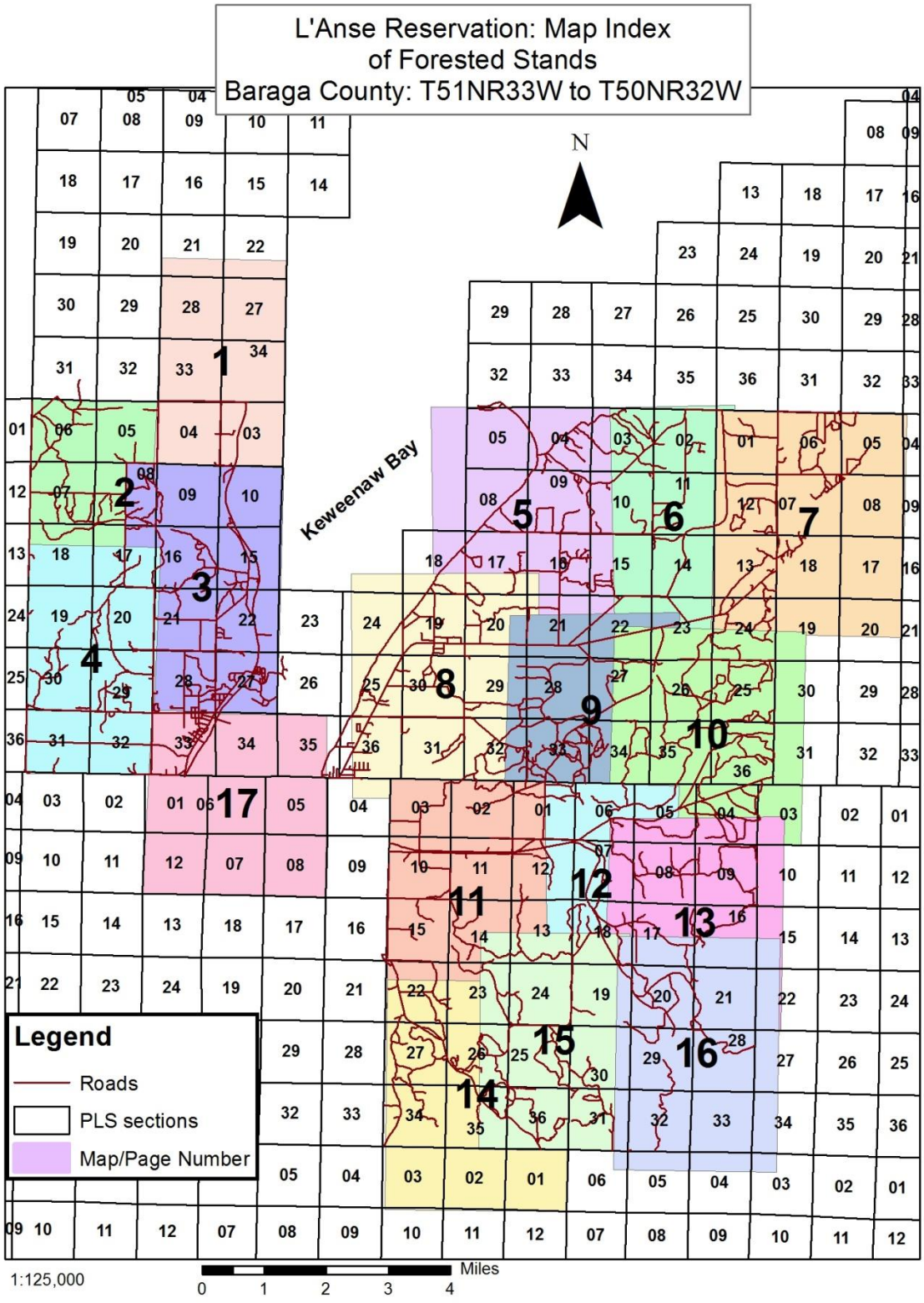
Appendix 2.0 Teachings and Lessons Learned

Through the discussion and development of this Forest Stewardship Plan, certain lessons arose that we had the benefit of generating, teaching, and learning from each other.

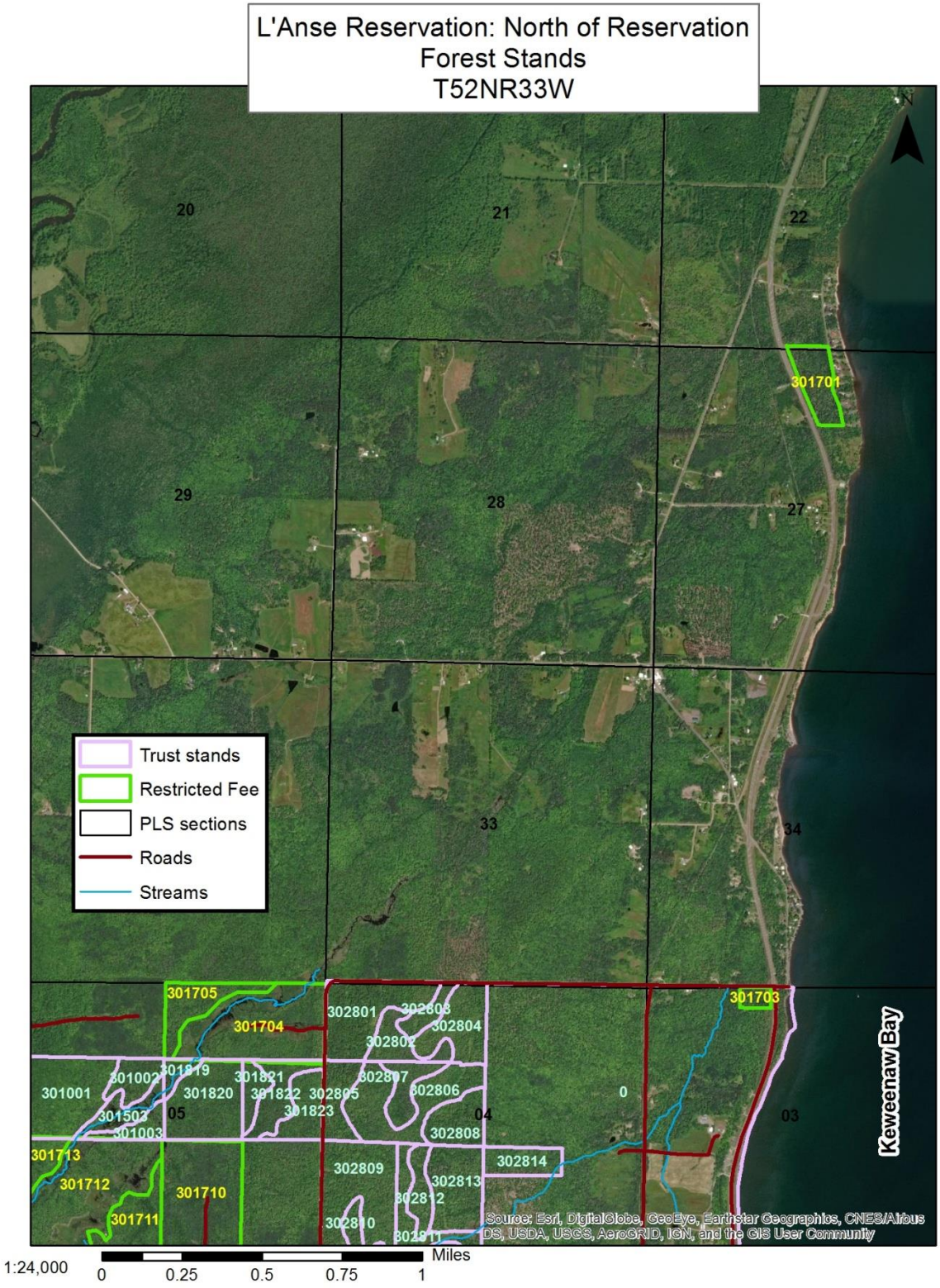
Amelioration: the concept of taking a good thing and making it better is one we should strive for. Sometimes the restrictive concepts of better and best can limit us. If "best" is what we are doing, why improve? But we can always learn from experiences, mistakes, and successes, and implement those lessons to strive to make an already good thing, better. The root of the word, *miel*, means honey.

Management: One teacher told me, "The forest will be fine without you. It does not need to be managed. It is people, our needs, desires, and impacts on the forest, that need to be managed."

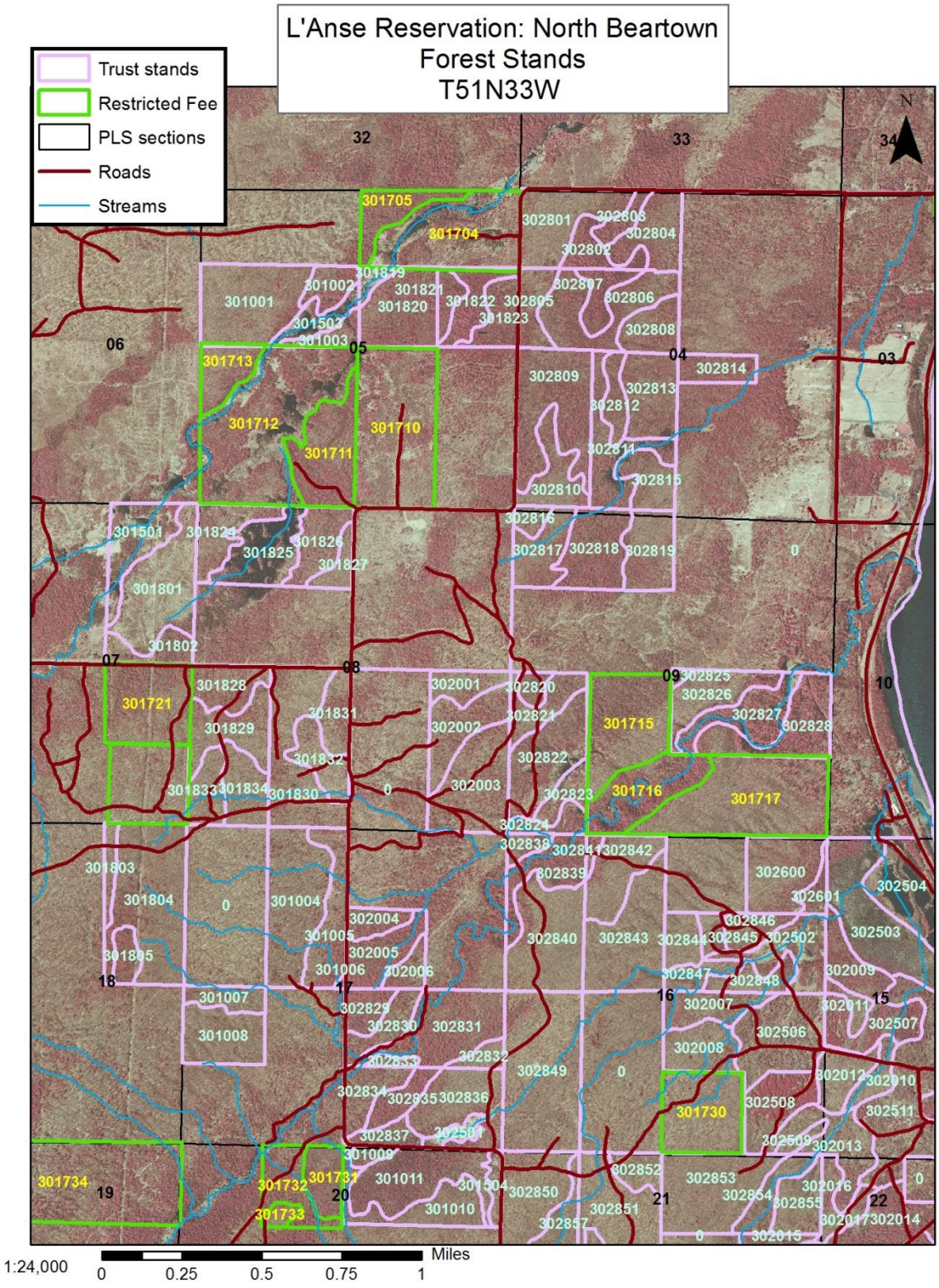
Appendix 3. Stand Maps for L'Anse Reservation



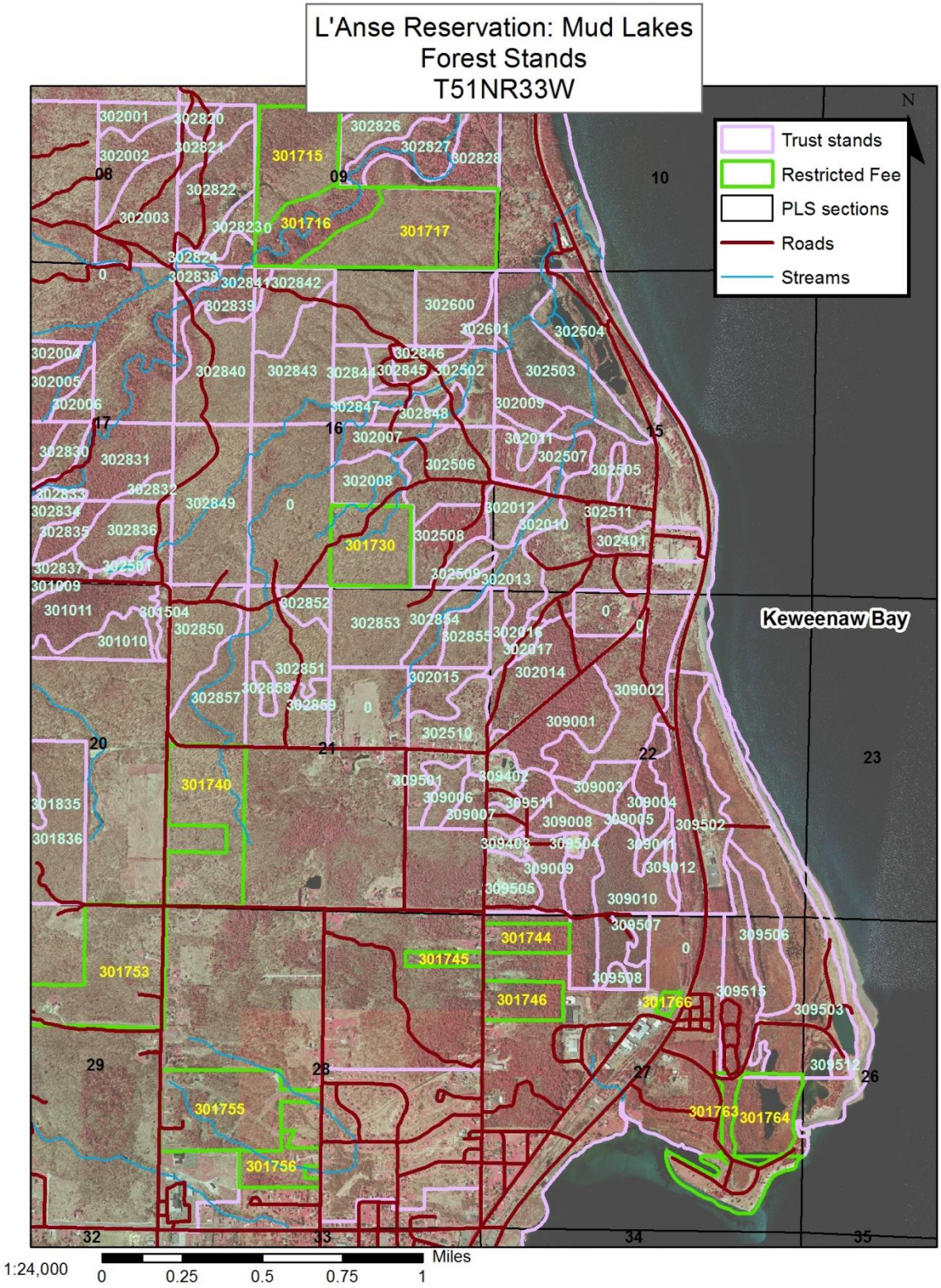
Map 1


L'Anse Reservation: North of Reservation
Forest Stands
T52NR33W
N
20
21
22
29
28
27
33
34
03
04
05
0
301701
301703
301705
301704
301710
301711
301712
301713
301001
301002
301003
301503
301819
301820
301821
301822
301823
302801
302802
302803
302804
302805
302806
302807
302808
302809
302810
302812
302813
302814
Trust stands
Restricted Fee
PLS sections
Roads
Streams
Keweenaw Bay
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
1:24,000
0
0.25
0.5
0.75
1
Miles

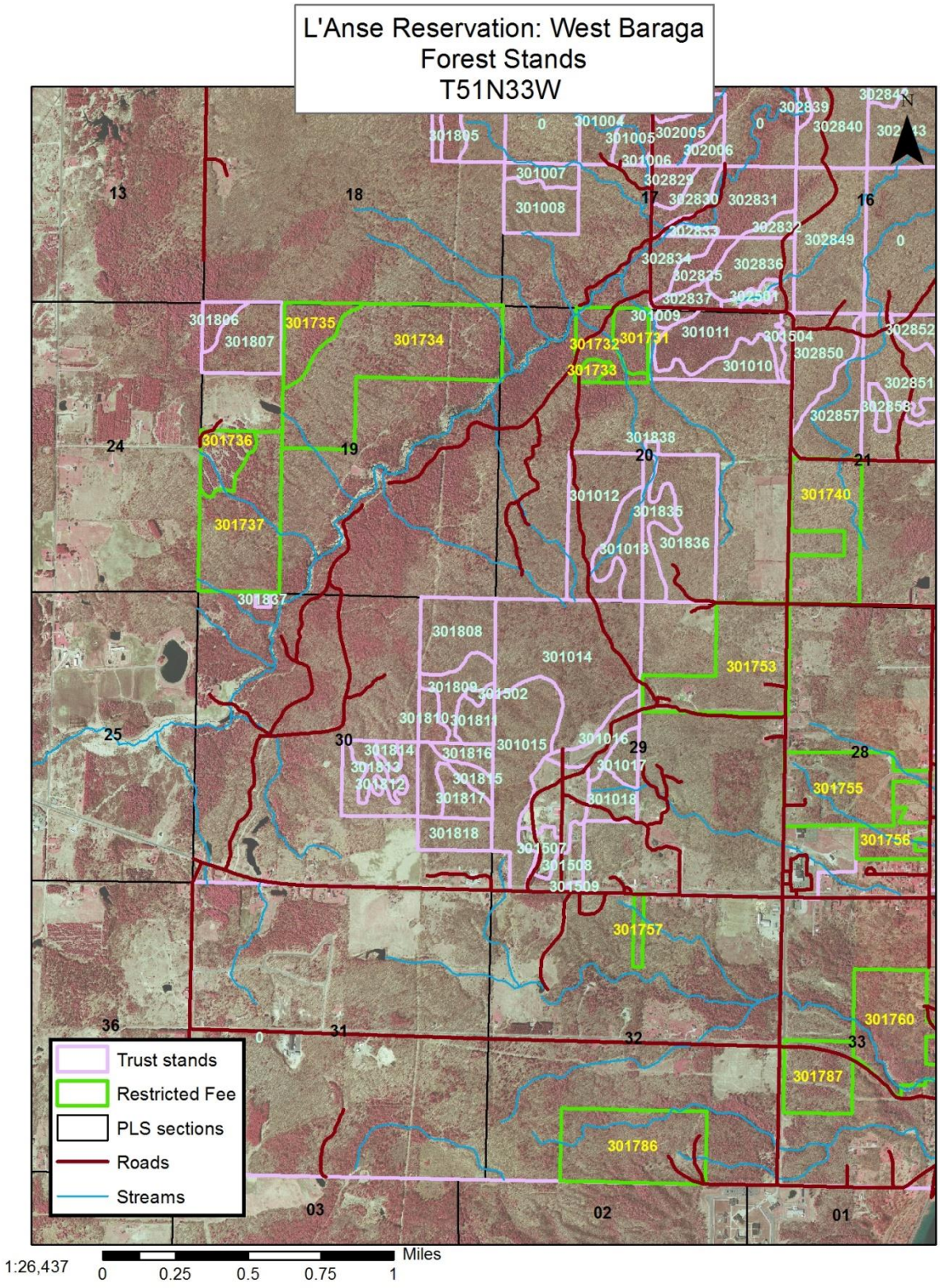
Map 2


L'Anse Reservation: North Beartown
Forest Stands
T51N33W
Trust stands
Restricted Fee
PLS sections
Roads
Streams
N
1:24,000
0
0.25
0.5
0.75
1
Miles

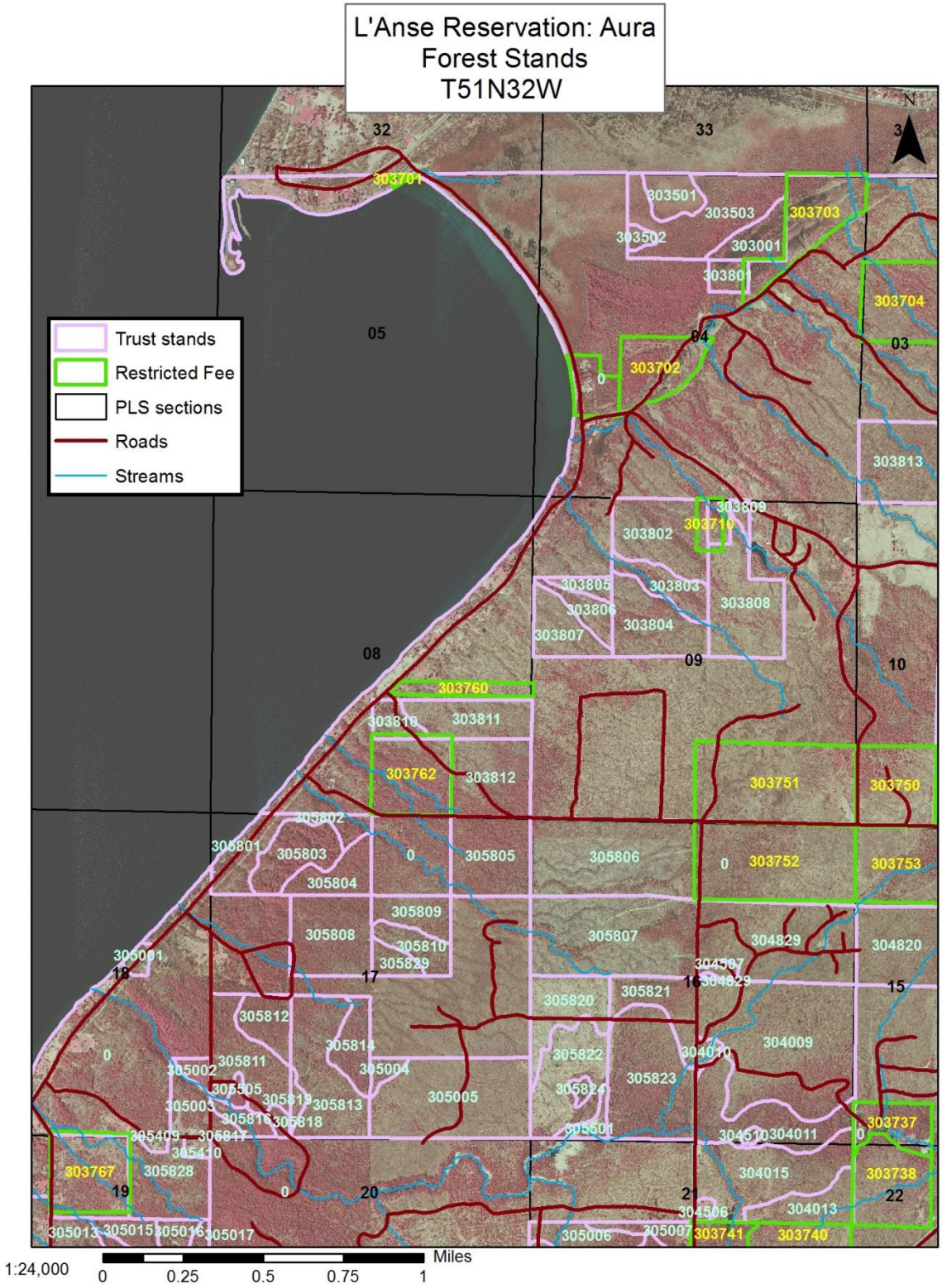
Map 3


L'Anse Reservation: Mud Lakes
Forest Stands
T51NR33W
N
Trust stands
Restricted Fee
PLS sections
Roads
Streams
Keweenaw Bay
1:24,000
0
0.25
0.5
0.75
1
Miles

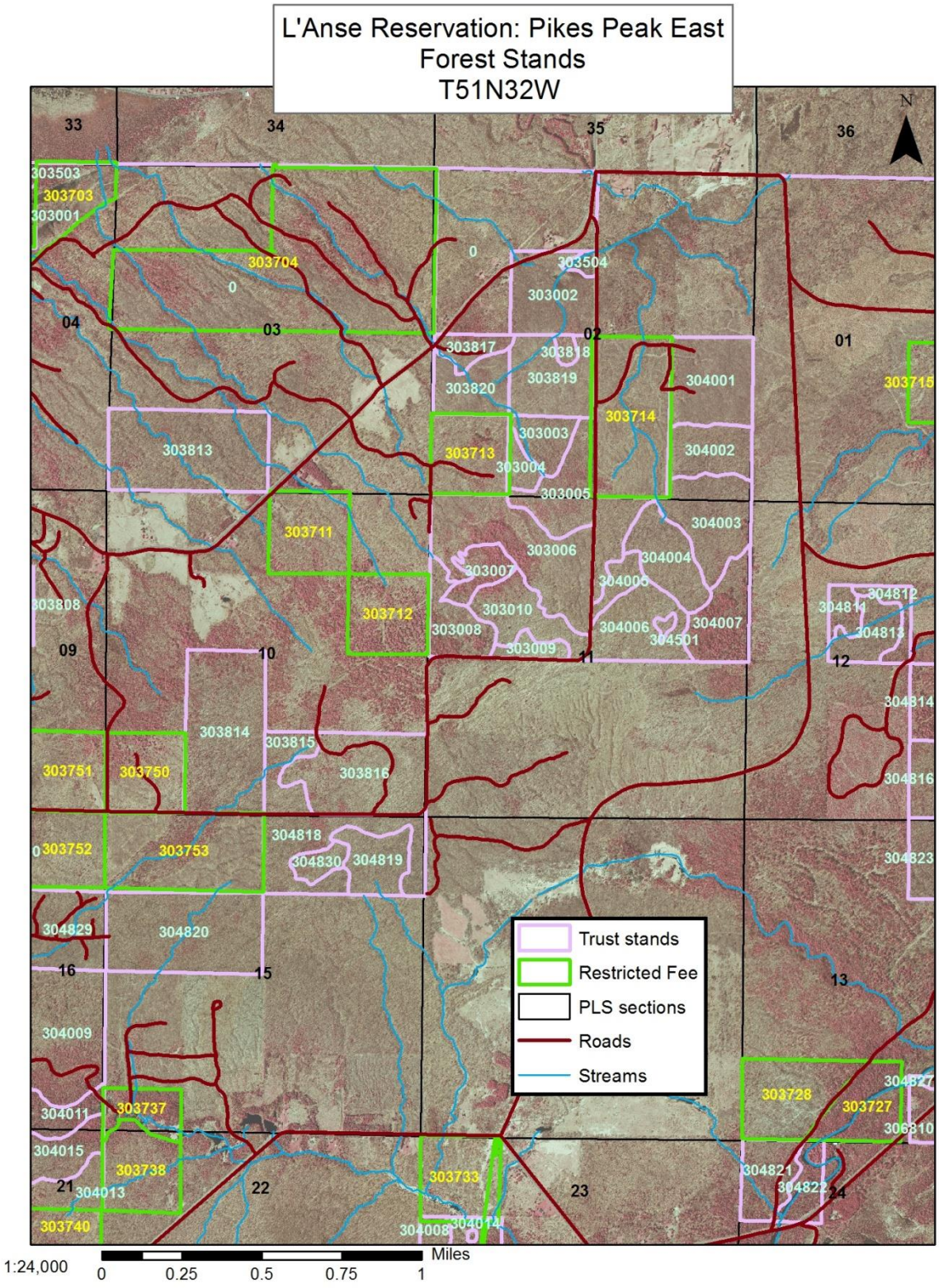
Map 4


L'Anse Reservation: West Baraga
Forest Stands
T51N33W
N
Trust stands
Restricted Fee
PLS sections
Roads
Streams
1:26,437
0
0.25
0.5
0.75
1
Miles

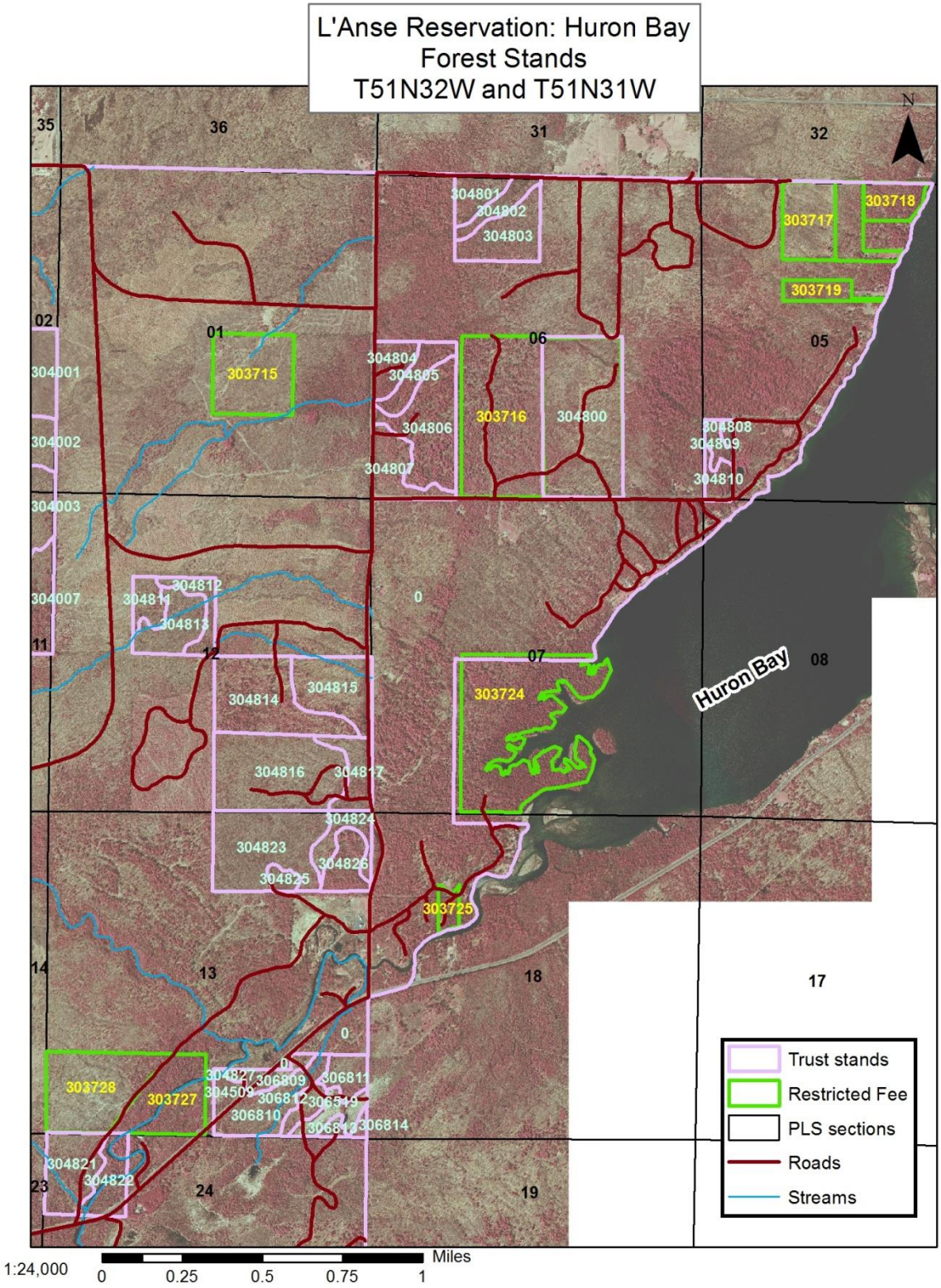
Map 5


L'Anse Reservation: Aura
Forest Stands
T51N32W
N
Trust stands
Restricted Fee
PLS sections
Roads
Streams
1:24,000
0
0.25
0.5
0.75
1
Miles

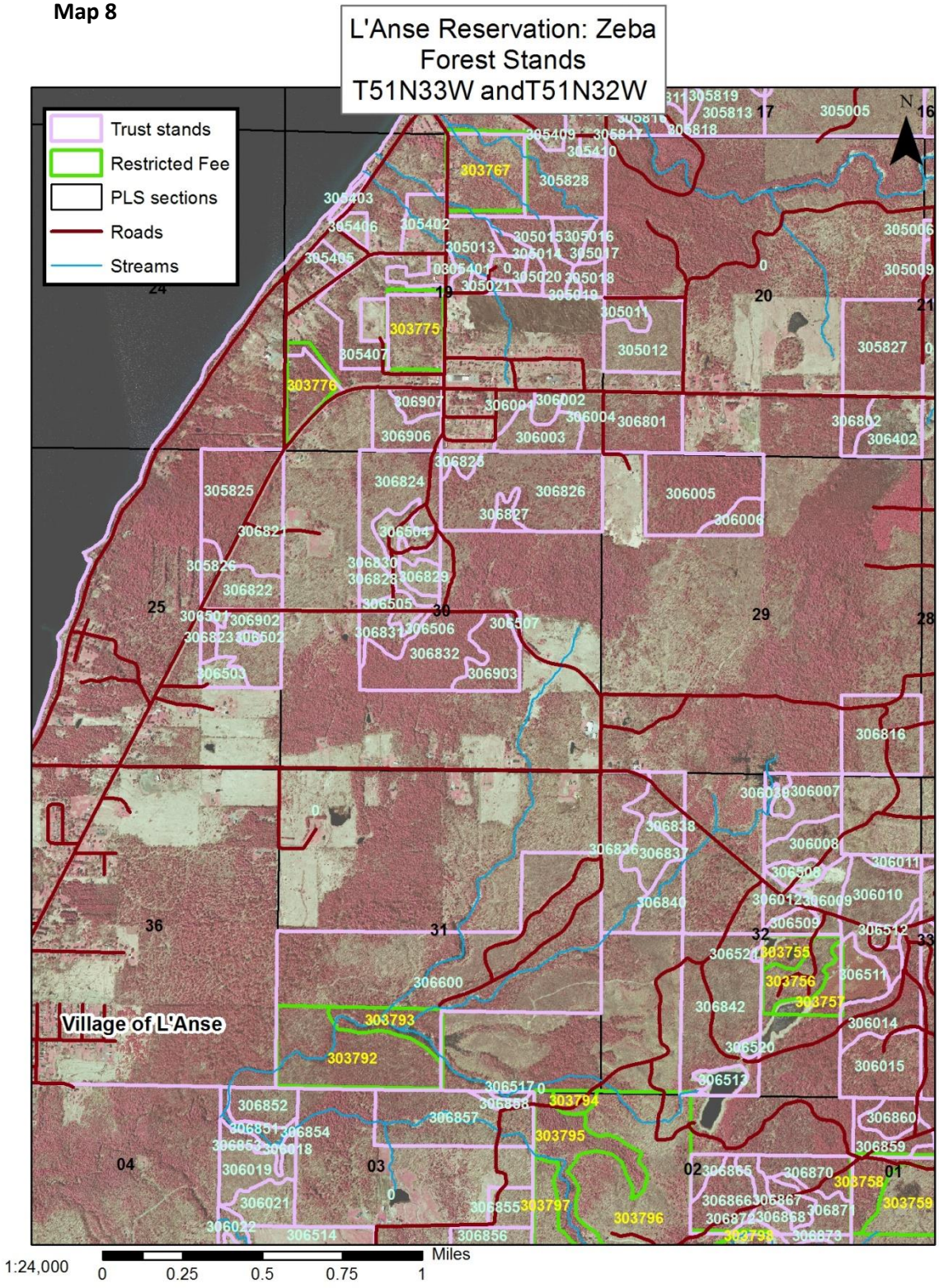
Map 6


L'Anse Reservation: Pikes Peak East
Forest Stands
T51N32W
N
Trust stands
Restricted Fee
PLS sections
Roads
Streams
1:24,000
0
0.25
0.5
0.75
1
Miles

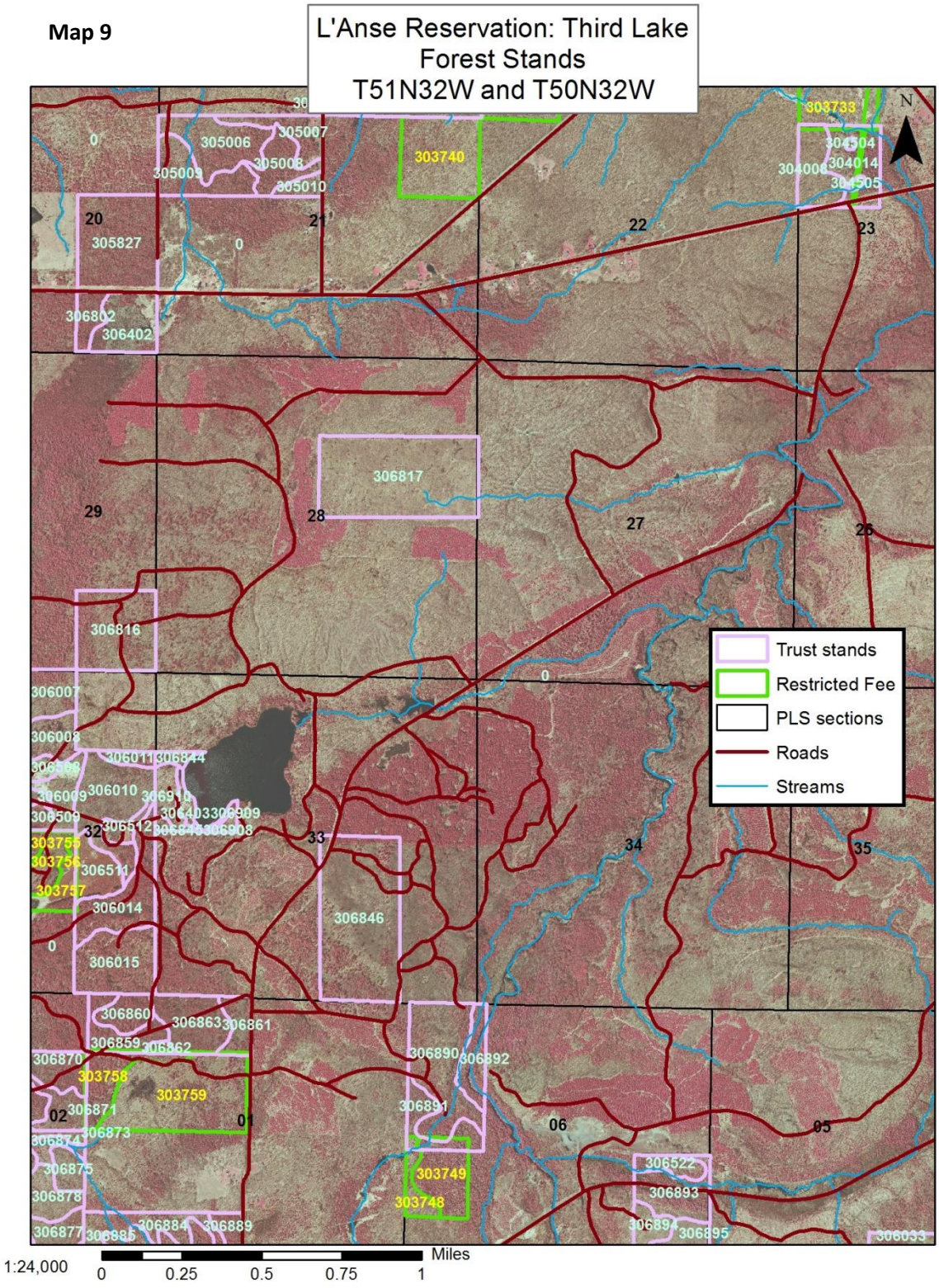
Map 7


L'Anse Reservation: Huron Bay
Forest Stands
T51N32W and T51N31W
N
35
36
31
32
02
01
06
05
11
12
07
08
13
18
17
14
23
24
19
304801
304802
304803
303718
303717
303719
304001
303715
304804
304805
303716
304800
304806
304808
304809
304807
304810
304002
304003
304007
304811
304812
304813
0
304814
304815
Huron Bay
303724
304816
304817
304824
304823
304826
304825
303725
303728
303727
304509
306809
306811
306812
306549
306810
306814
304821
304822
Trust stands
Restricted Fee
PLS sections
Roads
Streams
1:24,000
Miles
0
0.25
0.5
0.75
1

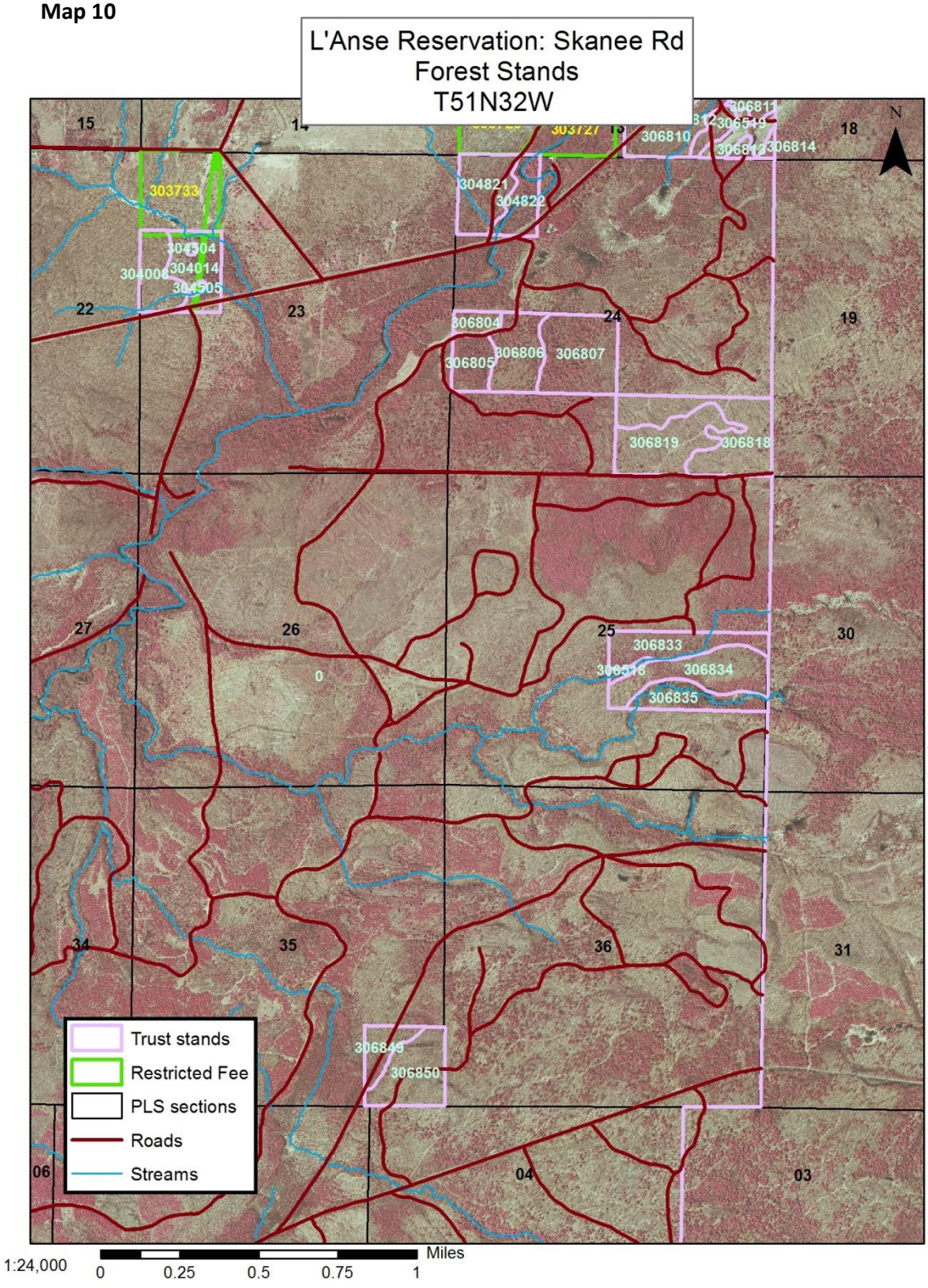
Map 8


L'Anse Reservation: Zeba
Forest Stands
T51N33W andT51N32W
Trust stands
Restricted Fee
PLS sections
Roads
Streams
N
Village of L'Anse
1:24,000
0
0.25
0.5
0.75
1
Miles

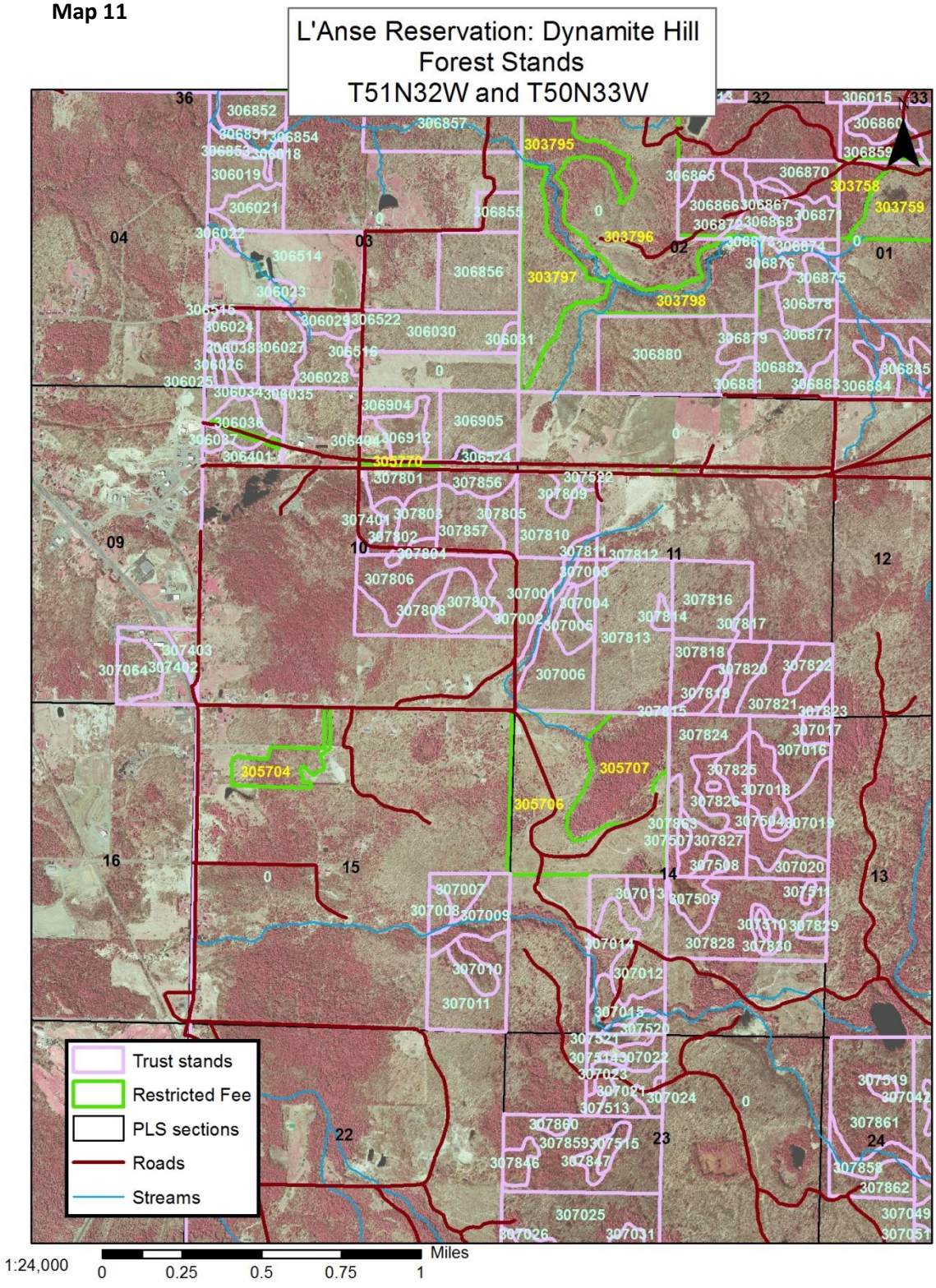
Map 9


L'Anse Reservation: Third Lake
Forest Stands
T51N32W and T50N32W
N
Trust stands
Restricted Fee
PLS sections
Roads
Streams
1:24,000
0
0.25
0.5
0.75
1
Miles

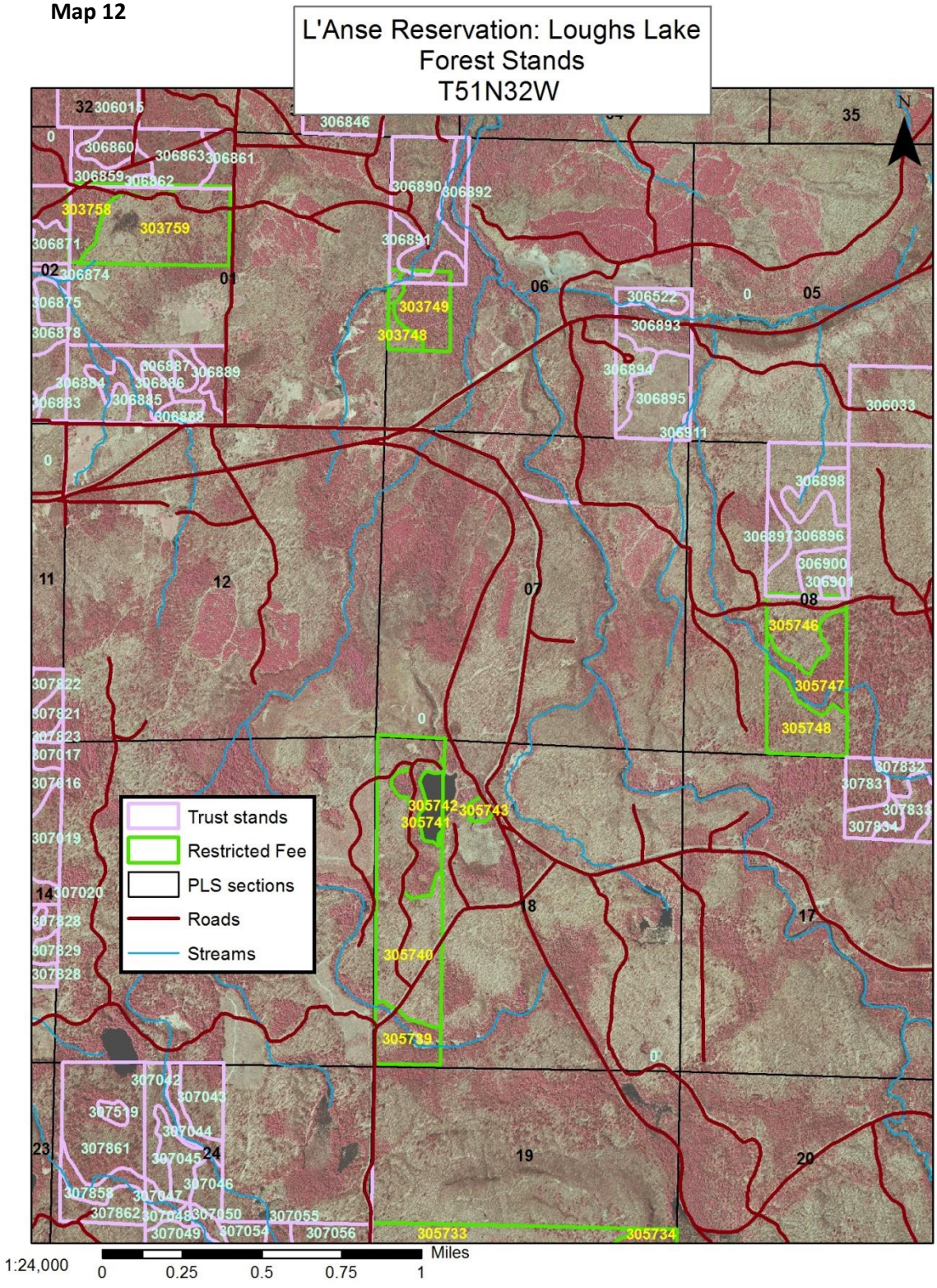
Map 10


L'Anse Reservation: Skanee Rd
Forest Stands
T51N32W
N
15
14
18
19
22
23
24
27
26
25
30
34
35
36
31
06
04
03
303733
303727
304821
304822
304504
304014
304005
306804
306805
306806
306807
306819
306818
306833
306834
306835
306849
306850
306810
306811
306814
Trust stands
Restricted Fee
PLS sections
Roads
Streams
1:24,000
0
0.25
0.5
0.75
1
Miles

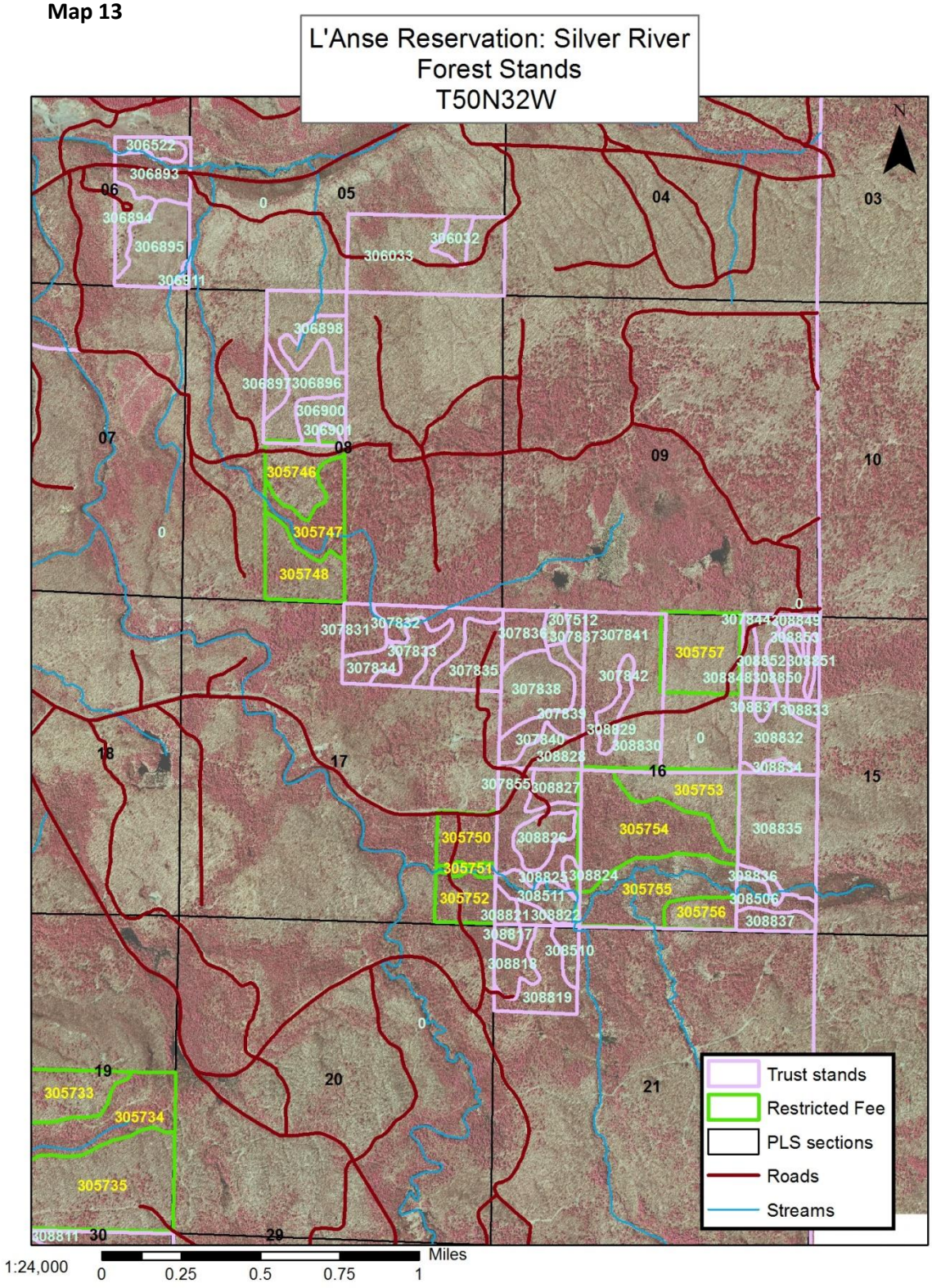
Map 11


L'Anse Reservation: Dynamite Hill
Forest Stands
T51N32W and T50N33W
Trust stands
Restricted Fee
PLS sections
Roads
Streams
1:24,000
0
0.25
0.5
0.75
1
Miles

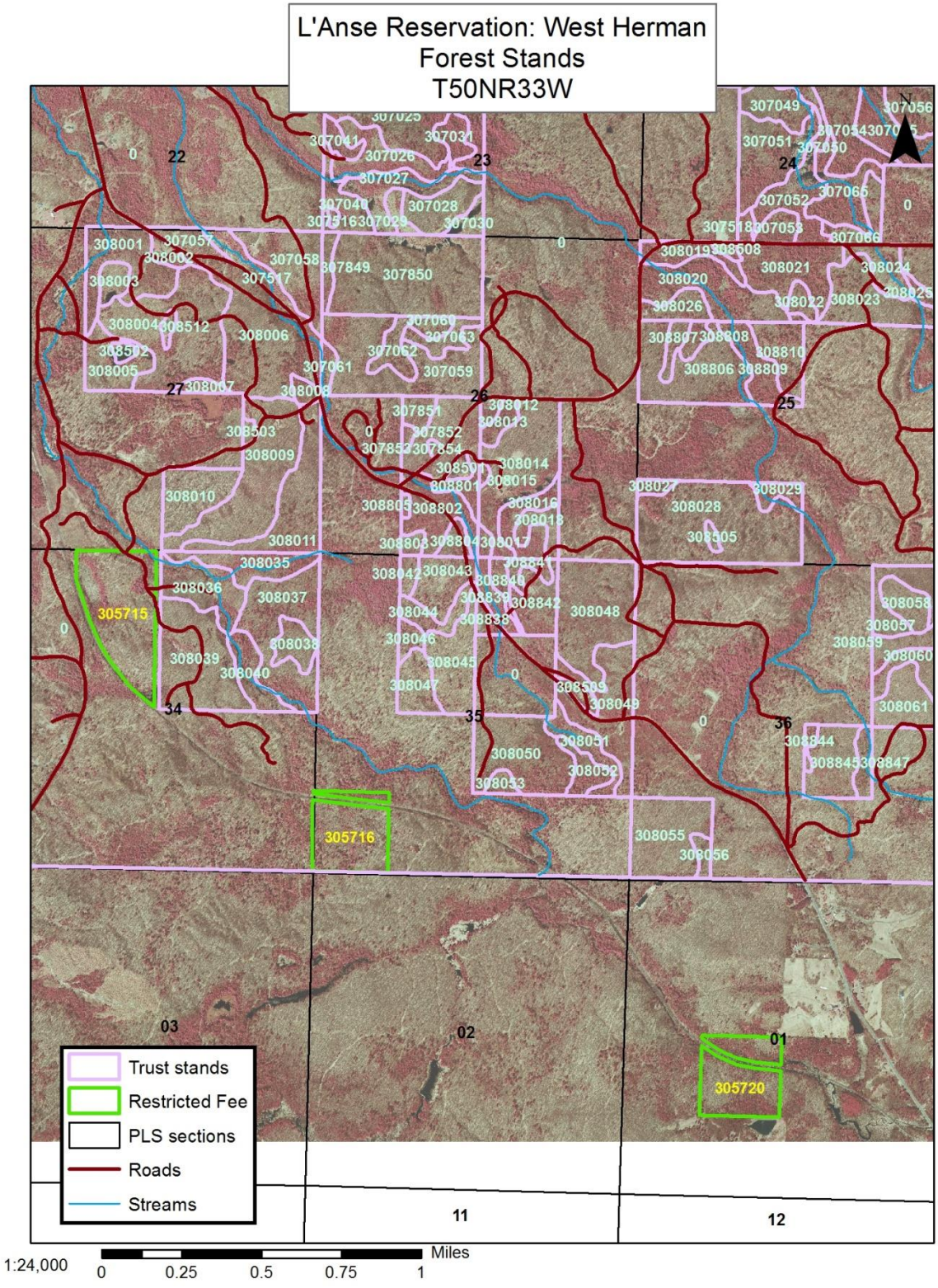
Map 12


L'Anse Reservation: Loughs Lake
Forest Stands
T51N32W
N
Trust stands
Restricted Fee
PLS sections
Roads
Streams
1:24,000
0
0.25
0.5
0.75
1
Miles

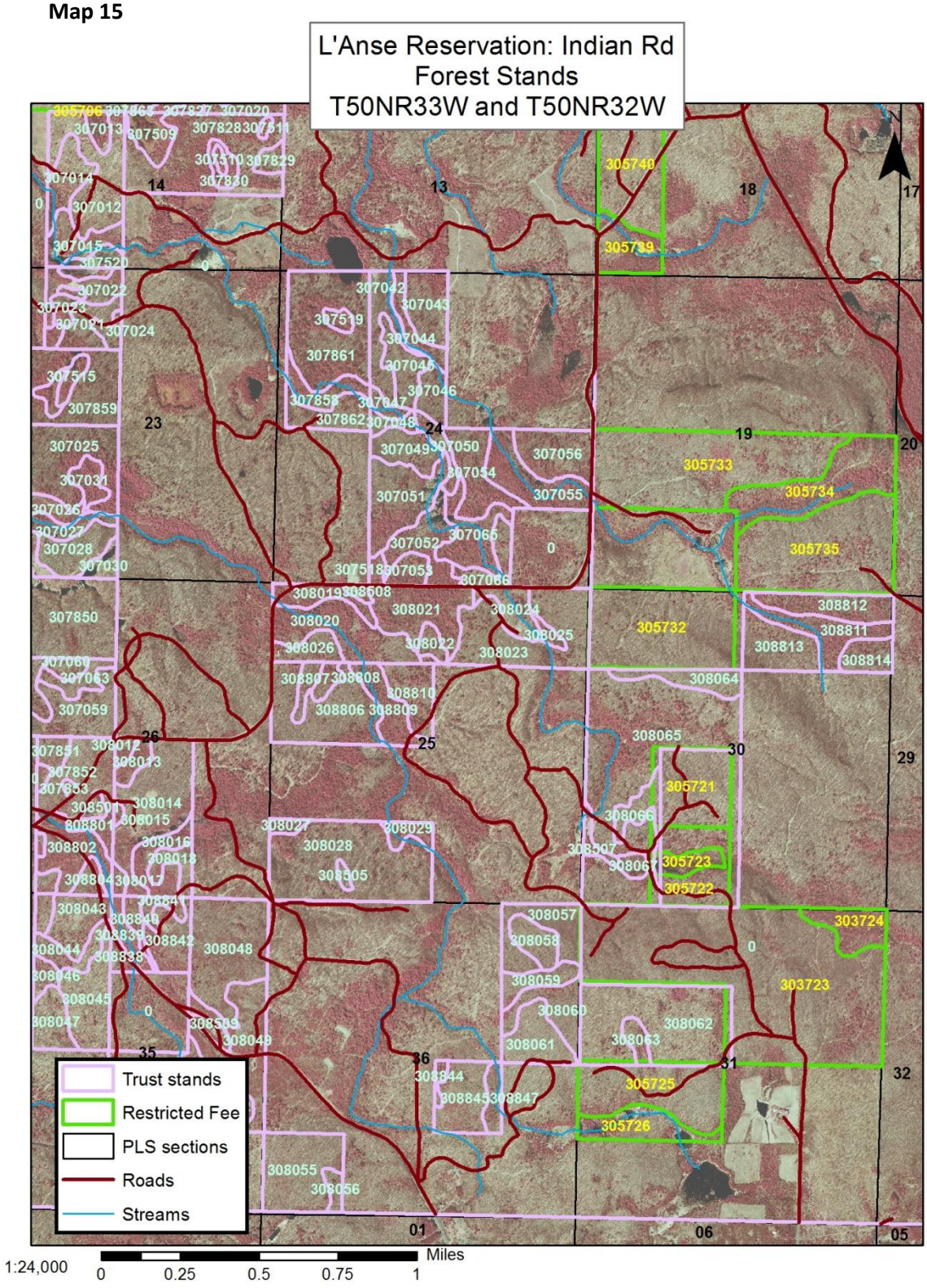
Map 13


L'Anse Reservation: Silver River
Forest Stands
T50N32W
N
Trust stands
Restricted Fee
PLS sections
Roads
Streams
1:24,000
0
0.25
0.5
0.75
1
Miles

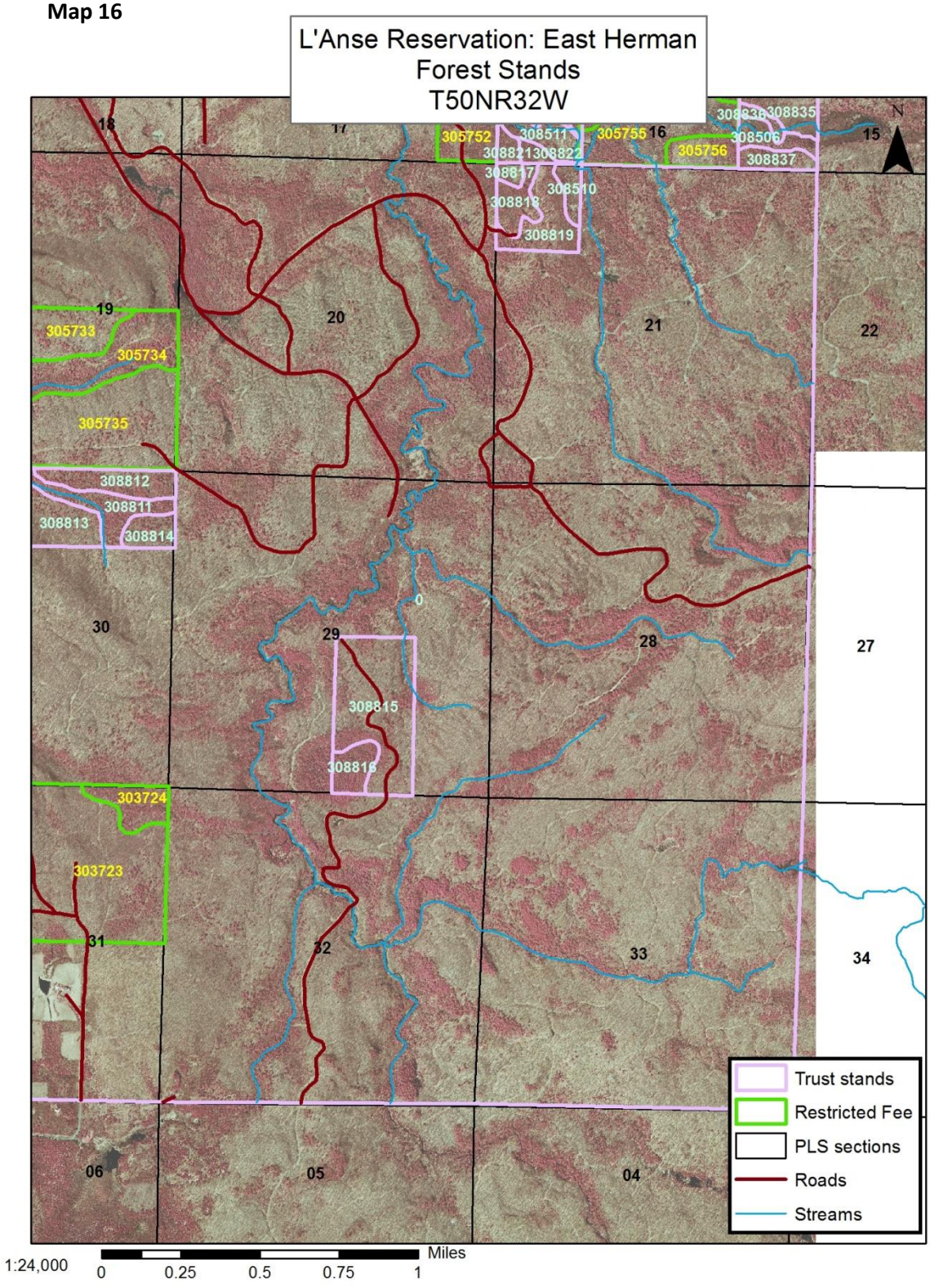
Map 14


L'Anse Reservation: West Herman
Forest Stands
T50NR33W
N
Trust stands
Restricted Fee
PLS sections
Roads
Streams
305715
305716
305720
1:24,000
0
0.25
0.5
0.75
1
Miles

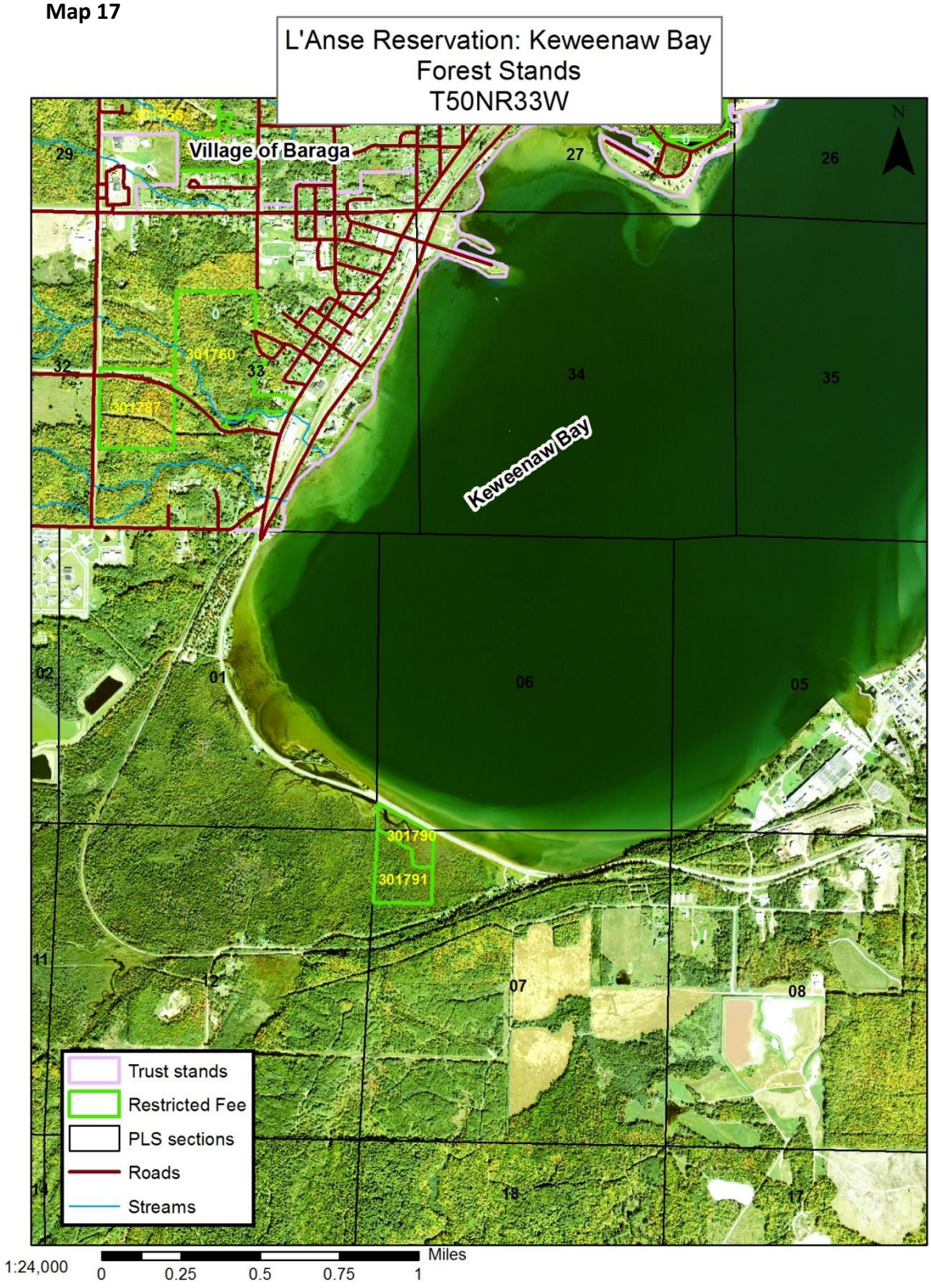
Map 15


L'Anse Reservation: Indian Rd
Forest Stands
T50NR33W and T50NR32W
Trust stands
Restricted Fee
PLS sections
Roads
Streams
1:24,000
0
0.25
0.5
0.75
1
Miles

Map 16


L'Anse Reservation: East Herman
Forest Stands
T50NR32W
N
18
17
16
15
19
20
21
22
30
29
28
27
31
32
33
34
06
05
04
305752
308511
305755
308836
308835
308506
305756
308837
308821
308822
308817
308510
308818
308819
305733
305734
305735
308812
308811
308813
308814
308815
308816
303724
303723
Trust stands
Restricted Fee
PLS sections
Roads
Streams
1:24,000
0
0.25
0.5
0.75
1
Miles

Map 17


L'Anse Reservation: Keweenaw Bay
Forest Stands
T50NR33W
Village of Baraga
Keweenaw Bay
N
29
27
26
32
33
34
35
02
01
06
05
11
12
07
08
14
18
17
301760
301787
301790
301791
Trust stands
Restricted Fee
PLS sections
Roads
Streams
1:24,000
0
0.25
0.5
0.75
1
Miles

Appendix 3.1 KBIC Trust Stand Inventory Records Sample

Note: For tables describing the codes used below, see Appendix 3.3 Trust Stand Inventory Tables

BUREAU OF INDIAN AFFAIRS
OPERATIONS INVENTORY
Stand Record Sheet

RCS Detail

Reservation: 475 | Compartment: 301 | Stand: 1 | RCS: 4753010001 | Trans Date: 26-Sep-16

Legal Description

Quad: | Township: 51N | Range: 33W | Section: 5 | Stand Acres: 49 | USGS Quad:
Air Photo #: | Year of Recon: 2006 | Source: CURR PROCEDURES | Ownership: 1 TRIBAL LANDS | Tract Number:
Allotment #: TRIBAL | Allotment Name: | UTM Zone: | UTM Easting: | UTM Northing:

Site Detail

Land Class: 1 CFL - REGULATED | Forest Class: 1 UNRS/ACCESSIBLE/TIMBERLANDS/COMM | Habitat Type: E+04 UNKNOWN | Co Habitat Type:
Total BA: 110 | Average DBH: 8 | Year of Origin: 1932 | Site Index Species: RED MAPLE | Site Index: 65 | Spcl Mgmt Zone: 1 GENERAL FOREST
Stand Condition: 2 OVERSTOCKED | Structure: 3 UNEVEN-AGED | Soil Code: 0 | Operability: 3 GOOD | Road Access: 4 FAIR
Objective Type/Dens: NORTHERN HRDWDS / MEDIUM DENSITY | Other 1: | Other 2:

Cover Type Info

	Type	Size	Density
Primary	NORTHERN HRDWDS	SMALL SAWTIMBER	MEDIUM DENSITY
Secondary	TREMBLING ASPEN	SMALL SAWTIMBER	LIGHT DENSITY
Understory	NORTHERN HRDWDS	SEED-SAPLING	LIGHT DENSITY

NHPA Survey Info

NHPA Survey Source: | TS=Timber Sale FD=Forest Development FM=Fuels Management
FY NHPA Survey Completed: 0 | T=Completed by Tribe C=Completed by Contractor Blank=Completed by BIA
NHPA Report or ARPA Permit Number:

Fuels Detail

Fire Zone: | Representative Location: | Fuel Model: | Fire Regime: | Condition Class:
FireMon Code: | Fuels Project Type: | Fuels Transect Completed:

BUREAU OF INDIAN AFFAIRS
OPERATIONS INVENTORY
Stand Record Sheet

RCS Detail

Reservation 475 Compartment 301 Stand 1 RCS 4753010001 Trans Date 26-Sep-16

Species and Product Volume Detail

TotalRecordType 0

Species	Product	Height	Top	Basal Area	Cords / Acre	MBF / Acre	Total Cords	Total MBF
Q. ASPEN	2	6	0	10	3.34	0	163.66	0.00
YELLOW BIRCH	1	3	3	6	0.67	0.46	32.83	22.54
YELLOW BIRCH	2	3	0	8	1.74	0	85.26	0.00
SUGAR MAPLE	1	2	4	12	1.99	0.64	97.51	31.36
SUGAR MAPLE	2	3	0	20	4.56	0	223.44	0.00
RED MAPLE	1	3	4	24	3.71	1.76	181.79	86.24
RED MAPLE	2	4	0	30	8.01	0	392.49	0.00
				Totals:	24.02	2.86	1,176.98	140.14

CutRecordType 1

Species	Product	Height	Top	Basal Area	Cords / Acre	MBF / Acre	Total Cords	Total MBF
Q. ASPEN	2	6	0	10	3.34	0	163.66	0.00
YELLOW BIRCH	2	3	0	4	0.95	0	46.55	0.00
SUGAR MAPLE	1	4	1	2	0.09	0.21	4.41	10.29
SUGAR MAPLE	2	5	0	2	0.58	0	28.42	0.00
RED MAPLE	1	3	5	4	0.73	0.28	35.77	13.72
RED MAPLE	2	4	0	18	4.62	0	226.38	0.00
				Totals:	10.31	0.49	505.19	24.01

Insect & Disease Detail

Insect Disease	Insect Disease Pct
62 BOLE - HEARTROT	1 1- 5 %

Stand Activity Planning Detail

Stand Entry	Treatment Acres	Priority	Program	Activity	FD Need	TS Name	Timber Sale Planning TS #	Cords	MBF
2010		2	TS	6				0	0

BUREAU OF INDIAN AFFAIRS
OPERATIONS INVENTORY
Stand Record Sheet

RCS Detail

Reservation 475 Compartment 301 Stand 1 RCS 4753010001 Trans Date 26-Sep-16

Stand Remarks

Date	Stand Remark
7/3/2007	EASTERN PORTION OF STAND - REMOVE ASPEN, IT IS IN DECLINE. SELECT CUT HARDWOODS AT THE SAME TIME. CUT IN 5 YEARS.
6/26/2007	SELECT CUT HARDWOODS, REMOVE ASPEN. ASPEN IS IN DECLINE. CUT IN 5 YEARS.
	ASP CUT 15 YRS AGO? ACCESS FROM SOUTH WEST. FLAT TERRAIN. WINTER LOGGING.

BUREAU OF INDIAN AFFAIRS
OPERATIONS INVENTORY
Stand Record Sheet

RCS Detail

Reservation: 475 | Compartment: 301 | Stand: 2 | RCS: 4753010002 | Trans Date: 29-Jun-07

Legal Description

Quad: | Township: 51N | Range: 33W | Section: 5 | Stand Acres: 12 | USGS Quad:
Air Photo #: 65-210 | Year of Recon: 2006 | Source: CURR PROCEDURES | Ownership: 1 TRIBAL LANDS | Tract Number:
Allotment #: TRIBAL | Allotment Name: | UTM Zone: | UTM Easting: | UTM Northing:

Site Detail

Land Class: 1 CFL - REGULATED | Forest Class: 1 UNRS/ACCESSIBLE/TIMBERLANDS/COMM | Habitat Type: E+04 UNKNOWN | Co Habitat Type:
Total BA: 139 | Average DBH: 9 | Year of Origin: 1933 | Site Index Species: RED MAPLE | Site Index: 55 | Spcl Mgmt Zone: 1 GENERAL FOREST
Stand Condition: 2 OVERSTOCKED | Structure: 3 UNEVEN-AGED | Soil Code: 0 | Operability: 5 WINTER ONLY | Road Access: 7 NONE
Objective Type/Dens: WHITE CEDAR / HEAVY DENSITY | Other 1: | Other 2:

Cover Type Info

	Type	Size	Density
Primary	WHITE CEDAR	POLETIMBER	HEAVY DENSITY
Secondary	SWAMP HARDWOODS	POLETIMBER	LIGHT DENSITY
Understory	UPLAND FIR-SPR	SEED-SAPLING	LIGHT DENSITY

NHPA Survey Info

NHPA Survey Source: FD — TS=Timber Sale FD=Forest Development FM=Fuels Management
FY NHPA Survey Completed: 0 — T=Completed by Tribe C=Completed by Contractor Blank=Completed by BIA
NHPA Report or ARPA Permit Number:

Fuels Detail

Fire Zone: | Representative Location: | Fuel Model: | Fire Regime: | Condition Class:
FireMon Code: | Fuels Project Type: | Fuels Transect Completed:

BUREAU OF INDIAN AFFAIRS
OPERATIONS INVENTORY
Stand Record Sheet

RCS Detail

Reservation 475 Compartment 301 Stand 2 RCS 4753010002 Trans Date 29-Jun-07

Species and Product Volume Detail

TotalRecordType 0

Species	Product	Height	Top	Basal Area	Cords / Acre	MBF / Acre	Total Cords	Total MBF
AM. ELM	2	1	0	3	0.28	0	3.36	0.00
Q. ASPEN	2	7	0	17	6.5	0	78.00	0.00
YELLOW BIRCH	2	2	0	13	2.66	0	31.92	0.00
RED MAPLE	1	2	4	10	1.71	0.61	20.52	7.32
RED MAPLE	2	3	0	33	7.73	0	92.76	0.00
HEMLOCK	2	2	0	10	2.75	0	33.00	0.00
WHITE CEDAR	1	1	3	7	1	0.31	12.00	3.72
WHITE CEDAR	2	3	0	43	9.49	0	113.88	0.00
BALSAM FIR	2	1	0	3	0.28	0	3.36	0.00
				Totals:	32.40	0.92	388.80	11.04

CutRecordType 1

Species	Product	Height	Top	Basal Area	Cords / Acre	MBF / Acre	Total Cords	Total MBF
Q. ASPEN	2	8	0	10	4.04	0	48.48	0.00
RED MAPLE	2	3	0	13	2.73	0	32.76	0.00
				Totals:	6.77	0.00	81.24	0.00

Insect & Disease Detail

Insect Disease	Insect Disease Pct
#Error	#Error

Stand Activity Planning Detail

Stand Entry	Treatment Acres	Priority	Program	Activity	FD Need	Timber Sale Planning TS Name	TS #	Cords	MBF
2005		1	FD	24	E				
2011		1	TS	7				0	0

BUREAU OF INDIAN AFFAIRS
OPERATIONS INVENTORY
Stand Record Sheet

RCS Detail

Reservation 475 Compartment 301 Stand 2 RCS 4753010002 Trans Date 29-Jun-07

Stand Remarks

Date	Stand Remark
6/26/2007	N.W. PART DECLINING ASPEN AMONG RED MAPLE. N.E. PART WELL STOCKED CEDAR. SOUTH PART MIX OF SWAMP HARDWOOD AND SWAMP CONIFER. REMOVE ASPEN SOON. POOR ACCESS. OVERMATURE ASPEN. GOOD MIXED REPRODUCTION.

Appendix 3.2 Restricted Fee Stand Tables

Table 1. Fee stand table

Fee Stand Number	Forest Type	Acres	Primary Size Class	Stocking/Density Code
301701	NH	16.10	3	2
301703	HH	3.91	3	3
301704	SH	60.60	2	1
301705	HH	18.45	3	3
301710	A	80.18	1	2
301711	RM	38.99	2	3
301712	SF	98.03	2	2
301713	HH	18.53	3	3
301715	HH	49.21	3	3
301716	HH	35.54	2	3
301717	NH	75.57	3	3
301721	NH	61.95	3	3
301730	NH	40.08	3	3
301731	FA	15.57	1	3
301732	HH	21.21	3	2
301733	NH	4.37	3	2
301734	NH	136.39	3	3
301735	HH	26.09	3	3
301736	PR	20.70	2	2
301737	NH	77.91	3	3
301740	NH	66.90	2	2
301746	SC	19.42	2	3
301753	NH	81.64	3	2
301756	NH	20.43	2	2
301760	HH	65.86	3	2
301763	PM	7.76	2	3
301764	KB	32.15	1	1
301766	KB	2.29	2	1
301786	NH	80.30	3	3
301787	HH	37.80	3	2
301790	KB	11.04	1	1
301791	SC	19.62	1	2
303701	SC	1.00	1	2
303702	KB	45.77	2	2
303703	KB	40.29	1	1
303704	AN	564.76	2	2
303710	NH	8.45	3	3
303711	NH	41.28	2	2
303712	NH	40.07	3	2
303713	NA	39.64	3	3
303714	A	80.20	1	3

303715	A	40.10	1	3
303716	HH	81.03	3	3
303717	A	25.46	1	3
Fee Stand Number	**Forest Type**	**Acres**	**Primary Size Class**	**Stocking/Density Code**
303718	NH	29.71	3	3
303719	NH	9.11	2	3
303723	A	216.50	3	3
303724	SC	96.65	1	3
303725	HH	5.12	3	3
303727	SC	33.23	2	3
303728	NH	46.21	3	3
303733	SH	44.28	3	1
303737	SC	20.73	3	3
303738	NH	39.30	3	3
303740	NH	71.33	3	2
303741	HH	34.78	3	3
303748	NH	8.22	3	2
303749	SC	22.90	2	3
303750	A	39.70	1	3
303751	AN	80.12	1	3
303752	AN	76.66	3	3
303753	A	76.46	1	3
303755	KM	8.90	3	1
303756	NH	18.70	2	3
303757	KM	12.03	2	1
303758	PM	19.70	4	3
303759	HH	61.04	3	3
303760	NH	11.55	3	2
303762	HH	40.08	3	3
303767	HH	39.88	2	3
303775	HH	28.09	3	3
303776	SC	19.95	2	3
303792	HH	62.40	3	3
303793	HH	20.40	3	3
303794	KM	5.36	1	2
303795	SH	43.32	3	2
303796	HH	116.88	2	2
303797	NH	51.93	3	3
303798	NH	74.30	3	3
304808	HH	2.00	4	2
305702	SC	3.50	2	1
305704	HH	30.98	3	3
305706	A	106.40	1	3
305707	SC	54.15	2	3

305715	NH	54.47	3	3
305716	NH	35.06	3	3
305720	HH	36.87	3	3
305721	A	40.08	3	3
305722	HH	30.66	3	3
305723	WB	9.43	2	1
305725	NH	52.37	3	3
Fee Stand Number	**Forest Type**	**Acres**	**Primary Size Class**	**Stocking/Density Code**
305726	WB	16.15	2	2
305732	AN	75.02	3	3
305733	NH	102.33	3	3
305734	SC	47.32	2	3
305735	NA	83.97	3	3
305739	SH	20.07	2	3
305740	NH	97.70	3	3
305741	SC	23.75	2	3
305742	WM	8.75	0	0
305743	HH	2.60	2	2
305746	AN	25.40	3	3
305747	HH	25.85	3	3
305748	NH	28.86	3	3
305750	SC	19.55	3	2
305751	WR	4.03	0	0
305752	HH	18.17	3	3
305753	NH	33.46	3	3
305754	SC	63.40	2	3
305755	WR	50.02	2	1
305756	NH	13.47	3	2
305757	NH	40.93	3	3
305770	NH	5.09	3	2

Acreage Total **5198.02**

Table 2: Size class codes to be used when conducting Inventory

Primary Size Class Code Definitions	Size Class Codes
Non-Stocked	**0**
Seedling-Sapling (0-5”)	**1**
Poletimber (5”-10.9”)	**2**
Small Sawtimber (10.9”-14.9”)	**3**
Large Sawtimber (15”+)	**4**

Table 3: Density codes to be used when completing the Detailed Tree Tally Sheet.

Stocking Density Code Definitions	Density Codes
Non-Stocked (Permanent or Temporary)	**0**
Light Density	**1**
Medium Density	**2**
Heavy Density	**3**

Table 4: Parameters to be used when determining the density of a size class.

Parameters for Determining Density of Size Class			
Size Class	**Light (1)**	**Medium (2)**	**Heavy (3)**
Seedling (Conifer Stems)	150-499	500-1249	1250+
Seedling (Hardwood Stems)	500-1499	1500-4499	4500+
Sapling (Conifer Stems)	50-249	250-599	600+
Sapling (Hardwood Stems)	300-499	500-1499	1500+
Poletimber (Cords)	3-7	7-13	13+
Poletimber (BA = sq. ft.)	10-39	40-69	70+
Small Sawtimber (MBF)	1.3-2.4	2.5-4.9	5.0+
Small Sawtimber (BA = sq. ft.)	10-39	40-69	70+
Small Sawtimber (Sticks/plot)	5-8	9-16	17+
Large Sawtimber (MBF)	1.3-3.9	4.0-8.4	8.5+
Large Sawtimber (BA = sq. ft.)	10-29	30-59	60+
Large Sawtimber (Sticks/plot)	5-13	14-28	29+

Table 5: Primary cover types and codes used in forest inventory procedures

Forest Cover Type Groups	Forest Cover Type Code Definitions	Primary Cover Type Codes
ASPEN/EARLY SUCCESSIONAL	Aspen	**A**
	Aspen-Northern Hardwoods	**AN**
	Northern Hardwoods-Aspen	**NA**
BIRCH	White Birch	**BW**
FIR & SPRUCE	Upland Fir-Spruce	**FS**
	Black Spruce	**SB**
HARDWOODS (NORTHERN)	Northern Hardwoods	**NH**
HEMLOCK	Hemlock	**HE**
	Hemlock-Hardwoods	**HH**
OAK	Red Oak	**OR**
	Oak-Pine	**OP**
PINE	Jack Pine	**PJ**
	Red Pine	**PR**
	Scotch Pine	**PS**
	White Pine	**PW**
LOWLANDS	Swamp Conifer	**SC**
	Swamp Hardwoods	**SH**
CEDAR	White Cedar	**CW**
MARSH/MUSKEG	Bog	**KB**
	Marsh/Muskeg	**KM**
EMERGENT VEGETATION	Emergent Vegetation	**KE**
LOWLAND BRUSH	Lowland Brush	**LB**
WATER	Lake	**WL**
	Minor Lake	**WM**
	River/Stream	**WR**
	Minor Stream	**WS**
	Beaver Pond	**WB**
NON-FOREST	Rock	**ZR**
	Sand Dunes	**ZS**
NON-PRODUCTIVE	Cities/Towns	**XC**
	Farm	**XF**
NON-PRODUCTIVE	Grass/Grazing Field	**XG**
	Industrial	**XI**
	Recreational	**XR**

	Temporary Non-Productive	**XT**
	Housing	**XH**

Appendix 3.3 Inventory Codes for Trust Stands

Note: many of these metrics and tables are the same as the Fee Stand Tables used in Appendix 3.2

Table 1: Stand codes used when completing the Detailed Tree Tally Sheet

Stand Definition	Stand Codes
Tribal Trust	**000-299**
Recreation	**300-399**
Housing	**400-499**
Non-Commercial Forest/ Non-Forested Lands	**500-599**
Fee Lands	**600-799**
Allotted Commercial Lands	**800-999**
Preserved Tribal Lands	**1000-2999**
Subdivided Allotted Lands	**8000-9999**

Table 2: Guide for number of inventory sample points per stand

Acreage	Minimum Number of Sample Points Required
<1-4 acres	**1**
5-11 acres	**2**
12-24 acres	**3**
25-39 acres	**4**
40-49 acres	**5**
50-59 acres	**6**
60-69 acres	**7**
70-79 acres	**8**
80-89 acres	**9**
90-99 acres	**10**
100-109 acres	**11**

110-119 acres	**12**
120-129 acres	**13**
130-139 acres	**14**
140+	**15**

Table 3: Primary cover types used in forest inventory procedures

Primary Cover Type Groups	Primary Cover Type Code Definitions	Primary Cover Type Codes
ASPEN	Aspen	**A**
	Bigtooth Aspen	**AB**
	Trembling Aspen	**AT**
	Aspen-Northern Hardwoods	**AN**
	Offsite Aspen	**AX**
ASH	Green Ash	**AS**
	White Ash	**AW**
BASSWOOD	Basswood	**BA**
BIRCH	White Birch	**BW**
	Yellow Birch	**BY**
CEDAR	White Cedar	**CW**
ELM	American Elm	**EL**
EMERGENT VEGETATION	Emergent Vegetation	**KE**
FIR & SPRUCE	Balsam Fir/Aspen	**FA**
	Balsam Fir	**FB**
	Black Spruce	**SB**
	Upland Fir-Spruce	**FS**
	White Spruce	**SW**
HARDWOODS (NORTHERN)	Northern Hardwoods	**NH**
	Northern Hardwoods-Aspen	**NA**
	Mixed Hardwoods	**MH**
	Mid-Tolerant Hardwoods	**NM**
	Low Quality Mixed Hardwoods	**NX**
	Bottomland Hardwoods	**BH**
	Swamp Hardwoods	**SH**
HEMLOCK	Hemlock	**HE**
	Hemlock-Hardwoods	**HH**
	Hemlock-Yellow Birch	**HY**
LOWLAND BRUSH	Lowland Brush	**LB**
MAPLE	Red Maple (Soft Maple)	**RM**
	Sugar Maple (Hard Maple)	**SM**
MARSH/MUSKEG	Bog	**KB**
	Marsh/Muskeg	**KM**
NON-FOREST	Rock	**ZR**

	Sand Dunes	**ZS**
NON-PRODUCTIVE	Cities/Towns	**XC**
	Farm	**XF**
	Grass/Grazing Field	**XG**
	Industrial	**XI**
	Recreational	**XR**
	Temporary Non-Productive	**XT**
	Housing	**XH**
	Right-of-Way	**XW**
OAK	Red Oak	**OR**
	Oak-Pine	**OP**
PINE	Jack Pine	**PJ**
	Red Pine	**PR**
	Scotch Pine	**PS**
	White Pine	**PW**
	Mixed Pine	**PM**
SWAMP CONIFERS	Swamp Conifers	**SC**
	Non-Commercial Swamp Conifers	**SX**
TAMARACK	Tamarack	**TA**
UPLAND BRUSH	Upland Brush	**UB**
WATER	Lake	**WL**
	Minor Lake	**WM**
	River/Stream	**WR**
	Minor Stream	**WS**
	Beaver Pond	**WB**
WILLOW	Willow	**WW**

Table 4: Size class codes indicating DBH in inches used when completing the Detailed Tree Tally Sheet.

Size Class Code Definitions	Size Class Codes
Non-Stocked	**0**
Seedling-Sapling (0-5”)	**1**
Poletimber (5”-10.9”)	**2**
Small Sawtimber (10.9”-14.9”)	**3**

Large Sawtimber (15”+)	**4**

Table 5: Density codes used when completing the Detailed Tree Tally Sheet.

Density Code Definitions	Density Codes
Non-Stocked (Permanent or Temporary)	**0**
Light Density	**1**
Medium Density	**2**
Heavy Density	**3**

Table 6: Parameters used when determining the density of a size class.

Size Class	Light (1)	Medium (2)	Heavy (3)
Seedling (Conifer Stems)	150-499	500-1249	1250+
Seedling (Hardwood Stems)	500-1499	1500-4499	4500+
Sapling (Conifer Stems)	50-249	250-599	600+
Sapling (Hardwood Stems)	300-499	500-1499	1500+
Poletimber (Cords)	3-7	7-13	13+
Poletimber (BA = sq. ft.)	10-39	40-69	70+
Small Sawtimber (MBF)	1.3-2.4	2.5-4.9	5.0+
Small Sawtimber (BA = sq. ft.)	10-39	40-69	70+
Small Sawtimber (Sticks/plot)	5-8	9-16	17+
Large Sawtimber (MBF)	1.3-3.9	4.0-8.4	8.5+
Large Sawtimber (BA = sq. ft.)	10-29	30-59	60+
Large Sawtimber (Sticks/plot)	5-13	14-28	29+

Table 7: Soundness classes defined by cull range and soundness range.

Soundness Class	Cull Range (%)	Soundness Range (%)
97	0-5	*100-95
93	6-10	94-90
86	11-18	89-82
78	19-26	81-74

65	27-49	73-51
44	50-60	**50-40
39	Cull	Cull

Table 8: Tree grade and product codes used when completing the Detailed Tree Tally Sheet

Tree Grade/Product	Tree Grade/Product Code
Veneer	**10**
Grade 1	**11**
Grade 2	**12**
Grade 3	**13**
Pulp	**20**
Cull	**00**

Note: Sound softwood trees will either receive a code of 10 for sawlogs or 20 for pulp. Softwood trees are not graded. Aspen and similar hardwoods, which do no usual receive a grade, will not be graded.

Table 9. Insect/Disease codes used when completing the Stand Record Sheet and Detailed Tree Tally Sheet.

Species	Insect/Disease Groups	Insect/Disease Code Definitions	Insect/Disease Codes
CONIFERS	ROOTS	General Code	**10**
		Mechanical Damage	**11**
		Disease	**12**
		Insects	**13**
		Animal Damage	**14**
		Fire Damage (any indication of char regardless if scarring is clear)	**15**
	BOLE	General Code	**20**
		Rust	**21**
		Heart Rot	**22**
		Mechanical Damage	**23**
		Bark Beetle	**24**
		Weevils	**25**
		Animal Damage	**26**
		Fire Damage or Scar (this does not include char unless there is an actual scar or damage of the living tissue)	**27**
		Weather	**28**
	CROWN	General	**30**
		Rust	**31**
		Shoot or Tip Blight	**32**
		Canker (e.g. Scleroderis)	**33**
		Insect (General)	**34**
		Mechanical/Weather	**35**
		Fire Damage (Any dead or dying foliage caused from a fire or charred/blackened stems)	**36**
HARDWOODS	ROOTS	General	**50**
		Mechanical Damage	**51**
		Disease	**52**
		Insects	**53**
		Animal Damage	**54**

		Fire Damage (any indication of char regardless if scarring is clear)	**55**
	BOLE	General	**60**
		Cankers	**61**
		Heart Rot	**62**
		Mechanical Damage	**63**
		Bark Beetle	**64**
		Borers	**65**
		Animal Damage	**66**
		Fire Damage or Scar (this does not include char unless there is an actual scar or damage of the living tissue)	**67**
		Necrosis	**68**
		Weather	**69**
	CROWN	General	**70**
		Wilt	**71**
		Anthracnose (Leaf Spots)	**72**
		Decline/Dieback	**73**
		Defoliators	**74**
		Scale Insects	**75**
		Mechanical/Weather	**76**
		Fire Damage (Any dead or dying foliage caused from a fire or charred/blackened stems)	**77**

Table 10: Insect/Disease percentage codes used when completing the Detailed Tree Tally Sheet and Stand Record Sheet.

Insect/Disease Percentage Code Definitions	Insect/Disease Percentage Codes
< 1%	**0**
1-5%	**1**
6-10%	**2**
11-20%	**3**

21-30%	**4**
31-40%	**5**
41-50%	**6**
>50%	**7**

Table 11: Stand condition codes used when completing the Detailed Tree Tally Sheet.

Stand Condition Code Headings	Stand Condition Code Definitions	Stand Condition Codes
Non-Stocked	This code applies to all stands/sampled areas that have a primary cover type, which is not forested (e.g. Water, Non-Productive, Non-Forest, etc.).	**0**
High Risk	Stand is past maturity and beginning to break up or is breaking up due to one or numerous factors (insects, disease, weather, etc). Stand will not survive until rotation age.	**1**
Overstocked	Based on stocking chart the stand is in excess of fully stocked.	**2**
Mature	Stand is near or at maturity and is beginning to decline in growth. Stand should be cut as soon as possible.	**3**
Sparse	Stand has merchantable volume, but it is less than the current minimal standards for operability (e.g. 5 cords/acre).	**4**
Low Quality	Stand does not meet any of the above codes, but is of poor quality due to product or defect.	**5**
Good (Fully Stocked)	Stand is more than 5 years from rotational age and is in good condition, within acceptable stocking range and is showing adequate growth.	**6**
Regenerating	Cultural work has been completed on the stand, but it is too soon to declare the stand stocked. Once the final stocking survey confirms that regeneration is adequate then the stand will be updated with a stocking density.	**7**
Fire Damage		**8**
Storm Damage	Recent blowdown of more than 10% of the stand stocking. Note that if a salvageable component of recent blowdown exists the stand should be coded as high risk to insure that a salvage sale is immediately scheduled.	**9**

Table 12: Stand structure codes used when completing the Detailed Tree Tally Sheet.

Stand Structure	Stand Structure Code
Non-Stocked (Permanent or Temporary	**0**
Even-aged	**1**
Two-aged	**2**
Uneven-aged	**3**

Table 13: Stand operability codes used when completing the Detailed Tree Tally Sheet.

Stand Operability Code Headings	Stand Operability Code Definitions	Stand Operability Codes
Not Operable	Stand not operable and will most likely never be due to low volumes and/or accessibility.	**1**
Excellent	Stand operable at any time of the year.	**2**
Good	Stand operable during most of the year with all types of equipment.	**3**
Summer Only	Operable during summer season only due to steep slopes or low volume.	**4**
Winter Only	Operable in winter season only after ground freezes.	**5**
Poor-Volume	Operable, but low volumes may make the stand inoperable.	**6**
Poor-Terrain	Stand has operable volume, but has bad accessibility due to topography.	**7**

Table 14: Road accessibility codes used when completing the Detailed Tree Tally Sheet.

Road Accessibility Code Headings	Road Accessibility Code Definitions	Road Accessibility Codes
Excellent	All weather roads lead directly to stand	**1**
Good	Roads passable most of the year	**2**
Average	Roads passable only under good conditions	**3**
Fair	Roads are overgrown or in need of major repair	**4**
Limited	Roads must be dry or frozen to use	**5**
Poor	Limited access. New roads may have to be built	**6**
No Roads	No usable roads available to reach stand	**7**

Not Accessible	Cannot be accessed due to lack of bridges across waterways or easements to the stand.	**8**

Table 15: Forest class codes used when completing the Stand Record Tally Sheet.

Forest Class Code Definitions	Forest Class Codes
Non-Forest	**0**
Unreserved/Accessible/Commercial/Timberland	**1**
Unreserved/Accessible/Noncommercial/Timberland	**2**
Unreserved/Accessible/Commercial/Woodland	**3**
Unreserved/Accessible/Noncommercial/Woodland	**4**
Unreserved/Inaccessible/Productive/Timberland	**5**
Unreserved/Inaccessible/Unproductive/Timberland	**6**
Unreserved/Inaccessible/Productive/Woodland	**7**
Unreserved/Inaccessible/Unproductive/Woodland	**8**
Reserved/Accessible/ Productive /Timberland	**9**
Reserved/Accessible/Unproductive/Timberland	**10**
Reserved/Accessible/Productive/Woodland	**11**
Reserved/Accessible/Unproductive/Woodland	**12**
Reserved/Inaccessible/Productive/Timberland	**13**
Reserved/Inaccessible/Unproductive/Timberland	**14**
Reserved/Inaccessible/Productive/Woodland	**15**
Reserved/Inaccessible/Unproductive/Woodland	**16**

Table 16: Special management zone codes used when completing the Stand Record Tally Sheet.

Special Management Zone Code Headings	Special Management Zone Code Definitions	Special Management Zone Codes
General Forest	No special considerations	**1**
Travel Influence	Major roads border stand and buffer zones may be necessary.	**2**

Water Influence	Stand borders a river, stream, or lake. Special management for erosion or scenic values may be necessary.	**3**
Erosion	Erosion problems will need to be addressed before treatment.	**4**
Small Game	Management for small game should be considered in management plan. This may call for leaving certain trees for game habitat.	**5**
Big Game	Management for large game should be considered in management plan. This may call for leaving certain trees for game habitat.	**6**
Wild or Natural	Special wild or natural features occur within stand. Special management should be considered to protect or maintain features.	**7**
Recreation	Stand heavily used for recreation purposes.	**8**
Developed	Some type of development (e.g. residential, etc.) occurs on or near the stand.	**9**
Cultural	Stand may either contain culturally significant sites or be currently used for cultural or traditional practices by local tribal members.	**10**

Table 17: Timber Sale Priority codes used when completing the Stand Record Tally Sheet.

Timber Sale Priority	Timber Sale Priority Code Definitions	Timber Sale Priority Codes
None	Stand is not a priority for a commercial treatment	**0**
High	Stand needs to be treated immediately	**1**
Medium	Stand needs to be treated within the next 5 years.	**2**
Low	Stand needs to be treated within the next 10 years	**3**

Table 18: Timber Sale Priority codes used when completing the Stand Record Tally Sheet.

Timber Sale Activity	Timber Sale Activity Code Definitions	Timber Sale Activity Codes
Clearcut	The majority of merchantable trees are cut and regeneration is obtained by advanced reproduction, seeds in the soil, or artificial reproduction (e.g. planting).	**1**
Seed Tree	All merchantable trees are removed except those designated as seed trees.	**2**

Shelterwood-Prep Cut	The cut of a three-cut shelterwood system designed to develop the crown in the remaining stand in preparation for a regeneration cut to made in the future (usually 10 years).	**3**
Shelterwood-Regen Cut	This is a cut under the shelterwood system designed to obtain regeneration. Reproduction is natural and the overstory is manipulated to provide the desired seed source and provide crown cover conditions conducive to seedling establishment and development. This is the 2nd cut of a 3-step shelterwood or the 1st cut of a 2-step shelterwood.	**4**
Shelterwood-Final Cut	The final cut under a shelterwood system it is initiated to remove the remaining overstory once regeneration is established.	**5**
Selection	A cut in an uneven-aged stand designed to remove mature and undesirable trees with regeneration occurring in canopy gaps.	**6**
Commercial Thinning	A commercial cut in the main stand designed to enhance the growth and quality of crop trees.	**7**
Improvement	A cut in an even-aged or two-aged stand that is designed to convert the stand structure to uneven-aged over multiple entries. The emphasis is on crop tree release and establishment of a new age class through the creation of canopy gaps.	**8**
Salvage	A commercial cut to salvage the value of timber damaged due to natural or unnatural events.	**9**
Release w/Standards		**10**
Release		**11**
Group Selection		**12**

Table 19: Timber Sale Priority codes used when completing the Stand Record Tally Sheet.

Timber Sale Activity	Timber Sale Activity Code Definitions	Timber Sale Activity Codes
Planting	Prescribed for severely under stocked stands than cannot be regenerated naturally or unforested areas with the potential for plantation management.	**21**
Habitat Management	Opening maintenance and other projects related to the development of wildlife habitat.	**22**
Direct Seeding	Prescribed for severely understocked stands that cannot be regenerated naturally with the existing stocking or as supplemental seeding for natural regeneration site preparation.	**23**

Natural Regeneration	Prescribed when stand stocking/crown cover is conducive to regeneration. This code will identify the need to do site preparation of a suitable seed bed through chopping and/or scarification.	**24**
Release	Prescribed for release of natural or planted seedlings or saplings.	**25**
Clean & Weed		**26**
Thinning	Precommerical thinning for overstocked stands that cannot be treated with a commercial harvest.	**27**
Pruning		**28**
Other		**29**

Table 20: Source codes used when completing the Stand Record Tally Sheet.

Source Code Definitions	Source Codes
Examination under current procedures (i.e. using the procedures outlined in this document – **Stand Exam**)	**1**
Data transferred from old examination and survey records	**2**
Data from intensive surveys such as regeneration surveys	**3**
Updated from treatment report	**4**
Projected from computer models	**5**
From aerial photography	**6**
Stand exam update	**7**

Table 21: Ownership codes used when completing the Stand Record Tally Sheet.

Ownership Code Definitions	Ownership Codes
Tribal Lands (Trust)	**1**
Band Lands	**2**
Tribal Non-Trust (Fee)	**3**
Band Fee	**4**
Government/BIA	**5**

Public Domain	**6**
Private	**7**
Allotment (Trust)	**8**

Appendix 4.0 KBIC 5-Year Timber Harvesting Plan Stand Detail

Sale Name	Reservation Compartment Stand	Ownership	Primary Type	Primary Size	Primary Density	Total Basal Area	Stand Acres	Hardwood Pulpwood Sale Volume in MBF	Aspen Pulpwood Sale Volume in MBF	Softwood Pulpwood Sale Volume in MBF	Hardwood Sawlog Sale Volume	Softwood Sawlog Sale Volume	Total Sale Volume in MBF
HAATAJA ROAD WEST	4753050006	TRIBAL	NH	2	2	140	27	271	357	0	20	0	648
	4753050007	TRIBAL	NH	2	3	163	14						
	4753050008	TRIBAL	NH	2	2	144	15						
	4753050009	TRIBAL	NH	2	2	99	22						
	4753050010	TRIBAL	NH	2	3	170	5						
							83						
MARKSMAN ROAD EAST	4753050013	TRIBAL	AN	2	3	155	18	129	332	0	5	0	467
	4753050014	TRIBAL	AB	4	3	140	4						
	4753050015	TRIBAL	NH	2	3	95	17						
	4753050016	TRIBAL	A	2	1	20	9						
	4753050017	TRIBAL	A	3	2	120	5						
	4753050018	TRIBAL	HH	2	2	100	6						
	4753050019	TRIBAL	HH	2	2	80	1						
	4753050020	TRIBAL	NA	2	3	160	5						
	4753050021	TRIBAL	HH	2	3	150	5						
							70						
INDIAN CEMETERY NORTH	4753060007	TRIBAL	NA	2	3	140	26	157	1491	0	8	0	1655
	4753060008	TRIBAL	AN	3	3	173	19						
	4753060009	TRIBAL	AN	3	3	134	14						
	4753060010	TRIBAL	AB	3	3	195	35						
	4753060012	TRIBAL	AB	3	3	145	8						
							102						
VUK and BREWERY	4753060030	TRIBAL	NH	2	2	125	37	162	129	0	30	0	321
	4753060031	TRIBAL	NH	3	2	140	3						
							40						
RABIDEAUX	4753010828	1B184-A	NH	2	2	92	18	305	0	0	84	0	389
	4753010829	1B184-A	NH	3	2	150	27						
	4753010833	1B184-A	NH	3	2	106	15						
Sale Name	Reservation Compartment Stand	Ownership	Primary Type	Primary Size	Primary Density	Total Basal Area	Stand Acres	Hardwood Pulpwood Sale Volume in MBF	Aspen Pulpwood Sale Volume in in MBF	Softwood Pulpwood Sale Volume in MBF	Hardwood Sawlog Sale Volume	Softwood Sawlog Sale Volume	Total Sale Volume in MBF
	4753010834	1B184-A	NH	3	2	96	20						
							80						
PIKES PEAK WEST	4753030003	TRIBAL	AN	2	3	133	17	372	758	0	79	0	1209
	4753030004	TRIBAL	AN	2	3	115	8						

	4753030005	TRIBAL	AN	3	3	113	28						
	4753030007	TRIBAL	HH	2	3	216	14						
	4753030008	TRIBAL	HH	4	3	153	32						
	4753030009	TRIBAL	BW	2	2	70	9						
	4753030010	TRIBAL	NA	2	2	106	30						
							138						
JULIA MARKSMAN	4753050805	1B259	NA	2	3	117	39	162	559	0	4	0	725
	4753030812	1B259	AN	2	3	125	38						
							77						
PIKES PEAK EAST	4753040002	TRIBAL	BH	2	2	110	27	458	309	0	51	0	818
	4753040003	TRIBAL	NA	2	2	91	62						
	4753040004	TRIBAL	NA	2	3	105	31						
	4753040005	TRIBAL	NA	2	3	110	10						
	4753040007	TRIBAL	HH	3	3	125	31						
							161						
Sale Name	Reservation Compartment Stand	Ownership	Primary Type	Primary Size	Primary Density	Total Basal Area	Stand Acres	Hardwood Pulpwood Sale Volume in MBF	Aspen Pulpwood Sale Volume in in MBF	Softwood Pulpwood Sale Volume in MBF	Hardwood Sawlog Sale Volume	Softwood Sawlog Sale Volume	Total Sale Volume in MBF
NANCY CREBASSA	4753060842	1C60	AB	3	3	144	70	16	1384	0	0	0	1400
JACOB BENDRY	4753080844	1A6	NH	2	1	60	2	118	21.84	0	37	0	176
	4753080845	1A6	NH	2	2	121	21						
	4753080847	1A6	NH	4	2	140	7						
							30						
ARVON ROAD SOUTH	4753060032	TRIBAL	NH	2	2	125	9	270	66	0	46	0	381
	4753060033	TRIBAL	NH	2	2	109	71						
							80						
EMMA DUSCHAINE	4753060849	1F21-A	NH	2	2	141	12	190	167	0	13	0	370
Sale Name	Reservation Compartment Stand	Ownership	Primary Type	Primary Size	Primary Density	Total Basal Area	Stand Acres	Hardwood Pulpwood Sale Volume in MBF	Aspen Pulpwood Sale Volume in in MBF	Softwood Pulpwood Sale Volume in MBF	Hardwood Sawlog Sale Volume	Softwood Sawlog Sale Volume	Total Sale Volume in MBF
	4753060850	1F21-A	NH	2	3	127	28						
							40						
JANE KESHKETAWUG	4753040801	1B133	NH	2	2	106	12	114	388	0	12	0	514
	4753040802	1B133	SH	3	2	85	10						
	4753040803	1B133	A	4	2	146	24						
							46						
PUSQUAGIN	4753070001	1B33	NH	2	2	167	18	485	0	0	62	0	547
	4753070002	1B33	NH	2	2	95	8						

	4753070003	1B33	NH	3	3	120	3						
	4753070004	1B33	NH	3	3	150	5						
	4753070005	1B33	NH	3	3	150	9						
	4753070006	1B33	NH	2	3	140	33						
							76						
SARAH GAUTHIER	4753040811	1G1	NH	2	2	150	9	105	382	0	7	0	494
	4753040812	1G1	A	4	2	155	10						
	4753040813	1G1	A	4	2	161	20						
							39						
INDIAN ROAD NORTH	4753070053	TRIBAL	NH	2	2	140	7	388	9	0	51	0	448
	4753070054	TRIBAL	NH	3	2	213	22						
	4753070056	TRIBAL	NH	4	1	63	23						
	4753070065	TRIBAL	NH	2	2	136	21						
	4753070066	TRIBAL	NH	2	3	190	11						
							84						
INDIAN ROAD SOUTH	4753080021	TRIBAL	HH	4	3	250	31	386	0	0	121	0	507
	4753080022	TRIBAL	NH	3	3	140	5						
	4753080023	TRIBAL	NH	4	2	114	51						
Sale Name	Reservation Compartment Stand	Ownership	Primary Type	Primary Size	Primary Density	Total Basal Area	Stand Acres	Hardwood Pulpwood Sale Volume in MBF	Aspen Pulpwood Sale Volume in in MBF	Softwood Pulpwood Sale Volume in MBF	Hardwood Sawlog Sale Volume	Softwood Sawlog Sale Volume	Total Sale Volume in MBF
	4753080024	TRIBAL	NH	3	2	99	12						
							99						
WAWBESKAW	4753060804	1B156	NH	2	3	105	7	202	55	0	24	0	281
	4753060805	1B156	SC	3	2	99	14						
	4753060806	1B156	NH	2	2	146	24						
	4753060807	1B156	NH	3	2	139	39						
							84						
JOHN BENDRY	4753070849		A	4	3	150	5	181	1158	0	10	0	1350
	4753070850		A	4	2	115	77						
							82						
HERMAN ROAD BOTH	4753080048	TRIBAL	NH	2	2	104	49	788	23	0	125	0	936
	4753080049	TRIBAL	NH	3	2	140	37						
	4753080050	TRIBAL	HH	4	2	120	41						
	4753080051	TRIBAL	NH	2	2	126	13						
	4753080052	TRIBAL	NH	2	2	160	9						
	4753080053	TRIBAL	HH	4	2	180	4						
							153						
OSAC	4753080806	1B78	NH	4	3	140	42	450	0	0	126	0	576
	4753080807	1B78	NH	4	3	180	5						
	4753080808	1B78	SC	3	2	110	5						
	4753080809	1B78	NH	3	2	134	16						
	4753080810	1B78	NH	3	3	201	17						
							85						