*Master Plan Variance*

**Property Names:** Northern State Forests including: Brule River State Forest, Northern Highland-American Legion State Forest, Peshtigo River State Forest, Flambeau River State Forest, Coulee Experimental State Forest, and Black River State Forest.

**Date Master Plan was approved:**
Brule River State Forest, 2002
NHAL State Forest, 2005
Peshtigo River State Forest, 2007
Coulee Experimental State Forest, 2009
Black River State Forest, 2010
Flambeau River State Forest, 2010

**Variance to the Master Plan**

This variance includes the following actions:

1. Replace Land Management Classification and Management Area maps and all associated charts for the Brule River State Forest, Northern Highland-American Legion State Forest, Flambeau River State Forest, and Black River State Forest. Addendum 1.
2. Replace the general introduction language for Forest Production Areas for the Northern Highland American Legion State Forest, Brule River State Forest, Peshtigo River State Forest, Flambeau River State Forest, Coulee Experimental State Forest, and Black River State Forest. Addendum 2.
3. Replace the Land Management Area descriptions, including objectives and prescriptions, for the Brule River State Forest. Addendum 3.

This master plan variance is directed by and compliant with 2015 Wisconsin Act 55, 2015 Wisconsin Act 358, and s. 28.04(3) Wis. Stats., which defines Forest Production Areas.

A supporting document for the variance is included in addition to the specific plan changes identified in the addendum sections.

**Approved:** [Signature]  **Date:** 3/14/17

Wisconsin DNR
Addendum 1

Replace Land Management Classification and Management Area maps for the Brule River State Forest, Northern Highland-American Legion State Forest, Flambeau River State Forest, and Black River State Forest. Specifically replace:

1. Replace Map “Brule River State Forest – Land Management”, Brule River State Forest Master Plan (publication PUB-FR-225 2003) approved December 4, 2002 and all associated maps using the Land Management Classification and Area information as base information with the new map “Brule River State Forest Proposed Land Management Classifications”.

2. Replace Map 56, 57, 56A, and 57B, Northern Highland / American Legion State Forest State Forest Master Plan (publication PUB-FR-0341A 2005) approved 2005 and all associated maps using the Land management Classification and Area information as base information with the new map “Northern Highland / American Legion State Forest Proposed Land Management Classifications”.

3. Replace Map 2.2 Black River State Forest Master Plan (publication PUB-FR-442-2010) approved January 2010 and all associated maps using the Land management Classification and Area information as base information with the new map “Black River State Forest Proposed Land Management Classifications”.

4. Replace Map 2.2 Flambeau River State Forest Master Plan (publication PUB-FR-462-2010) approved September 2010 and all associated maps using the Land management Classification and Area information as base information with the new map “Flambeau River State Forest Proposed Land Management Classifications”.
The data shown on this map have been obtained from various sources, and are of varying age, reliability and resolution. This map is not intended to be used for navigation, nor is the map an authoritative source of information about legal land ownership or public access. Users of this map should confirm the ownership of land through other means in order to avoid trespassing. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map.

PROPOSED LAND MANAGEMENT CLASSIFICATIONS

State Natural Area
Non DNR Managed Lands
Recreation Management Area
Area 1: Afterhours
Special Management Area
Area 2: Administrative Area
State Natural Area
Habitat Management Area
Area 3: Highway 13 Grassland
Scenic Resources Management Area
Area 4: Brule River
Native Community Management Area
Area 5: Clay Plain
Forest Production Management Area
Area 6: Sugar Camp Hill
Area 7: Mott's Ravine
Area 8: Motts Ravine
Area 9: Brule Bog
Area 10: Lake Minnesuing
Area 11: Superior Clay Plain
Area 12: Miller Road
Area 13: Troy Pit Pines
Area 14: Hilltop
Area 15: Hazel Prairie Pines
Area 16: Gordon Annex

Brule River State Forest
Lake Nebagamon
Lake Superior
Upper St. Croix Lake
Brule River State Forest

Lake Minnesuing

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PROPOSED CHANGES TO LAND MANAGEMENT CLASSIFICATIONS

Brule River State Forest
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Flambeau State Forest
PROPOSED LAND MANAGEMENT CLASSIFICATIONS
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Addendum 2

Replace the general introduction description of the Forest Production Area classification for the following Master Plans.

Black River State Forest Master Plan (publication PUB-FR-442-2010), page 12
Flambeau River State Forest Master Plan (publication PUB-FR-462-2010), page 12
Peshtigo River State Forest Master Plan (publication PUB-FR-404-2007), page 18
Coulee Experimental State Forest Master Plan (publication PUB-FR-445-2019), page 16
Northern Highland American Legion State Forest Master Plan (publication PUB-FR-341a 2005), page 18
Brule River State Forest Master Plan (publication PUB-FR-225 2003), add page

Forest Production Management Area Classifications
The primary management objective of the forest production areas is the production of timber and other forest products. Areas are managed to maximize timber production while using accepted silvicultural practices. Specific objectives for individual forest production areas consider the site's capability to produce timber, the type of timber produced in the area, the market for forest products, and the economy. Management activities or techniques may occur when consistent with the management objective specified in the plan for that area and compatible with the area's ecological capability and the practice of forestry. Given the large size and diversity of forest production areas, while managing for timber products and based on the markets for forest products and the local recreation, tourism, and hunting economy, some stands are managed for timber production in a way that also promotes wildlife and visual appeal.
Addendum 3

Replace Land Management Area Descriptions for the Brule River State Forest.

1. Replace the Land Management Areas for the Brule River State Forest Master Plan (publication PUB-FR-225 2003) approved December 4, 2002 and all associated figures with the following area description, objectives and prescriptions.
Area 1. Afterhours Recreation Management Area

The Afterhours Recreation Management Area is located south of HWY 2 and west of the Bois Brule River. This area is approximately 900 acres in size under state forest ownership. It is across the river and directly west of the Ranger Station. The current forest cover in the Afterhours Recreation Management Area consists primarily of a deciduous and conifer mix. While it is within the Bayfield Sand Plains it is in a transition area among the three primary ecological landscapes within the BRSF. Its current condition and management objectives have resulted in a management prescription that favors the Mille Lacs Uplands potential for this area. It includes the Afterhours Ski Trail system, which is an extremely popular cross-country ski area well known for its excellent grooming and dependable snow coverage. The system is currently about 17 miles and is gently rolling. The trail has easy and difficult entry loops and linking loops that are groomed for both classic and skate skiing styles. Hiking, hunting, and snowmobiling are other primary land based recreational activities in this management area.

Afterhours Recreation Area – Long-term Management Objectives (100 years):

- Maintain a desirable setting for high quality cross-country skiing, biking, and snowmobiling opportunities during winter months, as well as for biking, hunting, and hiking opportunities during the other seasons.
- Maintain a mixed conifer/hardwood forest consistent with the area’s ecological capabilities and the scenic recreational setting.

Afterhours Recreation Area – Short-term Management Objectives (50 years):

- Improve trail conditions and facilities to meet the current and projected demands of the cross-country skiers while maintaining the general rustic character of the management area. This would include tree harvest to expand the width of the trail, provide better and consistent grooming and provide additional restroom facilities.
- Assure regeneration of desired trees species with the goal of producing a scenic and diverse (age class and species) forested setting.

Afterhours Recreation Area – Authorized Management Activities:

Activities may include clearcuts, shelterwood, group selection and selection harvests, mechanical ground disturbance, mechanical or hand planting, seeding, mowing, prescribed fire, mechanical or chemical brush control, and seeding.

Afterhours Recreation Area – Resource Management Prescriptions:

As appropriate for the specific site, existing ecological communities and timber stand conditions, the following management prescriptions will be used to achieve the long-term and short-term objectives identified above:

- Establish a healthy stand of mature long-lived species with emphasis on various hardwoods, red pine and white pine. Use primarily selection, shelterwood, and small clearcut harvests to promote large trees, age class diversity, and regenerate the desired species.
- Management would involve primarily small-scale actions (timber harvest, scarification, planting, prescribed fire, etc.) to maintain pine and oak components in this forest. These actions generally occur in the summer and fall months to avoid the primary ski season.
- Clearcuts will occur in primarily aspen cover types and management will focus on the development of longer lived species as well as the spreading out of age classes in future stands.
• Selectively harvest and remove diseased and defective trees to enhance the scenic quality of the area, particularly near trails.
• All slash within 100 feet of recreational trails will be treated to minimize their visual impact and at a height less than 24 inches.
Area 2. Ranger Station/Hatchery Administrative Special Management Area
The administrative area encompasses the Ranger Station, CCC era garages, the maintenance garage, the wildlife and fishery garages, and the open area just north of the fishery garage. This area is approximately 400 acres in size. It is roughly one mile long, running from the end of Ranger Road nearly to HWY 27, and is just north of Stoney Hill. The Little Brule River is located within this area, as well as the Brule Fish Rearing Station.

Administrative - Long-term Management Objectives (100 years):
• Maintain the structures and facilities in this area that provide functions such as forest headquarters offices, customer service to the public, garages, equipment storage and maintenance.

Administrative - Short-term Management Objectives (50 years):
• Develop additional educational opportunities and customer services in association with the existing building complex.

Administrative - Management Prescriptions:
Authorization of any modifications to WDNR administrative offices / buildings would be handled separately from the master plan under the WDNR facilities development process. Management actions, other than modifications to WDNR administrative offices / buildings, would include the following:
• Construct a rustic shelter on the terrace north of the headquarters building for use during education programs. Opportunities for such education facilities were identified in the *Environmental Education and Awareness Assessment* (Fannucchi et al. 1998).
• Forest resources would be managed with the objective of developing a stand of large pines and maintaining regeneration of a pine community through a variety of management activities.
• Diseased and defective trees would be removed annually.
• Remove invasive species.

Administrative - Cultural Resource Management:
• Preserve, protect and interpret the site of the former CCC camp and develop a non-personal interpretive facility to explain that camp’s role in the history of BRSF. Opportunities for this type of user education were identified in the *Environmental Education and Awareness Assessment*. (Fannucchi et al. 1998)
Area 3. Hwy 13 Grassland Complex Habitat Management Area

This management unit consists of approximately 650 acres of state owned land which is located primarily along the Hwy 13 corridor, with a few outlying grassland areas include near Hwy FF as well as Fasteland Road near the town of Brule. These areas are located on previously farmed areas that consist of restored wetlands with surrounding associated grasslands.

The managed wetland/grassland areas offer waterfowl hunting, wildlife viewing, wetland wildlife habitat and provide storm water storage to reduce rate and volume of major snowmelt and rain events. The grasslands currently maintained in this area were not a part of the historic condition but offer opportunities to manage for rare or declining grassland birds as well as some game species (Sample and Mossman 1997, Bartelt et al. 1999, Epstein et al. 1999, Eckstein et al. 2001, Pohlman et al 2006). Grasslands were the only existing habitats in this area where specific management needs for rare or uncommon species were noted in this area by the Biotic Inventory of the Brule River State Forest (Epstein et al. 1999).

Long Range Management Objectives:

- Maintain, create and enhance constructed wetlands to provide habitat for a wide variety of wetland birds such as sora rail, American bittern, spotted sandpiper, pied-billed grebe; song birds such as sedge wrens, yellow-headed black birds, eastern kingbird; and waterfowl such as mallard, blue-winged teal, hooded merganser, and Canada goose.

- Maintain areas of existing grassland in an early successional grass and shrub cycle of management in order to provide habitat for a variety of game and non-game wildlife species, including upland sandpiper, sharp tailed grouse, eastern meadowlark, clay colored sparrows, woodcock and bobolink. The grasslands would also provide summer habitat for leopard frogs, nesting habitat for waterfowl, grazing and fawning areas for deer, and contribute to year-round habitat for sharp-tailed grouse.

- Continue to provide grassland-wetland habitat to support the unique hunting and wildlife viewing opportunities offered by the Brule River State Forest.

- Continue to provide rain and snowmelt runoff storage.

Authorized Management Activities:
Management of grasslands and wetlands require a variety of active management techniques. Activities may include mechanical ground disturbance, mowing and mechanical brush control, haying, earthwork for drainage and wetland management, water level manipulation on existing impoundments, planting native trees, shrubs or ground vegetation, chemical vegetation manipulation, and prescribed fire.

Resource Management Prescriptions:
Reduce peak storm water flows to the Brule River by plugging old drainage ditches to restore more natural drainage patterns across the landscape to protect water quality.

Maintain grasslands through hay contracts, periodic mowing, or prescribed burns.
Wetlands would be restored, enhanced, or created to foster sedge meadows, shallow marshes, and open marsh wetland habitats through water manipulation and earthwork necessary to construct or maintain water control structures.

Native species, such as wild rice, may be planted as part of wetland enhancement

Consider using herbicides to control invasive plants or to create the desired vegetative composition when other natural or mechanical methods are not effective.
Area 4. Brule River Scenic Management Area

The Brule River Scenic Management Area stretches approximately 16 miles from CTH B to the mouth of the river at Lake Superior. This management area has significant scenic, biological and recreational resources that will be well supported by this designation. The management area includes several distinct management aspects or areas that will be discussed separately. These include the scenic river corridor and eastern border forest.

At the narrowest stretches this management area generally contains the lands on both sides of the river up to the top of the slope where a change in habitat type is recognized. It includes all of the canoe landings with their accessory facilities north of HWY B, including parking areas, restrooms, signage, etc. and the angler parking lots located at various points along the river’s course. This area is approximately 4,000 acres under state forest ownership.

Scenic River Corridor
The scenic corridor includes all the public lands on both sides of the Brule River from Lake Superior upstream to CTH B where it joins the Brule Bog and Spillway Native Community Management Area. Forest covertypes vary through this area with common types being ash and alder dominated floodplain forest, upland aspen, mixed aspen/fir forest, boreal mixtures of pine/hardwood/fir/spruce, and northern hardwood forests. Along each side of the river the management area extends from the Brule River to a management line corresponding to the topography and vegetation change found where the slopes leading to the river flatten out to a more level upland or a minimum of 400 feet from the river’s edge whichever is greater. It should be recognized that not all river shorelands are part of the state forest and some private owners maintain lawns, buildings and other settings.

Scenic River Corridor – Long and Short-term Management Objectives:
• Maintain the natural scenic quality of the river with a conifer dominated older forest corridor.
• Manage public access areas to support use of the river but not detract from the scenic quality.

Scenic River Corridor - Authorized Management Activities:
Activities will be conducted to maintain a scenic and safe experience for recreational users and will not be conducted for natural community management. Maintenance of public use facilities, exotic plant control, erosion mitigation, hazard tree removal, and salvage harvests would occur if deemed necessary to maintain the scenic and safe nature of the management area.

Scenic River Corridor – Resource Management Prescriptions:
• No ongoing active management (timber harvest/ground disturbance) would occur within this corridor. The only timber cutting that would occur along the river would be done to provide a safe and scenic experience to users of the forest and river.
• Maintain the approximately 35 acre “Brule River Marsh and Lagoon” complex in a healthy natural condition with no further developments.
• Maintain existing public use access and recreation areas consistent with the overall scenic character of the management area. These sites are detailed in the river recreation section.
• Monitor for invasive plant infestations and use control methods appropriate to the species and infestation threat. These methods may include mechanical removal, herbicide applications or biological control.
Border Forest
The border forest includes all forested lands within this mapped management unit that lie outside of the River Valley area as described above. In general, this border forest describes lands that lie outside of 400 feet from the river. The largest block of this border forest area begins 0.5 mile south of CTH FF and includes lands between the top of the eastern slope of the river corridor area and the eastern property line south to HWY 2. South of HWY 2 it includes lands from the top of the eastern slope of the river corridor area east to HWY 27.

Most of this narrow section of the management unit is within the Lake Superior Clay Plain and has similar ecological condition and history to the forest described in that section. However, in this section forest management will be conducted with an emphasis on developing and maintaining a forest for scenic resources rather than a specific ecological condition.

Border Forest - Long-term Management Objectives (100 years):
- Develop a forest of older trees dominated by conifer species to promote a scenic setting between the river corridor and the public roads.
- Manage public access areas to support use of the river but not detract from the scenic quality.

Border Forest - Short-term Management Objectives (50 years):
- Increase the covertype of white pine and fir-spruce.
- Establish white pine, white spruce and white cedar in areas lacking these species.
- Explore management opportunities to reduce areas of alder in favor of other wet soil species such as white cedar and tamarack.

Border Forest – Authorized Management Activities:
Depending on the existing community type, different management activities will be used to manage the forest toward the same future desired condition of a scenic older conifer forest. Activities may include passive management, clear cuts, shelterwood harvests, seed tree, selective harvests, seeding, planting and site preparation, exotic plant control and maintenance of existing public access areas.

Border Forest – Resource Management Prescriptions:
As appropriate for the specific site, existing ecological communities, and scenic resources, the following management prescriptions will be used to achieve the long-term and short-term objectives identified above.

- Encourage existing aspen stands to convert to a more boreal mixture of conifers through a combination of active and passive management. Harvest areas would generally be small in size and irregularly shaped to blend into the landscape. Where applicable, the harvest areas would be replanted or seeded with boreal conifers (white pine, white spruce, and white cedar). Any harvest areas greater than three acres in size will involve leave trees as a residual stand to discourage aspen regeneration. In general, small patch clearcutting methods would be used to encourage the development of mid to shade tolerant species.
- Harvest operations would be limited to frozen or dry ground conditions.
- Manage the existing hardwood types (primarily oak and poor quality northern hardwood stands) to promote the growth of large diameter trees. Long-lived species such as oak, sugar maple, and pine species would be encouraged within this management unit for their aesthetic qualities.
Regeneration treatments on these stands will be done with small patch clearcutting methods to encourage species such as fir, oak, pine and spruce.

- Periodically thin pine plantations in order to create a density of large diameter trees with a natural appearance.
- Grow pine on extended rotations using natural regeneration systems to produce a new stand of trees.
- Whenever appropriate, use harvesting methods which leave a large number of residual trees to minimize the visual impact.
- Plant a native mix of trees when natural regeneration fails, avoiding straight row look.
- In the event of a catastrophic event such as a major windstorm, fire, or flood, use timber salvage operations to clean up the areas affected by the event.
Area 5. Clay Plain Native Community Management Area

This management area, including state owned lands within the area boundary, is approximately 5900 acres in size. This management area involves lands north of an irregular line that approximately follows CTH FF and the east side of the Brule Valley, as well as lands lying between Clevedon Road and Hwy 13 lying north of where Hwy 13 crosses the Brule River. Also included are lands bordering Lake Superior shoreline across the entire 9 mile length of state land ownership.

The uplands of the Clay Plain NCMA consist of about 50% aspen with many of these stands showing strong development of balsam fir as a secondary species. while the fir-spruce covertype totals about 10% of the land base. The remaining acreage consists of a diversity of forest and shrub habitats. Stands of white birch, alder, red pine, and white pine are present throughout the uplands. Generally, white birch has shown a steady decline while balsam fir is regenerating well. Scattered individual white spruce and white pine exist through this area but regeneration of these species is limited.

Extensive stretches of undeveloped Lake Superior shoreline are found to the east and west of the mouth of the Brule River. Much of this is an unvegetated sand beach. The present upland vegetation behind the beach and above the low clay bluffs generally consists of open stands of trembling aspen, white birch and a dense shrub layer of speckled alder.

The existing natural community composition provides a variety of benefits. The aspen areas provide habitat for early successional wildlife and popular game species and maintenance of this habitat provides a sustainable source of forest products. However, early successional habitats are common throughout the clay plain on other lands (Brusoe et al. 2001). Recreational data indicate that while similar game habitat is found elsewhere in the region, the BRSF attracts hunters seeking the unique setting it provides (Watkins et al. 2001). Over 30,000 hunter visits are made to the entire state forest each year (Brusoe et al. 2001).

The most unique quality of this management area is its potential for restoration of the historic clay plain boreal forest (Epstein et al. 1999, Eckstein et al. 2001, Brusoe et al. 2001). The boreal forest community was historically of limited extent within Wisconsin. Although boreal forest exists broadly in other parts of the continent, it is now considered a rare community in Wisconsin. Analysis of historic records shows a high importance of white spruce, white pine, and white birch, the “three whites,” in the original forest cover along with common associates including white cedar, red maple, balsam fir, aspen, upland white cedar and upland tamarack (Mossman et al. 1997, Bartelt et al. 1999, Eckstein et al. 2001). Management on the BRSF has been slowly increasing the fir-spruce covertype in this area to a percentage that is twice that of the surrounding landscape. In addition, much of the aspen covertype in this management area supports balsam fir at various age classes as the second most dominant tree species. The existing conifer dominated forests in this part of the BRSF provide multiple benefits such as increased regional biodiversity, aesthetic values and habitat for boreal birds and plants on the southern edge of their range. Some existing areas of fir-spruce are developing old growth structural attributes for this community type such as large trees, snags, coarse woody debris and tip-up mounds. This forest composition is rare throughout the region and is generally not expected to be a management priority for
other landowners (Bartelt et al. 1999). This unique opportunity is the basis for the management emphasis of this area.

The restoration of the historic clay plain boreal forest community faces some difficult challenges and will be a slow process (>100 years) with no guarantee of success (Eckstein et al. 2001). The Community Restoration and Old Growth Assessment recognizes the challenge of restoration in this community type and recommends a varied and adaptive management approach (Eckstein 2001). Increasing some components of this forest community such as white birch may be achieved sooner than other components such as white pine. To maximize the chances of success, the restoration plan would need to be adaptive to prescriptions that work and would need to experiment with alternative methods. While the forest management practices within the BRSF over the last 40 years have facilitated some increase in conifers on the clay plain, the changes in soil structure and seed sources prior to state ownership have created long-term impacts to this system. Many of the historically occurring seed sources are reduced or no longer present in the area. Restoration efforts will be further challenged by the clay soil in the area, which is often either too wet or too dry for successful seeding or planting of trees. The size and shape of the property and dominant land uses in the surrounding landscape will limit large-scale conservation opportunities. The following objectives and prescriptions for this management area focus primarily on using a variety of passive and active management techniques to increase the dominance of the historic clay plain boreal forest species.

Long-term Management Objectives - 100 years:
• Develop and maintain an ecological landscape dominated by clay plain boreal forest communities interspersed with areas of wetland and stream habitats. The upland landscape would be large enough for a diversity of cover types and ages to exist at levels necessary to support the wildlife and plant species associated with these different habitats and successional stages.
• Manage the upland forest toward a dominance of white spruce, white pine, and white birch, along with common associates including white cedar, balsam fir, aspen, red pine and upland tamarack. This forest would have a representation of a full spectrum of age classes within these forest types.
• Establishing large forest patches (100s to 1,000s acres) with relatively high canopy closure and good representation of clay plain forest species.
• Develop a forest with at least 10% of the stands supporting a structure containing large trees of longer lived species such as white pine, white spruce and white cedar and much of the structural diversity typical of natural old growth forests, including large living trees, dead trees, snags, tip-up mounds and a substantial amount of coarse woody debris. The understory would likely be characterized by a dense growth of shrubs such as alder and beaked hazel. This forest structure would benefit wildlife such as woodpeckers, cavity nesters, small mammals, amphibians and predators such as fisher and bobcat.
• Maintain white birch as a dominant component along with associated early successional species.
• Continue to protect water quality and aquatic habitat of streams by managing the riparian forest primarily to reduce run off from clay soils and prevent unnatural levels of bank erosion.
• Manage several conifer dominated areas passively and monitor as reference areas with considerations. Management actions would be considered in cases of exotic plant control and public safety needs.
• Continue to provide the habitat and setting to support the unique hunting opportunities offered by the Brule River State Forest.
• Manage the Brule River Boreal Forest State Natural Area and the Pearsen Creek portion of the Bear Beach State Natural Area as passive management reference sites to provide base information for adaptive management approaches to clay plain boreal forest restoration (Refer to the State Natural Area map in the Maps Section at the back of this Document)
• Manage the Bear Beach State Natural Area to protect the banks and beach of the Lake Superior shoreline (Refer to the State Natural Area map in the Maps Section at the back of this Document)
• Preserve and enhance the natural aesthetic quality in areas seen from the Brule River; its tributaries, lagoons, the Lake Superior shoreline and designated public use areas.

Short-term Management Objectives – 50 years:
• Conduct forest reconnaissance monitoring of vegetation every 10 years to measure change in actively and passively managed areas
• Use monitoring information on changes in composition and structure from existing conifer dominated reference areas for future management decisions.
• Reduce aspen acreage to allow an increase in other covertypes. Aspen would remain a component of these other covertypes.
• Increase acreage of fir and spruce.
• Increase acreage of white pine and increase the presence of white pine throughout other covertypes.
• Establish white pine and white spruce seed source in areas lacking these species.
• Increase the white birch covertype acreage.
• Regenerate some areas of aspen and fir and slowly convert other areas to the target species.
• Experiment with management options to increase white cedar or tamarack in areas currently dominated by tag alder.

Authorized Management Activities:
Depending on the existing community type, different management activities will be used to manage the forest toward the same desired future condition. Because of the experimental nature of restoring a conifer dominated clay plain forest, a variety of techniques will be applied over small areas to determine successful management scenarios. Management of grasslands and wetlands also require a variety of active management techniques. Activities may include, passive management, clearcuts, shelterwood, group selection and selection harvests, mechanical ground disturbance, mowing, chemical and mechanical brush control, earthwork for drainage and wetland management, planting and seeding of native trees, shrubs or ground vegetation, and prescribed fire.

Resource Management Prescriptions:
As appropriate for the specific site, existing ecological communities and current conditions, the following management prescriptions will be used to achieve the long-term and short-term objectives identified above:
• Reduce peak stormwater flows to the Brule River by plugging old drainage ditches to restore more natural drainage patterns across the landscape to protect water quality.
• Limit logging operations to periods when the soil is dry or frozen and restrict construction of new roads in order to reduce potential for increasing runoff. Perform no timber harvests on the slopes along the stream corridors, except as necessary to maintain public safety and control invasive exotic species. Retain large woody debris to minimize erosion, reduce rate of run-off, and increase habitat quality for both fish and wildlife.
• In some areas increase downed woody debris to benefit wildlife, including wood frogs, toads, blue-spotted salamanders, mice, chipmunks, etc.
• Manage the Brule River Boreal Forest State Natural Area (652 acres) and the Pearsen Creek portion of the Bear Beach SNA as passive management reference sites to provide information for the adaptive management approach to clay plain boreal forest restoration.
• Manage the Bear Beach State Natural Area (103 acres) to protect the banks and beach of the Lake Superior shoreline.

Passive Management Reference Areas
• Perform no forest management in designated reference areas, except as necessary to maintain public safety and control invasive exotic species.
• Three sites will serve as reference areas for boreal forest. These sites include the Task Creek-Weir Riffles, Bracket’s Corner and the Pearson Creek sites. The boundaries of these areas are similar to those in the Biotic Inventory but have been adjusted to facilitate the management goals.
  • The Task Creek-Weir Riffles site and the Pearson Creek site (as part of the Bear Beach SNA) will be established as a State Natural Area.
  • Continue to monitor these areas for vegetative changes at least every 10 years using forest reconnaissance and repeat biotic inventory monitoring at least every 20 years.

Conifer-dominated stands
• Balsam fir is currently the dominant conifer on the clay plain of the Brule River State Forest. Manage areas of balsam fir to perpetuate balsam fir and increase white pine, white spruce and white birch through shelterwood, group selection, and selection harvests. Where white pine and white spruce are absent plant these species to establish a seed source. Various planting techniques and configurations will be used and monitored for success.
• Encourage conifers through selective removal of hardwoods (including aspen), seeding, planting, or allowing natural succession.
• Existing areas of white pine or white spruce can serve as a seed source so actions may be concentrated on managing surrounding areas to encourage regeneration of these species. Within these stands they may be thinned to allow growth of larger trees while increasing the presence of old growth structure such as snags and downed woody debris.
• Stands of white cedar will be retained as a seed source for expanding the distribution of this species.
• The few red pine plantations in this area will be gradually thinned to create forest stands with greater diversity and a more natural structure.

White birch
Manage for areas of white birch with a mix of other early successional species through clear cuts, group selection harvest, shelterwood harvest and ground disturbance. Ground treatments necessary for white birch regeneration may include prescribed burning, anchor chaining, blade scarification, or summer whole tree skidding.

Alder/Forested Wetlands
Some stands of existing alder, particularly on upland clay soils, are present because of soil conditions, altered hydrology, and tree seed source lost during the period before state management. A goal is to shift these areas to increased presence of species that were
historically more common on these sites, such as white cedar and tamarack. A variety of active management techniques including harvesting and planting will be experimented with to reduce the area or dominance of alder. Areas of alder will also be maintained through maintenance mowing, which will rejuvenate alder stands, which may have a positive effect on the presence of productive forest cover on these wet sites. The presence of Emerald Ash Borer within the county necessitates the management of lowland forested sites to maintain productivity and health of the forest. All options will be considered when managing lowland stands with the presence of ash to regenerate productive forested cover.

Aspen-dominated stands
- Use clear cuts, group selection, or seed tree harvests to remove overstory aspen or other hardwood species in order to increase the conifer component by allowing more sunlight for improved conifer reproduction and growth.
- These management prescriptions are not intended to replicate the historic disturbance sizes or frequency but represent a balance of managing for desired species, minimizing the potential for increasing run off on clay soils, working within the narrow nature of the current property and aesthetic conditions desired by some users of the state forest.
- These actions will regenerate aspen and early successional species while increasing the percentage of conifers over several rotations.
- These harvests would be designed to promote regeneration of white spruce, white pine and white birch, which require partial to full sunlight while allowing maintain aspen as a component. Additional actions such as ground disturbance, fire or planting may be used if natural regeneration fails.

Lake Superior Beach
- The beaches and banks along Lake Superior would be maintained for their scenic and ecological values. The Bear Beach State Natural Area will encompass much of this habitat.
Area 6. Sugar Camp Hill Native Community Management Area

This area under state ownership is approximately 1,500 acres in size. It is located on the west side of BRSF in the area known as the Copper Range. This area includes the following sites identified in the Biotic Inventory (Epstein et al 1999): CCC Miller Boreal Forest and Pines, Sugar Camp Hill, and Lenroot Ledges. As suggested in the Biotic Inventory, these sites have been combined into a single management area, thereby increasing their combined conservation value. This is the core area of the largest block of closed canopy, northern hardwood forest that currently exists on the Brule River State Forest. BRSF cover within this area contains a mixture of northern red oak, basswood, sugar maple, ash, balsam fir, aspen, and white birch. Reproduction of shade-tolerant species like sugar maple and basswood is good under this closed canopy while reproduction of red oak or white birch will depend on future disturbance. Closer to the river, white pine and white spruce become more common. This area contains the richest soils found on the BRSF, however, they are still poor compared to other ownerships in the adjacent Mille Lacs Ecological Landscape.

Scientific assessments noted the potential to support a northern hardwood forest on Sugar Camp Hill and boreal forest on Lenroot Ledges. However, the Community Restoration and Old Growth Assessment (Eckstein et al. 2001) rated the restoration /old growth opportunity for the northern hardwood community as low. The Regional Ecology Assessment (Bartelt et al. 1999) noted that other public lands in the region have greater opportunity to support the northern hardwood community type.

Wisconsin Department of Natural Resources (WDNR) experts discussed the varied findings of the assessments and determined that, while the opportunity to restore an “old growth” northern hardwood community was considered a relatively low priority in the regional context, it was agreed that it is an important community in the context of the BRSF’s landscape management. It is important because it provides the largest block of closed canopy forest, which increases the conservation value for many forest dwelling species and natural processes. It also provides wildlife habitat, stand diversity, serves as a buffer for rare species, and contributes to the establishment of a wildlife corridor (Epstein et al. 1999).

Land ownership in this area is a mixture of public and private. This area contains several sites of historical value. The Old Bayfield Road hiking trail follows an old travel route that connected the towns of Superior and Bayfield and was traveled by foot and later by horse and wagon. Copper mines were active on Sugar Camp Hill in the 1870s and one old mine can be viewed from the hiking trail.

A designated snowmobile and winter ATV trail crosses through this area. It connects with the Tri-County Corridor on the south end, continues northward from Miller Road, turns east and crosses the river near the Copper Range Campground, continues east and connects with a Bayfield County snowmobile trail. Winter motorized recreation is popular in the Brule region. This trail is a connector snowmobile trail that crosses the Brule River State Forest, linking a regional trail network (Watkins et al. 2001).

Long-term Management Objectives – 100 years:
• Develop a primarily closed canopy, managed old-growth, native mixed species forest connected with the Brule River corridor.
• In the Sugar Camp Hill area maintain the well-developed canopy with a full mix of northern hardwood species.
• In the Lenroot Ledges area, the objective would be to maintain a conifer-dominated forest realizing that much of this area is in private ownership and out of state control.
• In the remainder of the area (primarily aspen) develop northern hardwood forest with some areas dominated by conifers (balsam fir, white spruce, white pine). The vegetation would be characterized by a large block of northern hardwood forest containing a mixture of northern red oak, sugar maple, basswood, yellow birch, ash, balsam fir, aspen, and white birch. This would provide potential habitat for a variety of wildlife species including some rare species such as black-throated blue warbler and red-shouldered hawk.
• Closer to the river, white pine and white spruce would be encouraged. These stands would be represented by large and relatively old trees (older than their traditional rotation age). This community would have much of the structural diversity of typical natural old growth forests, including dead trees, snags, tip-up mounds and a substantial amount of coarse woody debris.
• Forest aesthetic qualities would be preserved and enhanced, particularly in areas seen from the Brule River, its tributaries, and designated public use areas.
• Maintain the existing recreational opportunities to accommodate visitors while maintaining the rustic character of the property, two goals identified in the *Recreational Supply and Demand Assessment* and the Property Vision and Goals (Watkins et al 2001).

**Short-term Management Objectives – 50 years:**

• Increase the acreage of northern hardwood forest while encouraging a diverse forest of northern red oak, sugar maple, basswood, yellow birch, balsam fir, aspen and white birch.
• Maintain the existing acreage of red oak by encouraging regeneration of this species.
• Manage for an increase in the fir-spruce acreage covertype and the white pine covertype from particularly along the Brule River and tributaries, on state ownership in Lenroot Ledges area and in CCC Miller Boreal Forest and Pines area.
• Decrease the acreage of aspen.
• Manage for large diameter, native tree species and old-growth structural characteristics.

**Authorized Management Activities:**
Depending on the existing community type, different management activities will be used to manage the forest toward the same desired future condition. Activities may include, passive management, patch clearcuts, shelterwood, group selection and selection harvests, prescribed fire, seeding and planting.

**Resource Management Prescriptions:**
As appropriate for the specific site, existing ecological communities and timber stand conditions, the following management prescriptions will be used to achieve the long-term and short term objectives identified above:

**Overall**

• Management practices will be used which extend the rotation ages for long-lived tree species on the best quality sites to establish larger trees and other old growth characteristics. In this management area it would include white pine, northern hardwood and red oak on the best quality sites for those species.
• Perform no timber harvests on the slopes of the stream corridors, except as necessary to maintain public safety and control invasive exotic species. Retain large woody debris on
slopes along streams to minimize erosion, reduce rate of run-off, and increase habitat quality for both fish and wildlife.

- Protection of vernal (ephemeral) ponds and rock outcroppings

**Northern Hardwood**

- Sugar Camp Hill area - Manage existing northern hardwood stands with small-scale actions designed to develop stands that meet the objective of developing stands with a variety of native species.
- Use selective harvest in the northern hardwood covertype to encourage development of a managed old growth condition.

**Red Oak**

- In northern hardwood areas limited management would occur to maintain a component of oak. This would include small clear cuts to regenerate this species. These small cut areas would be done in conjunction with a good acorn crop year to facilitate regeneration of the oak.
- These cuts will be staggered over time to assure that there are large blocks of continuous forest cover in the management area.
- Manage existing stands of red oak through small clear cuts to regenerate the species but allow trees to develop to their biological rotation age.
- Oak regeneration will be monitored and ground disturbance methods such as fire, scarification, or release may be used if needed.

**Conifer-dominated stands**

- Balsam fir is currently the dominant conifer on the clay plain of the Brule River State Forest. Manage areas of balsam fir to perpetuate balsam fir and increase white pine and white spruce through shelterwood, group selection, and selection harvests combined with planting if necessary to establish a seed source.
- Existing areas of white pine or white spruce can serve as a seed source so management actions may concentrate on managing surrounding areas to encourage regeneration of these species. Within these stands they may be thinned to allow growth of larger trees while increasing the presence of old growth structure such as snags and downed woody debris.
- Stands of white cedar will be retained as seed source for expanding the distribution of this species.

**Aspen**

- Small clear cuts, group selection, selection or seed tree harvests to remove overstory aspen in order to allow in more sunlight for improved conifer or northern hardwood reproduction and growth. These harvests may be needed in conjunction with planting or seeding to promote the conifer covertype.

**Alder/Forested Wetlands**

Manage to maintain the species diversity characteristics of this community type. Some stands of existing alder, particularly on upland clay soils, are present because of soil conditions, altered hydrology, and tree seed source lost during the period before state management. A goal is to shift these areas to increased presence of species that were historically more common on these
sites, such as white cedar and tamarack. A variety of active management techniques including harvesting and planting will be experimented with to reduce the area or dominance of alder. Areas of alder will also be maintained through maintenance mowing, which will rejuvenate alder stands, which may have a positive effect on the presence of productive forest cover on these wet sites.

The presence of Emerald Ash Borer within the county necessitates the management of lowland forested sites to maintain productivity and health of the forest. All options will be considered when managing lowland stands with the presence of ash to regenerate productive forested cover.
Area 7. Willard Road Native Community Management Area

The Willard Road Native Community Management Area occurs along a transition between the Bayfield Sand Plain and Mille Lacs Upland ecological landscapes. The area included in this management unit is approximately 1,700 acres under state ownership. It is located on the western edge of the Brule River State Forest in the area north and west of the Brule River between CTH B and CTH S.

The Mille Lacs Upland has a richer and moister soil conditions than most uplands within the BRSF and studies suggest that it has the potential to support a northern hardwood forest (Eckstein 2001). This management area represents a gradual transition into the drier soils of the disturbance dominated forests on the Bayfield Sand Plain. Historically this area likely experienced periodic windthrows and fires but at a lower frequency than the area east of the Brule River. Very large forest fires altered this area’s forest cover in the 1920s, causing large areas dominated by aspen. Much of the oak presently found also got its start following these fires but white pine did not fare well. The BRSF Community Restoration and Old Growth Assessment rated the northern hardwood restoration opportunity as low on the BRSF (Eckstein et al. 2001). The Regional Ecology Assessment notes that other public lands have greater opportunity to support the northern hardwood community type in this area (Bartelt et al. 1999). This area contains varied topography, with small kettle swamps filled with black spruce surrounded by upland oak and aspen. The area provides high-quality groundwater to the Brule River and its tributaries. Within this management unit are two Biotic Inventory sites that contain remnants of native red pine stands.

Willard Road - Long-term Management Objectives (100 years):
- Restore and perpetuate the native mixed hardwood forest ecosystem including aspen, white birch, yellow birch, red maple, sugar maple, red pine, white pine and red oak.
- Promote a diverse mixture of size and age classes while slowly increasing the percentage of northern hardwood, oak, and white pine coverts in the area.
- Establish two forest management reference areas within this management area located at the Vapa Road Pines and Willard Road Pines sites (Epstein et al. 1999). Portions of these sites would be passively managed as large red/white pine reference sites.

Willard Road - Short-term Management Objectives (50 years):
- Reduce the dominance of aspen allowing the other hardwoods present to increase acreage of northern hardwood coverts.
- In areas adjacent to passively managed reference sites, seek opportunities to establish natural origin red pine and white pine stands.
- Maintain a presence of white birch, pine, aspen, and oak coverts on the landscape through active management practices to encourage these species.

Willard Road - Authorized Management Activities:
Activities may include passive management, clearcuts, shelterwood, group selection, selection harvests, mechanical ground disturbance, mechanical or hand planting, mowing, prescribed fire and mechanical brush control.

Willard Road – Resource Management Prescriptions:
As appropriate for the specific site, existing ecological communities and timber stand conditions, the following management prescriptions will be used to achieve the long-term and short term objectives identified above:

- Regenerate the mixture of hardwoods and pine that are native to this area by clearcutting small, irregularly shaped areas and leaving seed source trees along the edges of the cut areas.
- Hand-planting of pine within and along the edges of the small cut areas and protect young trees from animal browsing.
- Use management actions such as selection, shelterwood, seed tree harvests and non-commercial treatments in conjunction with scarification to promote pine, oak, and birch regeneration.
- Use scarification around existing large pine to promote establishment of pine seedlings into the ecosystem.
- Perform site scarification for white birch. This species is declining in numbers across this area and requires an adequate seedbed for its regeneration. Small-scale attempts would specifically be made to regenerate this species using intensive site scarification in conjunction with shelterwood and seed tree cuts. Direct seeding efforts may be tried following the scarification to bolster natural seeding.
- Passively manage the two reference areas but monitor vegetation change to provide information on future management elsewhere.
Area 8. Motts Ravine Native Community Management Area

This site occurs within the larger Bayfield Sand Plain ecological landscape which is an important and important groundwater recharge area which provides high quality water to the Brule River. This area, including is approximately 1,500 acres under state ownership. The management area contains the 600 acre Mott’s Ravine State Natural Area. This area is generally located in the area surrounding Motts Ravine road in the southeast corner of the property.

This management area can provide management of some barrens and dry pine community elements at the scale of 100s of acres. However, to manage for the complex plant communities and seral stages present in a barrens/dry pine forest ecological landscape management must occur at a scale in the 1,000s to 10,000s of acres. There are opportunities to work with neighboring landowners both public and private to manage this landscape to have a better representation of the barrens community. Work has been done to do complementary management on adjacent lands under other ownerships.

The vegetation of the Motts Ravine Native Community Management Area is a mixture of red and jack pine plantations, scrub oak, and aspen forest types. Other existing native communities include open, grassy-brush prairie (a.k.a. barrens), pine savannas (pine barrens), dense-regenerating pine forest, and mature pine forests. Prior to the extensive salvage of jack pine in the early to mid 1990s due to an outbreak of jack pine budworm, the forest cover was dominated by jack pine with red pine being the second most dominant forest type. Other less common forest types found here were white pine, oak, aspen, and mixed hardwoods.

Within the current state forest project boundaries the Biotic Inventory of the Brule River State Forest identifies a site referred to as the “North Country Trail Barrens” (Epstein et al. 1999). Approximately half of this 2,800-acre site is in private ownership. It is recommended that consideration be given to maintaining the existing natural community remnants and expanding them where feasible. According to early surveyors notes, native communities found here prior to 1850 ranged from open, grassybrush prairie (a.k.a. barrens) to pine savannas, dense-regenerating pine forest, and mature pine forests. The forest cover was dominated by jack pine with red pine being the second most dominant forest type. Other less common forest types found here were white pine, oak, aspen, and mixed hardwoods. The Community Restoration and Old Growth Assessment recognized the unique but small opportunity to restore 400-600 acres of barrens on the existing state forest land in the Motts Ravine area and also recommends the maintenance of the existing jack pine component (Eckstein et al. 2001). Within the region there are other public lands with greater acreage and potential for barrens restoration than the BRSF (Bartelt et al. 1999).

Pine Forest and Barrens – Long-term Management Objectives (100 years):

- Through management of existing state ownership and additional neighboring lands create a pine barrens landscape with permanent open areas and a shifting mosaic of the full compliment of barrens plant communities and seral stages at a scale of 1,000s and 10,000s of acres. This diverse ecosystem would be large and dynamic enough to more closely replicate historic disturbance patterns and support sustainable populations of characteristic wildlife such as sharp-tailed grouse.
- Restore and maintain a mosaic of native vegetative communities that provide a range of conditions from open barrens to dry pine forest types.
- Mimic natural disturbance patterns in rates and size, as best as knowledge and implementation constraints allow.
- Maintain jack pine as the dominant tree species with red pine being secondary.
- Maintain white pine, oak, aspen, and hardwoods in significantly smaller amounts.
- Maintain existing recreation of primarily snowmobile trails, hiking trails, wildlife viewing, berry picking and hunting.
- Protect the water quality and quantity of an important groundwater recharge area and tributaries of the Brule River.

**Pine Forest and Barrens – Short-term Management Objectives (50 years):**
- Gradually thin existing red pine plantations to natural dry forest, pine savanna or barrens conditions. Over time the acreage of red pine plantations would be reduced upon the existing red pine plantations reaching economic rotation age.
- Increase the grass and shrub covertype.
- Increase acreage of jack pine.
- Decrease oak acreage.
- Decrease the aspen cover.
- Conduct monitoring of vegetation every ten years to measure the effects of management and aid in developing adaptive management approaches.

**Pine Forest and Barrens – Authorized Management Activities:**
Activities may include clearcuts, shelterwood, group selection and selection harvests, plantation thinning, mechanical and hand planting, seeding, mechanical and chemical shrub control, mechanical ground disturbance, road and fire break maintenance, mowing and mechanical brush control, and prescribed fire.

**Pine Forest and Barrens – Resource Management Prescriptions:**
As appropriate for the specific site, existing ecological communities and timber stand conditions, the following management prescriptions will be used to achieve the long-term and short-term objectives identified above:
- Conduct forest reconnaissance monitoring of vegetation every ten years and develop additional vegetation monitoring as needed to evaluate management results.
- Use a combination of timber harvest, prescribed fire, mechanical scarification/site preparation, and seeding or planting to mimic natural disturbances.
- Additional information on the Mott’s Ravine State Natural Area is provided in the Appendix – Brule River State Forest State Natural Areas write-up and map.

**Barrens**
- Restore open barrens and pine savanna areas in the Motts Ravine State Natural Area, through clearcutting, thinning and prescribed burns to re-create a representative natural vegetative community that includes jack pine and scrub oak as scattered individual trees and small groves.
- A central core area of grass and shrub habitat of 200-400 acres would be permanently maintained through prescribe fire or mechanical vegetation management as needed.
- Lands surrounding this central core, within and outside the State Natural Area, would use timber harvest to provide a shifting mosaic of early age forest, grass and shrub habitats to increase the effective size of the early successional habitat in the core area.
Pine-dominated Sites

- The pine forest would be managed to maintain a dominance of jack pine, with red pine, aspen and oak as lesser components. Management would consist of regeneration harvests at or before biological rotation age (40-70 years old) followed by treatments (anchor chaining or prescribed fire) to stimulate natural regeneration. In some cases direct seeding or planting may occur to bolster regeneration numbers and/or alter species composition. Fully stocked stands of pine would be the goal within these areas.
- Final harvest of a timber stand would range from 50 to 100% of the mature trees on an area ranging in size up to several hundred acres.
- Prolong regeneration attempts 3-5 years to mimic the natural period of open grassland/savanna habitat following fire. Less than optimal (full stocking rates) would be accepted in some areas in order to provide savanna conditions.
- Use natural regeneration where possible. Consider planting of trees and other native vegetation when needed to restore the full community.
- Site preparation for planting may include techniques such as furrowing, prescribed burning, anchor chain scarification, patch scarification, pre-sale scarification with bulldozers, and fully plowing and disking specific sites.
- Use herbicide as needed to control invasive exotic species or to create a specific effect on the vegetative structure and composition needed to fulfill a complete community restoration objective.
Area 9. Brule River Bog Native Community Management Area

Refer to the Land Management map in the back of this document to locate the Brule River Bog and Spillway Area. This management area occurs within the larger Brule River System ecological landscape. This area spans a state owned acreage of over 3100 acres. It extends to the slopes adjacent to the Bog leading out of the valley on both sides of the river from Upper St. Croix Lake to CTH B on the Brule River. Primarily, this management area consists of the spillway and bog area adjacent to the river and the surrounding lowland forest associated with the river. The Brule Glacial Spillway State Natural Area encompasses about 2,510 acres of this management area. (Refer to Brule River State Forest State Natural Areas and Map in the back of this document)

As described above, this area is an ecologically rich site and important to maintaining the water quality and quality of the Brule River ecosystem (Bartelt et al. 1999). It also has historic significance as the early portage route between Lake Superior and the St. Croix River. The primary management needs involve periodic monitoring of the water quality and plant composition to assuring the long-term sustainability of this area (Epstein et al. 1999). Potentially significant ecological changes to the current condition could come from exotic plant invasion, large-scale wildfires or the continued poor regeneration of white cedar. Conditions related to these issues will be monitored and additional research or action will be implemented as indicated by the monitoring results.

The boundaries, descriptions, objectives and prescriptions for the Brule River Spillway State Natural Area are detailed in the State Natural Area section in the Appendix and the Brule River State Forest State Natural Area Map in the map section at the end of the document.

Brule River Bog and Spillway – Long-term Management Objectives (100 years):

• Maintain a high quality forest and shrub wetland system for ecological, water quality, and habitat values. The vegetation would be characterized by shrub wetlands and lowland forest associated with the river; composed of a mixture of northern white cedar, tamarack, black spruce, and balsam fir.
• Develop and maintain a natural upland forest (red pine, jack pine and aspen) on several ridges located within the area near the headwaters of the East Fork of the Brule.
• Protect the water quality of wetlands, springs, spring ponds and streams within the management area.
• Maintain the existing levels of public use access and facilities with a rustic setting. Maintain the overall scenic nature of the river, wetlands and forest.
• Prohibit any utility corridors through this management area.

Brule River Bog and Spillway – Short-term Management Objectives (50 years):

• Conduct research to determine the impact of the loss of white cedar on other biota and successful methods to regenerate white cedar in forested wetlands.
• Develop a monitoring strategy for the aquatic community, forest composition and exotic plants.
• If significant evidence of exotic plants is found, implement control activities.
• Continue to identify sites where habitat restoration or improvement could benefit the fishery, without impacting the native community qualities and continue to apply the appropriate habitat management techniques at those sites.

**Brule River Bog and Spillway – Authorized Management Activities:**
Timber harvest to thin existing pine plantations, exotic plant control activities, maintenance of existing roads and public use access, mowing and brush cutting in existing public use areas, development activities necessary for stated improvements to public use facilities, and monitoring and research activities.

**Brule River Bog and Spillway – Resource Management Prescriptions:**

• Monitor for the presence of exotic plants. Exotic species to watch for in the bog area include glossy buckthorn and purple loosestrife. Implement cutting and limited herbicide use to control exotic plants.

• Monitor the forest composition and regeneration, specifically white cedar. Conduct research activities to learn more about regeneration of existing wetland conifers.

• No timber harvesting would be performed within the bog area.

• Hazard tree removal and salvage harvests would be conducted if deemed necessary to maintain the scenic nature and provide for public safety.
Area 10. Lake Minnesuing Native Community Management Area

This management unit is located on the western end of the BRSF and extends along the western and southern shores of Lake Minnesuing. This area is approximately 470 acres in state ownership. The area is bordered by County Hwy L and P, and several town roads managed by the town of Bennett are within its borders. The state forest maintains primitive boat launches at the end of Park Road and Bennett Road on Lake Minnuesing. These are lightly used as boat landings, but are heavily used at times during winter months to access the lake for ice fishing.

This area consists of a diverse mix of aspen, oak, northern hardwood, and lowland forested cover types on a rolling morainal topography with wetlands and ephemeral ponds scattered across the area. Dominant species include aspen, red oak, sugar maple, red maple, hemlock, basswood, balsam fir, black spruce, and black ash. The understory in places is dominated by a thick growth of ironwood and balsam fir.

Lake Minnesuing - Long-term Management Objectives (100 years):
- Develop an older forest of primarily shade tolerant species such as northern hardwoods and hemlock. Red oak and white pine will also be encouraged to be retained in future stands.
- Monitor hemlock and white pine regeneration to determine if management actions are necessary to keep these species as a component of the forest.
- Manage lowland forest areas to maintain healthy forest cover on the sites.

Lake Minnesuing - Short-term Management Objectives (50 years):
- Monitor hemlock and white pine regeneration and recommend management actions; openings, planting etc. to provide a future generation of these species.
- If management actions in other areas of the forest are shown to be successful in shifting species composition from black ash to other species, portions of lowland forest areas shall be managed to shift species composition in wetland forested areas away from a dominance of black ash to other species such as tamarack and white cedar. Trials shall be completed on other areas to show successful establishment of other lowland species prior to the work being done on this management area.
- Allow natural succession as well as use active management to reduce areas of aspen and white birch in favor of mid tolerant and shade tolerant northern hardwoods. This will take several rotations to see a major shift in species.

Lake Minnesuing - Authorized Management Actions:
Single tree selection harvests, patch clearcuts, research activities surrounding hemlock regeneration, monitoring and control of exotic plants, planting and direct seeding. Encourage regeneration efforts of northern hardwood and hemlock species through management activities and planting.

Lake Minnesuing – Resource Management Prescriptions:
As appropriate for the specific site and existing ecological communities, the following management prescriptions will be used to achieve the long-term and short term objectives identified above.
- Stands will be managed to maintain mixed hardwood and conifers, with emphasis on maintaining and increasing hemlock in future stands.
- Management will be focused on regeneration of species such as hemlock, sugar maple, red oak, white pine, basswood, and red maple. Management emphasis will not be on area wide, stand
level regeneration harvests, but will focus on portions of stands that do not exhibit the tendencies to develop into an older forest of mixed hardwood and conifers.

- Large woody debris, particularly near ephemeral ponds, should be encouraged and increased to provide habitat for amphibians.
- In the case of a catastrophic event such as a windstorm, a fire, or flood, timber salvage operations would be conducted to clean up the areas affected by the event and restore scenic beauty following consultation with an integrated team of resource staff.
- Research in the Lake Minnesuing area would be focused upon obtaining hemlock and white pine regeneration.
- Within wetland forested types, a goal is to increase the presence of species that were historically more common on these sites, such as white cedar and tamarack.
- The presence of Emerald Ash Borer within the county may necessitate the management of lowland forested sites to maintain productivity and health of the forest. All options will be considered when managing lowland stands with the presence of ash to regenerate productive forested cover. Proven techniques tried and proven on other areas of the forest will be utilized within this management unit to regenerate stands if necessary to maintain site productivity.
Area 11. Superior Clay Plain Forest Production Management Area

This management area is approximately 7500 acres in size. This management area includes all of the lands that were purchased in 2007 as part of the 6,000 acre “great addition”. These management units are generally located north of where Hwy 13 crosses the Brule River, both on the east and west sides of the Brule River Valley. In addition to these recently purchased areas, one other large block of forest that has been under state ownership for a longer period of time is included which is located just south of Hwy 13 on the west side of the Brule River Valley.

Historically, the lands included within the management unit have been managed under a forest production objective over the last 50 plus years, and consist of all age classes of highly productive aspen forest with generally good road access. Soils are red clay, which limits management opportunities to dry or frozen conditions.

The uplands of this management area consist primarily of aspen, with balsam fir, black ash, and white spruce being other major tree species. Contiguous conifer cover can be found in drainages heading to Lake Superior in the northwestern block of this area. Scattered individual white spruce and white pine exist through this area with regeneration of white spruce in particular being prevalent in areas of good seed sources.

Long-term Management Objectives - 100 years:
- Maintain the aspen covertype while increasing percentage of conifer species within these stands over several rotation periods.
- Encourage white birch, white pine, and white spruce as conditions allow and as species components within aspen stands.

Short-term Management Objectives – 50 years:
- Maintain aspen acreage.
- Allow and encourage an increase of fir, spruce, and white pine prevalence on the landscape.
- Work to maintain the presence of white birch across the area.
- Experiment with management options to increase white cedar or tamarack in areas currently dominated by tag alder. Tag alder areas can be managed through mowing and shearing to both regenerate desired tree species as well as to provide young alder for forest wildlife species that desire that habitat such as migratory woodcock and ruffed grouse.

Authorized Management Activities:
Activities may include clearcuts, shelterwood harvest, group selection and selection harvests, mechanical ground disturbance, mowing, chemical, and mechanical brush control, seeding or planting native trees, shrubs or ground vegetation, aerial seeding, and prescribed fire.

Resource Management Prescriptions:
As appropriate for the specific site, existing ecological communities and current conditions, the following management prescriptions will be used to achieve the long-term and short term objectives identified above:
- Reduce peak stormwater flows to the Brule River by plugging old drainage ditches to restore more natural drainage patterns across the landscape to protect water quality.
- Limit logging operations to periods when the soil is dry or frozen and restrict construction of new roads in order to reduce potential for increasing runoff. Establish all weather road systems to facilitate the harvest and hauling of forest products from this management unit. Protect slopes along stream corridors and follow BMPs for water quality during all harvesting operations. Retain large woody debris within waterways to minimize erosion, reduce rate of run-off, and increase habitat quality for both fish and wildlife.

Aspen-dominated stands
- Manage aspen on a 40-60 year rotation through regeneration clearcut harvest techniques.
- Conifers patches can be left to facilitate green tree retention standards.
- These actions will regenerate aspen and early successional species while increasing the percentage of conifers over several rotations.

Conifer-dominated stands
- Areas of conifers shall be managed to maintain their presence on the landscape to produce recurring forest products. Conifers shall be encouraged across all cover types to maintain a diversity of choices in future management of stands.

White birch
Manage for areas of white birch with a mix of other early successional species through clear cuts, group selection harvest, shelterwood harvest and ground disturbance. Ground treatments necessary for white birch regeneration may include prescribed burning, anchor chaining, blade scarification, or summer whole tree skidding.

Alder/Forested Wetlands
Some stands of existing alder, particularly on upland clay soils, are present because of soil conditions, altered hydrology, and tree seed source lost during the period before state management. A goal is to shift these areas to increased presence of species that were historically more common on these sites, such as white cedar and tamarack. A variety of active management techniques including harvesting and planting will be experimented with to reduce the area or dominance of alder. Areas of alder will also be maintained through maintenance mowing, which will rejuvenate alder stands, which may have a positive effect on the presence of productive forest cover on these wet sites. The presence of Emerald Ash Borer within the county necessitates the management of lowland forested sites to maintain productivity and health of the forest for long term production of forest products. All options will be considered when managing lowland stands with the presence of ash to regenerate productive forested cover.
Area 12. Miller Road Forest Production Management Area

The majority of this management area occurs within the larger Lake Superior Clay Plain ecological landscape. The area is south of the Sugar Camp Hill area, west of the Brule River and primarily north of HWY 2. This area, including both private and state owned lands, is approximately 2,100 acres under state ownership. The history of this area includes attempts at pasturing followed by large areas of timber harvesting in the 1960s and 1970s.

The current vegetation is about 50% aspen dominated stands ranging from 20-60 years old. Alder lowlands makes up another 22% of the area. Smaller portions of the management area consist of grassland/wetland, red pine and conifers found primarily on the steeper terrain along river and creek drainages. This historic boreal landscape contained areas of younger aspen/birch forest but in a much lower percentage than currently exists here. The aspen areas provide high quality habitat for early successional wildlife and popular game species and maintenance of this habitat provides a sustainable source of forest products. Early successional habitats are common throughout the clay plain on other lands, however state forest lands are easily accessible and are a popular hunting area (Brusoe et al. 2001).

No specific management needs for rare or uncommon species were noted for this area in the Biotic Inventory of the Brule River State Forest (Epstein et al. 1999).

Recreation in this area is primarily hunting, wildlife viewing and snowmobiling. The snowmobile trail in this area is an important “connector” trail that crosses the Brule River State Forest, linking a regional trail network (Watkins et al. 2001).

Long-term Management Objectives – 100 years:
• Manage for a forest dominated by the early successional stages of the clay plain boreal forest but with greater species and age class diversity than occurs presently. This will continue to provide for high quality habitat for game and non-game wildlife species. Species that would benefit from maintaining early successional habitats range from game species such as ruffed grouse, woodcock, snowshoe hare, deer, and bear to many non-game birds such as goldenwigned warbler, yellow-shafted flicker, clay-colored sparrow, and amphibians such as green grass snake and leopard frogs. Predator species that utilize these prey species would be sharphinned hawks, broad-winged hawks, fisher, bobcat, red fox, coyote, and timber wolves.
• Continue to generate forest products through managing for a diverse forest and desired wildlife habitat.
• Manage riparian forests along stream corridor slopes to promote conifer cover and to retain large woody debris and protection of soils and maintenance of fish habitat.

Short-term Management Objectives – 50 years:
• Manage for regeneration of aspen as the dominant forest covertype but diversify the age classes within the area to produce a steady supply of forest products while optimizing wildlife habitat.
• Increase the diversity of conifer and hardwood species as secondary types.
• Maintain existing openings and trails to be utilized as access points and log landings to be used during management activities.

Authorized Management Activities:
Depending on the existing community type and desired forest condition different management actions will be implemented. Activities may include clearcuts, shelterwood harvest, group selection and selection harvests, mechanical ground disturbance, mowing and mechanical brush control, chemical use, earthwork for drainage and wetland management, planting, seeding and prescribed fire.

Resource Management Prescriptions:
As appropriate for the specific site, the following management prescriptions would be used to achieve the long-term and short-term objectives identified above.

Overall
- Limit logging operations to periods when the soil is dry or frozen.
- Perform no timber harvests on the direct slopes of stream corridors, except as necessary to maintain public safety and control invasive exotic species. Retain large woody debris to minimize erosion, reduce rate of run-off, and increase habitat quality for both fish and wildlife.

Aspen
- Maintain aspen and white birch through patch clearcuts and manage for multiple age classes. Encourage bur oak, white spruce, white pine, white birch, and balsam fir to create stand diversity.
- Continue to maintain smaller scattered forest openings and trails through mowing, hand cutting, herbicide applications, and grading. These trails and openings will be utilized for logging access points.

Conifer-dominated stands
- Balsam fir is currently the dominant conifer on the clay plain of the Brule River State Forest. Manage areas of balsam fir to perpetuate balsam fir and increase white pine, white spruce and white birch through shelterwood, group selection, and selection harvests. Where white pine and white spruce are absent plant these species to establish a seed source.
- Stands of white cedar will be retained as seed source for expanding the distribution of this species.
- A few small stands of red pine currently exist in this unit. Conduct periodic thinnings and site preparation to encourage growth and natural regeneration. Where natural regeneration does not occur, prepare appropriately for planting.

Alder/Forested Wetlands
Some stands of existing alder, particularly on upland clay soils, are present because of soil conditions, altered hydrology, and tree seed source lost during the period before state management. A goal is to shift these areas to increased presence of species that were historically more common on these sites, such as white cedar and tamarack. A variety of active management techniques including harvesting and planting will be experimented with to reduce the area or dominance of alder. Areas of alder will also be maintained through maintenance mowing, which will rejuvenate alder stands, which may have a positive effect on the presence of productive forest cover on these wet sites.
The presence of Emerald Ash Borer within the county necessitates the management of lowland forested sites to maintain productivity and health of the forest for long term production of forest products. All options will be considered when managing lowland stands with the presence of ash to regenerate productive forested cover.
Area 13. Troy Pit Pines Forest Production Management Area

This management area occurs within the larger Bayfield Sand Plain ecological landscape. This area has approximately 6200 acres under state ownership. The Troy Pit Pines area is characterized by very sandy soils, a very rolling topography with a mixed forest cover dominated by red and jack pine with aspen and scrub oak dominant in some areas. Historically, this area had scattered failed farms that were planted with red pine or jack pine during the CCC era in the 1930s and 1940s. Numerous moderately developed town roads cross this management area.

The area is within the Bayfield Sand Barrens ecological area which naturally supports a variety of disturbance dominated natural communities and has good site potential for growth of pine species (Eckstein et al. 2001). The Community Restoration and Old Growth Assessment identifies maintenance of the jack pine forest through active management as an important opportunity on the BRSF (Eckstein et al. 2001). Maintenance of aspen/birch and oak areas is important to wildlife species and hunting recreation on the BRSF (Watkins et al. 2001). Within this forest production area, there are three sites that were identified for significant natural features; specifically Rush Lake, Kurt’s Deep Depression, and Devils Hole Pines (Epstein et al. 1999). Specific management actions for these areas are noted within the management prescriptions. Management directly surrounding these would be adapted to compliment the management prescriptions for these areas. Kirtland’s Warblers, an endangered (state and federally listed) bird species has been found in the area immediately adjacent to this management area and opportunities exist to create and maintain its habitat through specific harvest and forest regeneration techniques. The area as a whole provides high-quality groundwater to the Brule River and its tributaries.

The management unit currently provides dispersed recreational opportunities with the potential to offer additional facilities. The existing snowmobile and winter ATV trail that crosses the Brule River State Forest provides a link to a regional trail network. (Watkins et al. 2001). The North Country Trail crosses the BRSF providing an important link for this regional hiking trail. Several lightly traveled forest roads in this area are important in providing access for hunters and other non-motorized recreators as well as fire breaks for forest fire suppression efforts. Interest in additional cross-country ski areas is evidenced by use levels as the Afterhours Ski area, staff observations and the recreation supply and demand assessment.

Long-term Management Objectives (100 years):

- Maintaining a dry pine forest community for the compatible values of ecological characteristics and a steady supply of renewable forest products. This would include maintenance of primarily pine covertypes, with scattered patches of mixed hardwoods.
- Maintain 22 acre Rush Lake’s water quality, diverse beach community, aquatic resources and scenic setting. Rush Lake is designated as a State Natural Area.
- Maintain the 33 acre Kurt’s Deep Depression aquatic community and dry slope vegetation.
- Promote a late successional stage forest in the Devils Hole Pines area, dominated by older red pine. Protect the natural stand of red pine and enhance the site by promoting the regeneration of native pine.
- Provide recreational opportunities, which are compatible with the physical characteristics and other uses in the area, including hunting, snowmobiling, hiking, horseback riding, and cross-country skiing.
Short-term Management Objectives (50 years):
- Increase covertype of jack pine.
- Decrease covertype of red pine.
- Decrease covertype of scrub oak.
- Maintain aspen and white birch acreage.
- Maintain a component of white pine in various covertypes.
- Maintain 200-300 acres of barren type areas of open grass and upland shrubs in shifting mosaic within the management area.
- Manage the 52 acres forest of the Devils Hole Pines to favor old growth red pines and sustained pine regeneration.

Authorized Management Activities:
Activities may include clearcuts, shelterwood, group selection and selection harvests, plantation thinning, mechanical and hand planting, mechanical and chemical shrub control, mechanical ground disturbance, road and fire break maintenance, mowing and mechanical brush control, and prescribed fire. Development and maintenance of a new ski trail system, toilet and warming facilities and a parking area would require some land clearing and construction.

Resource Management Prescriptions:
- As appropriate for the specific site, existing ecological communities, wildlife species and timber stand conditions, the following management prescriptions will be used to achieve the long-term and short-term objectives identified above.
- Encourage a mixture of white pine in all natural stands of trees. This is a species that was historically found scattered across the landscape.
- Attempt to eliminate exotic species such as scotch pine through primarily hand cutting treatments.
- Monitor for presence of invasive plants such as leafy spurge and spotted knapweed, particularly in areas where ground disturbance is used for regeneration of tree species.

Red Pine
- Manage existing red pine plantations using timber management guidelines found in the DNR Silvicultural Handbook. Young stands would be released from competing vegetation using a variety of methods, including both mechanical and chemical means. Stands would be thinned by entire rows or by more selective methods depending on stand conditions. As stands are thinned, pockets of natural regeneration would be encouraged to grow by removal of overstory where appropriate.
- Red pine natural regeneration techniques would be used whenever feasible, but if not successful, the stand would be mechanically prepared for planting, through either trench, furrow, or spot scarification treatments. The stand would then be replanted either by hand or by machine.
- Regenerate red pine at recommended rotation ages.

Jack Pine
- Manage jack pine on a 40-55 year rotation with natural regeneration techniques being used as the first choice for regeneration. Jack pine will be managed for multiple age classes to reduce the potential impact of jack pine budworm. The primary technique used to regenerate jack pine would be to harvest all jack pine and other species within a stand.
followed by anchor chaining to expose mineral soil and distribute existing seeds across the treated area. Prescribed fire may also be used where feasible. Success of these techniques would be evaluated through a regeneration survey five growing seasons after the chaining occurs to determine if jack pine regeneration was successful. If the natural regeneration is not successful, the area would then be planted.

**Aspen**

- Maintain current levels of aspen in its present locations for timber production purposes as well as to provide habitat for a variety of wildlife. Differing age classes would be maintained in areas where aspen is most prevalent for optimum wildlife habitat. The aspen would be managed on a 50-year rotation, at which time the stand would require a regeneration harvest. Diversity would be encouraged in the aspen covertype by not requiring all competing species to be cut within regeneration cuts. Very poor aspen sites would be converted to pine through planting of pine species suitable to the site along with site preparation treatments (either mechanical or chemical) to ensure the success of the planting.

**Oak**

- Maintain scrub oak on poor quality pine sites but convert to jack pine where possible. Stands that are to be maintained as scrub oak would be harvested on a 60-80 year rotation to maintain a mixture of age classes of this species. Much of the acreage now typed as scrub oak is actually this mixture of oak, aspen, red maple, and other species. These types would be maintained using patch clearcuts. Whole tree harvesting techniques followed by aerial seeding has shown promise in increasing percentages of jack pine in future stands.

**White birch**

- Attempt to maintain white birch in this ecosystem on current sites that have a predominance of birch. Birch requires mineral soil exposure and full sunlight to regenerate. Generally, the most birch regeneration on the forest is found in the most disturbed areas such as the sides of old skid roads where mineral soil was exposed. This would be done through a combination of timber harvests and soil scarification techniques such as anchor chaining before or following timber harvests. Prescribed fire would be used where feasible.

**Kurt's Deep Depression**

This 33 acres site was noted for the aquatic community found in the pond and wetland in the bottom of this glacial kettle as well as the upland barrens vegetation found on the steep slopes descending to the pond. It will be managed to maintain these characteristics.

**Devils Hole Pines**

- Maintain the natural stand of red pine.
- Promote the regeneration of native pine through soil scarification. Some areas surrounding the stand of older pine would be encouraged to develop old growth characteristics through the removal of non-pine species through commercial thinning operations.

**Rush Lake**

This site has been recognized for a unique geological setting and important aquatic resources by the State Natural Areas program. The 25 acres lake and surrounding shoreline to the ordinary high water mark will be managed as a State Natural Area. The location, objectives and
management are detailed in the Brule River State Forest State Natural Areas in the back of this document. The surrounding forest will be managed to replicate natural disturbance in keeping with the objectives of the State Natural Area.
Area 14. Hilltop Road Forest Production Management Area

The Hilltop Road FPMA management area occurs along a transition between the Bayfield Sand Plain and Mille Lacs Upland ecological landscapes. The area included in this management unit is approximately 900 acres under state ownership. The bulk of this area is located between Hilltop Road and the Brule River and western side of the Brule Valley.

The Mille Lacs Upland has a richer and moister soil conditions than most uplands within the BRSF and studies suggest that it has the potential to support a northern hardwood forest (Eckstein 2001). This management area represents a gradual transition into the drier soils of the disturbance dominated forests on the Bayfield Sand Plain. Historically this area likely experienced periodic windthrows and fires but at a lower frequency than the area east of the Brule River. Very large forest fires altered this area’s forest cover in the 1920s, causing large areas dominated by aspen. This area has a very high site productivity for aspen, as evidenced by the present stands of aspen found on this management area. Much of the oak got its start following these fires but white pine did not fare well. Areas of mixed conifer cover are interspersed with the primarily aspen and oak covertypes which dominate this area.

Hilltop Road - Long-term Management Objectives (100 years):

- Maintain the high productivity aspen and oak stands found across this management unit.
- Promote a diverse mixture of size and age classes while slowly increasing the percentage of northern hardwood and pine covertypes in the area.

Hilltop Road - Short-term Management Objectives (50 years):

- Maintain the presence of aspen through active management options which increase the age class diversity of the area.
- Maintain and increase the presence of white birch, pine, and oak covertypes on the landscape through active management practices to encourage these species.

Hilltop Road - Authorized Management Activities:

Activities may include clearcuts, shelterwood, group selection and selection harvests, mechanical ground disturbance, mechanical or hand planting, mowing, prescribed fire, mechanical or chemical brush control, and seeding.

Hilltop Road – Resource Management Prescriptions:

As appropriate for the specific site, existing ecological communities and timber stand conditions, the following management prescriptions will be used to achieve the long-term and short term objectives identified above:

- Regenerate aspen and oak within this through active regeneration harvests designed to increase age class diversity across the area.
- White pine seed sources will be used to increase the presence of white pine within aspen and oak stands.
- Use management actions such as selection, shelterwood and seed tree harvests in conjunction with scarification to promote pine, oak, and birch regeneration.
- Use scarification around existing large pine to promote establishment of pine seedlings into the ecosystem.
- Perform site scarification and other specific management activities to promote white birch regeneration. This species is declining in numbers across this ecoregion and requires an adequate
seedbed for its regeneration. Direct seeding efforts may be tried following the scarification to bolster natural seeding.
Area 15. Hazel Prairie/Jersett Pines Forest Production Area

This area is located in the southern part of the Brule River State Forest both north and south of the Brule River valley. There are approximately 8200 acres under state ownership within this management unit. Very few town roads are located within this management unit, with Hazel Prairie and Jersett roads being the most heavily traveled. Ownership within this management area is primarily state owned, with only a few private parcels.

This area is a flat, outwash sand plain with very sandy soils. The management area also includes an approximately 400 acre terrace area near the Brule River. No significant rare species were noted on these terraces, however, the potential for these sites to produce an older forest of red and white pine has been recognized. This management area also contains an aquifer that provides high quality groundwater to this headwaters region of the Brule River. Much of this land area was once farmed, and is now primarily vegetated with pine plantations. There is an area of over 2,000 acres of contiguous red pine plantations in the area near Turkey Farm Road. As part of the Bayfield Sand Plains, this area naturally supports a variety of disturbance dominated natural communities and has good site potential for growth of pine species. This unit is on the northern edge of the larger Northwest Sands ecological community and is bisected by the Brule River. Historically, the north side of the river had a lower dominance of jack pine and a higher percentage of red pine, white pine and hardwoods than the areas south of the Brule River.

Portions of this forest were heavily damaged by a hailstorm in August 2000, resulting in the high mortality of trees, primarily jack pine, red pine and aspen. This created a number of forest management challenges including fire control, disease concerns and future regeneration plans. The forest area most impacted by this storm was harvested and was regenerated.

The primary recreation in this area is hunting. Maintenance of aspen/birch and oak areas is important to wildlife species and hunting recreation on the BRSF (Watkins et al. 2001). In this region of Wisconsin the generation of forest products and forest based recreation have been shown to be compatible and often complimentary (Marcouiller and Mace 1999, WDNR 1999). Forest roads in this area provide access for hunting and management as well as serve as fire breaks.

Long-term Management Objectives (100 years):

- Maintain a dry pine forest community for the compatible values of wildlife habitat, ecological characteristics, water quality protection and a steady supply of renewable forest products. This would include maintenance of primarily pine covertypes in different age classes.
- Maintain areas of a mixed hardwood forest with areas of oak and aspen for wildlife habitat and a steady supply of renewable forest products.
- Manage the terrace area toward an older forest of red and white pine.

Short-term Management Objectives (50 years):

- Increase covertype of jack pine.
- Increase covertype of white pine.
- Decrease covertype of aspen.
- Maintain oak, red pine, and birch acreage.
- Maintain a diverse healthy pine forest of varying species and age structure.
**Authorized Management Activities:**
Activities may include: clearcuts, shelterwood, group selection and selection harvests, plantation thinning, mechanical and hand planting, seeding, mechanical and chemical shrub control, mechanical ground disturbance, road and fire break maintenance, mowing and mechanical brush control and prescribed fire.

**Resource Management Prescriptions:**
As appropriate for the specific site, existing ecological communities, wildlife species and timber stand conditions, the following management prescriptions would be used to achieve the long-term and short-term objectives identified above.

**Pine-dominated sites**
- Manage existing red pine plantations using timber management guidelines found in the DNR Silvicultural Handbook and described under the Troy Pit Pines management area.
- Following harvest, prepare sites for tree planting using mechanical planting site preparation methods such as furrowing, disk trenching, or spot scarification.
- Use natural and artificial regeneration techniques to encourage a native mix of jack pine, red pine, white pine, and various hardwoods on the landscape. Preference will be applied to natural origin jack pine stands where possible.
- Plant red pine with a mixture of white pine and jack pine in some locations to provide forest diversity to maintain a healthy forest.
- Plant existing openings that are not within frost pockets with red pine, provided they are not suitable for future log landings.
- Maintain jack pine on sites that it currently occupies as well as in frost pockets. It would be managed on a 40-60 year rotation with natural regeneration techniques being used as the first choice for regeneration.

**Aspen/Oak**
- Manage aspen on a 40-60 year rotation, at which time the stand would require a regeneration harvest. Diversity would be encouraged in the aspen covertype by not requiring all competing species to be cut within all regeneration cuts.
- Maintain scrub oak on poor quality pine sites but convert to jack pine where possible. Stands that are to be maintained as scrub oak would be harvested on a 60-80 year rotation to maintain a mixture of age classes of this species. Much of the acreage now typed as scrub oak is actually this mixture of oak, aspen, red maple, and other species. These types would be maintained using patch clearcuts. Whole tree harvesting techniques followed by aerial seeding has shown promise in increasing percentages of jack pine in future stands.
Area 16. Gordon Annex Forest Production Management Area
The Gordon Annex Forest Production Area is located about 10 miles south of the main portion of the state forest. This 1,000 acre area was once used as a state forest tree nursery, closing nursery operations in the mid 1960s. Now located on the property is a minimum security prison, which is operated there by agreements between the Department of Corrections and the DNR.

This land area is located within the Bayfield Sand Plain and has very sandy soil conditions. The Eau Claire River flows through the Gordon Annex. A small, unnamed lake is located partially within the property in the northeast corner of state ownership. Surrounding ownership is primarily industrial forestland, with only a few bordering private non-industrial owners.

Vegetation types on this management unit primarily consist of pine plantations. Much of this area was planted with leftover trees from nursery operations. There are small areas of aspen and one undisturbed kettle bog is located in the center of the property. A rare plant was found in a barrens remnant within a pine plantation adjacent to the bog and rare invertebrates occur in the Eau Claire River (Epstein et al. 1999).

Long and Short-term Management Objectives:
- Provide a steady supply of renewable forest products with emphasis on growing red pine.
- Maintain acreage of red pine, jack pine, and aspen.
- Provide for a mix of tree species in aesthetic areas along the river and public roads.
- Maintain the long term lease of 45 acres with Department of Corrections for use as a minimum security prison
- Maintain the bog in a natural state to continue to provide habitat for a rich native flora of highly specialized species.

Authorized Management Activities:
Activities may include clearcuts, shelterwood harvest, group selection and selection harvests, plantation thinning, seeding, mechanical and hand planting, mechanical and chemical shrub control, mechanical ground disturbance, road and fire break maintenance, mowing and mechanical brush control, and prescribed fire.

Resource Management Prescriptions:
- Maintain existing forest openings and woods roads throughout this area to provide firebreaks in case of a wildfire.
- This area would also remain available for fire training operations. Historically, this area had been used as a location for fire equipment training and certification.
- Maintain other species such as scrub oak, birch, and red maple as components of jack pine and aspen stands.
- Manage the riparian areas of the Eau Claire River to encourage species such as scrub oak, red maple, and aspen mixtures.
- Eliminate scotch pine from the landscape primarily through hand-cutting.

Red pine
- Manage existing red pine plantations using timber management guidelines found in the DNR Silvicultural Handbook. Practices used would vary by stand condition but would follow a similar prescription to that described in the Troy Pit Pines Management Area.
• Plant red pine with a small amount of white pine mixed into the first 20 rows adjacent to town roads. Prior to planting, the site would be prepared through a mechanical scarification treatment.

**Jack Pine**
• Maintain jack pine as a small component of future stands as natural regeneration.
• Maintain the jack pine that presently borders the river.
• Manage jack pine on a 40-60 year rotation with natural regeneration techniques being used as the first choice for regeneration.
• The primary technique used to regenerate jack pine would be to harvest all jack pine and other species within a stand followed by anchor chaining to expose mineral soil and distribute existing seeds across the treated area. If jack pine regeneration is poor, replanting would be done. In some cases this would mean the entire area would be replanted, in others it would mean that spot planting would be done to bolster stocking rates.

**Aspen**
• Maintain current levels of aspen in its present locations for timber production purposes as well as to provide habitat for a variety of wildlife.
• Manage aspen on a 40-60 year rotation, at which time the stand would require a regeneration harvest.

**Recreation Management Prescriptions:**
• Due to the location of the prison, much of this area is off limits to public use. The only developed recreation area on the property is a rustic boat landing on the Eau Claire River located off of Highway G. Other recreational activities involve hunting outside of the posted area surrounding the prison.
• The current network of forest roads would be utilized during management activities, and individual roads would be closed to public use following timber sales based upon the potential for resource degradation. Any new forest roads and drivable skid trails built during forest management activities would be closed following the completion of the timber sale activities.
Addendum 4
NHAL Forest Production Management Areas and General Forest Management Provisions

The following revisions identified in strikethrough will be removed from the existing NHAL master plan Forest Production Management areas to comply with the definition of Forest Production Areas in 28.04(3), Wis. Stats.

AREA 1
LONG-TERM OBJECTIVES (100 YEARS)
- Maintain and enhance existing stands of northern hardwoods to increase age diversity and to maintain stand health and vigor.
- Manage at a landscape level considering how these lands can complement the objectives in the adjacent Hemlock Hardwood Native Community Management Areas.
- Maintain areas of early successional forest (aspen, white birch) in mixed forest stands.
- Maintain diversity of forested and unforested wetlands

SHORT-TERM OBJECTIVES (50 YEARS)
- Develop a diversity of ages and stand sizes for aspen, white birch and northern hardwoods.
- Retain and encourage yellow birch, white pine and hardwood components on aspen dominated sites. Some harvesting of these species is permitted to meet stand goals.
- Maintain diversity of forested and unforested wetlands. Some black spruce and tamarack stands would be regenerated through active management. Priorities are in biologically mature stands on productive sites that can be regenerated by recommendations outlined in the General Management Prescriptions section.
- Manage a small reduction of aspen acreage to northern hardwood stands.
- Increase northern hardwoods with active management from aspen, white birch and fir-spruce cover types. Manage these stands for multiple age classes, tree sizes and a diversity of tree species.
- Encourage white pines, red pine components in natural stands and manage plantations for biological maturity.
- Maintain hemlock-hardwood stands at existing levels and encourage scattered hemlock in all stands.

RESOURCE MANAGEMENT PRESCRIPTIONS
Please see the General Management Prescriptions at the beginning of this section for general management prescriptions by forest type. The General Management Prescriptions apply and all management activities are authorized, except as noted below for this management area. The richer soils and northern hardwood component make this area different than most of the rest of the NH-AL.
- Clearcut harvest aspen maintaining the current mosaic of size and age class within the aspen forest type, and retain groups or individuals of northern hardwoods, pine, spruce, or oak to promote a mix of tree species on these sandy soils.

This Management Area may contain designated Wilderness Lakes, Wild Lakes, and Scenic Lakes. The land management surrounding these lakes must be consistent with the management objectives and prescriptions for the respective lake designation. The list and map of Wilderness, Wild, and Scenic lakes as well as their objectives and prescriptions can be found in the Lake Management Zone section.

AREA 2
LONG-TERM OBJECTIVES (100 YEARS)
- Maintain the high quality open sedge meadow/bog, shrub and forested wetland system primarily for ecological, water quality and habitat values.
• Maintain a diversity of forested and unforested wetlands. The small patches of existing old growth pine and hemlock-hardwoods would be maintained, and expanded where possible.
• A larger portion of the upland area would maintain a variety of successional forest types and stages. Early successional types (aspen, white birch and fir) would be managed at economic age maturity. Later successional stages of long-lived trees (hemlock hardwoods, northern hardwoods, and red and white pine) would be managed to their biological mature ages (Eckstein, 2001).

SHORT-TERM OBJECTIVES (50 YEARS)
• Encourage forest management practices and the production of forest products that sustainably meet the needs of current generations while providing adequate resources to meet the needs of the future.
• Maintain red and white pine communities where possible. There are many small scattered stands existing as islands in wetland communities that are challenges to access. Plantations will be managed at biological maturity and replanted back to pines.
• Increase acres of Northern Hardwood stands with management as mixed stands of white birch and ‘not classified’ acreages are harvested. Most Hemlock-Hardwood stands will not be managed or will use special techniques to attempt hemlock regeneration.
• Maintain aspen stands using General Management Prescriptions.
• Unforested-Wetland community’s long-term objectives would be met through passive management in most areas.
• Regenerate black spruce and tamarack stands through active management.
• Access across some wetland areas in a frozen ground condition may be required in certain circumstances.

RESOURCE MANAGEMENT PRESCRIPTIONS
Please see the General Management Prescriptions at the beginning of this section for information on general management prescriptions by forest type. The General Management Prescriptions apply and all management activities are authorized, except as noted below for this management area.
• Establish dead tree snags of early successional species and course woody habitat by leaving selected aspen, white birch, balsam fir and red maple trees in harvest areas.
• Some of the wetland areas in this management unit will be passively managed and some will be actively managed. Place heavy emphasis on protection of the streams, waterways and watersheds in this area. Temporary road access across some of these wetlands may be required. To protect wetlands during timber harvests, temporary road access across wetland areas would only be allowed when there are frozen ground conditions.

This Management Area may contain designated Wilderness Lakes, Wild Lakes, and Scenic Lakes. The land management surrounding these lakes must be consistent with the management objectives and prescriptions for the respective lake designation. The list and map of Wilderness, Wild, and Scenic lakes as well as their objectives and prescriptions can be found in the Lake Management Zone section.

AREA 3
LONG-TERM OBJECTIVES (100 YEARS)
• Increase red and white pine as a dominant community type in some stands and as a greater component in others.
• Maintain aspen as a strong component in mixed stands across the landscape and as the dominant component of more diverse stands.
• Develop a primarily mixed forest with areas dominated by older red and white pine (150-250 years old) with aspen, white birch, jack pine, and older red oak as important secondary species. Other areas will continue to be dominated by aspen but with greater stand diversity and older pines than exist today.
• Maintain a diversity of habitat conditions to support harvestable populations of the major forest game species including white-tailed deer, black bear, ruffed grouse, American woodcock, and snowshoe hare.
• Increase the availability of habitat for non-game species which use pine forests such as evening grosbeak, pine siskin, red crossbill and pine warbler.
• Maintain a diversity of forested and unforested wetlands.
• Protect and maintain the water quality and riparian habitat on lakes and streams.

SHORT-TERM OBJECTIVES (50 YEARS)
• Increase the presence and age of red and white pine on suitable sites across the area. Specifically, increase the acreage of stands that are dominated by red/white pine and, in mixed forest stands where red and white pine are not the dominant species, increase the average pine component.
• Maintain aspen as a strong component in mixed stands across the landscape but reduce the number of aspen dominated stands as the red/white pine increase. Manage for a variety of stand sizes and species mixtures.
• Manage for current levels of red oak, assuring natural regeneration through harvest and site disturbance and increasing the average age of this type.
• Manage for current levels of white birch, jack pine, fir spruce and northern hardwoods.
• Maintain forested wetlands with a representation of multiple age classes of black spruce and tamarack applying General Management Prescriptions.
• Maintain current levels of natural and artificial grass openings for wildlife.

RESOURCE MANAGEMENT PRESCRIPTIONS
Management actions in this area follow the General Management Prescriptions, as described in the beginning of the Land Management section and all management activities are authorized.
This Management Area may contain designated Wilderness Lakes, Wild Lakes, and Scenic Lakes. The land management surrounding these lakes must be consistent with the management objectives and prescriptions for the respective lake designation. The list and map of Wilderness, Wild, and Scenic lakes as well as their objectives and prescriptions can be found in the Lake Management Zone section.
• Lake Trout Lake, Little Rock, and Sparkling Lakes are designated as experimental lakes as per Administrative Code NR 20.41. All management activities should consider the long and short term impacts to the research lake.

AREA 4

LONG-TERM OBJECTIVE (100 YEARS)
• Develop, increase and maintain a mixed forest dominated by older red and white pine with aspen, red oak, white birch, and jack pine as important secondary species. Areas with slightly richer soil would be managed for red oak with red and white pine.
• Maintain a diversity of forested and unforested wetlands.
• Harvest would occur when long-lived trees reach biological maturity.

SHORT TERM OBJECTIVE (50 YEARS)
• Increase the presence and age of red and white pine on suitable sites across most of the mixed forest as opportunities present. Specifically, increase the acreage of stands that are dominated by red and white pine and, in mixed forest stands where red and white pine are not the dominant species, increase the average pine component.
• Maintain or increase abundance of red and white pine trees in aspen, red oak, white birch, jack pine and northern hardwood stands.
• Maintain sites with early successional forest types such as aspen, jack pine, and white birch. Although white birch will be decreased by mortality and regeneration challenges. Some white birch stands will be converted to pine plantations.
• Maintain aspen as a dominant community as well as maintain aspen as a secondary component in other stand types. Some of the white birch and fir-spruce types will convert to aspen. Some aspen type will convert to pine types.
• Manage for current levels of red oak, assuring natural regeneration through harvest and site disturbance and
increasing the average age of this type in mixed stands.

• Northern hardwood communities will be decreased as these stands are managed for red oak and natural pine regeneration.
• Maintain forested wetlands with a representation of multiple age classes of black spruce and tamarack, applying General Management Prescriptions.
• Grass opening reduction will go to pine plantation or natural regeneration of aspen or white pine.

RESOURCE MANAGEMENT PRESCRIPTIONS

Please see General Management Prescriptions in the beginning of the Land Management section for information on general management prescriptions by forest type. All management activities managing this forest type are authorized.

• Retain long-lived trees to biological maturity. This Management Area may contain designated Wilderness Lakes, Wild Lakes, and Scenic Lakes. The land management surrounding these lakes must be consistent with the management objectives and prescriptions for the respective lake designation. The list and map of Wilderness, Wild, and Scenic lakes as well as their objectives and prescriptions can be found in the Lake Management Zone section.
• Forestry staff will work cooperatively with volunteers to develop erosion control measures at Musky Mountain. Erosion control activities may include tree planting, seeding, and gating of area.

AREAS

LONG-TERM OBJECTIVES (100 YEARS)

• Maintain a mixed forest dominated by older red and white pine and (northern hardwoods) with aspen, red oak, white birch, and jack pine as important secondary species.
• Large-scale ecosystem management with increased forest block size, stand age, and conifer component that enhances the ecological characteristics of this area.
• Maintain a diversity of forested and unforest wetlands.
• Maintain and expand the white birch and red oak type.
• Maintain early successional forest types.
• Manage small scattered old growth stands.

SHORT-TERM OBJECTIVES (50 YEARS)

• Increase the presence and age of red and white pine on suitable sites across the area. Specifically, increase the acreage of stands that are dominated by red/white pine and, in mixed forest stands where red and white pines are not the dominant species, increase the average pine component.
• Retain and increase pine components on aspen, red oak, white birch and northern hardwood stands as secondary objectives to their active management.
• Maintain aspen as a strong component across the landscape. Manage for a variety of stand sizes and ages. Look for opportunities to manage for larger stand sizes. Aspen would see gains from managing white birch stands and grassy openings filling in naturally.
• Maintain and increase the red oak component of this area. Increase oak components in management of all stands and assure natural regeneration through harvest and site disturbance.
• Maintain current levels of jack pine with active management activities.
• Maintain forested wetlands with a representation of multiple age classes of black spruce and tamarack applying General Management Prescriptions.

RESOURCE MANAGEMENT PRESCRIPTIONS

The General Management Prescriptions for each appropriate forest type, found at the beginning of the Land Management section, apply to this management area. All management activities appropriate for the forest type are authorized. This Management Area may contain designated Wilderness Lakes, Wild Lakes, and Scenic Lakes. The land management surrounding these lakes must be consistent with the management objectives and
prescriptions for the respective lake designation. The list and map of Wilderness, Wild, and Scenic lakes as well at their objectives and prescriptions can be found in the Lake Management Zone section.

**AREA6**

**LONG-TERM OBJECTIVES (100 YEARS)**
- Maintain a mixed forest dominated by older red and white pine with aspen, red oak, white birch, and jack pine as important secondary species.
- Maintain a diversity of forested and unforested wetlands.
- Maintain white birch and expand the red oak type.
- Maintain early successional forest types as a strong component of the landscape.
- The age range of major tree species will be up to biological age for longed-lived species and economic age on the short-lived species.

**SHORT-TERM OBJECTIVES (50 YEARS)**
- Increase the presence and age of red and white pine on suitable sites across most of the mixed forest as opportunities present. Specifically, increase the acreage of stands that are dominated by red and white pine and in mixed stands where pines are not the dominant species, increase the average pine component.
- Retain and increase pine components on aspen, red oak, white birch and northern hardwood stands as secondary objectives.
- Maintain aspen component as a dominant community as well as maintain aspen as a secondary component in other stand types. Some aspen will convert to pine types with active management and by forced conversion to pine types.
- Maintain white birch, jack pine, fir-spruce and hemlock hardwood types.
- Manage for current levels of red oak and look for opportunities to expand the red oak type with active management on suitable soils. Increase red oak component in mixed stands.
- Maintain forested wetlands with a representation of multiple age classes of black spruce and tamarack, applying General Management Prescriptions.

**RESOURCE MANAGEMENT PRESCRIPTIONS**
The General Management Prescriptions for each appropriate forest type, found at the beginning of the Land Management section, apply to this management area. All management activities appropriate for the forest type are authorized. This Management Area may contain designated Wilderness Lakes, Wild Lakes, and Scenic Lakes. The land management surrounding these lakes must be consistent with the management objectives and prescriptions for the respective lake designation. The list and map of Wilderness, Wild, and Scenic lakes as well at their objectives and prescriptions can be found in the Lake Management Zone section.
The following revisions identified in **bold** and *strikethrough* will be added and removed, respectively from the existing NHAL master plan to comply with the definition of Forest Production Areas in State Statute 28.04(3)

Pages 12, 13 of the NHAL 2005 approved Master Plan

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**MANAGEMENT OF SMALL, SCATTERED OLDER STANDS OF RED AND WHITE PINE**

Manage the small, scattered red and white pine stands with a year of origin of 1910 or earlier for old growth characteristics using active and passive techniques. *(Old growth characteristics will begin to develop at age 150 to 180 years as some of the large trees begin to die and become snags and coarse woody debris.)* Small and scattered is defined as stands approximately 15 acres or less in area. These stands may be nested in other cover types or typed out as distinct stand polygons. *In all classifications, and unless active management is restricted, management would apply a thinning of stands to remove small and crowded trees to allow the age and structure of the remaining trees to increase. Entry into these stands should be at longer intervals than typical for areas managed under Big Tree Silviculture.* Regenerate these stands after they have established old growth characteristics and before the age when establishing regeneration would be a problem. In areas or zones designated as passive management only allow the stands to naturally regenerate. Passive management may be used in actively managed areas as deemed appropriate, such as along shorelines, on small swamp islands, or for pine stands that are 150 or more years old. *Small scattered old stands will be managed with adjacent scheduled stands.*
The following revisions identified in **bold** and *strikethrough* will be added and removed, respectively from the existing NHAL master plan to comply with the definition of Forest Production Areas in State Statute 28.04(3)

Page 14,15 2005 NHAL Master Plan GENERAL FOREST MANAGEMENT PRESCRIPTION

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**RED AND WHITE PINE DOMINATED MIXED FOREST**

This forest type occurs in a wide range of current conditions that require a range of management intensities and a variety of techniques. Some soil disturbance is required for successful regeneration of these pine species.

**General Management Prescriptions**

Depending on the origin and composition of the red and white pines, several management activities will be used to manage pine forests toward future desired condition of increased pine composition and mixed species stands.

- Where red and white pine are of natural origin and the primary cover type, use selective to harvests maintain the health, vigor and growth of the pines. Remove selected individuals or small groups to maintain species diversity and structural diversity. At biological maturity (140-250 years red pine, 150-350 years white pine). Follow DNR Silvicultural Handbook guidance for Pine rotations and entry intervals. Each Classification Area stated objectives will guide pine management. At rotation of the stand, harvest pine and replant or naturally regenerate. Clearcutting, seed tree harvest and overstory release may be used depending on site conditions. Stand considerations, seed sources, and site prep needs will determine the appropriate management action to use.

- Plant red and white pine plantations as needed to maintain pine on sites or to convert other forest types to pine. Hand or machine plant nursery stock seedlings following site preparation by mechanical and herbicide application. Use hand or herbicide release following planting to maintain growth and vigor of planted pine trees and increase survival of planted trees.

- Thin pine plantations (red, white, possibly jack) on a recurring basis (8-20 year intervals), according to prescriptions outlined in the DNR Silviculture and Forest Aesthetics Handbook, to gradually create a structure similar to that of a naturally appearing pine stand.

- Mixed pine stands containing a large percentage of tree species other than pine may be treated with selection harvest, shelterwood harvest or overstory removal of other species to promote pine to dominate the future stand or increase the numbers of pine in natural regeneration after harvest. Several harvest entries may be required to bring pine to a dominant position.

- Where red and white pine is a viable understory component, use natural regeneration techniques. Plant pine if natural regeneration fails or is not possible.

- Leave scattered large red and white pine in many harvest areas if they are healthy and do not pose a risk to humans or forest health. *(Big Tree Silviculture)*.

- Ground disturbance or prescribed fire may be used to promote regeneration of red or white pine where feasible and safe.