Michigan Department of Natural Resources
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Michigan State Forest Management Plan

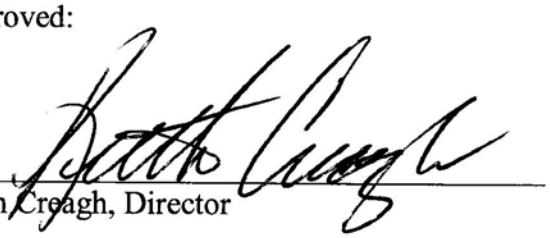
April 10, 2008

Amended October 9, 2014
(Sections 4.1.2.2 and 5.2)

Forest Resources Division
Wildlife Division

As of the below date, the 2008 Michigan State Forest Management Plan is amended to effectively replace sections 4.1.2.2 and 5.2.

Approved:



Keith Creagh, Director

10/9/2014

Date

4.1.2.2 Forest Resources

Desired future condition–The DNR works cooperatively with stakeholders and other public agencies to manage a stable forestland base and to offer a diverse assemblage of community types, tree species, successional stages, age classes, and forest products, while also providing for the conservation of biological diversity, forest health, and other ecological and socioeconomic values.

Goals:

1. As stated in 2013 Regional State Forest Management Plans, propose for harvest an average of 61,000 acres a year, and (a total 10-year proposed harvest level of 611,000 acres (Tables 4.1, 4.2, and 4.3).
2. Maintain up-to-date, comprehensive information on forest inventories and engage in efforts to keep abreast of market conditions at the local, state, national, and international levels.
3. Actively manage the state forest for stable, long-term, sustainable timber production.
4. Actively manage the state forest for sustainable forest-based wood fiber, such as biomass.
5. Cooperate with the Michigan Department of Labor and Economic Growth and the Michigan Economic Development Corporation to promote and encourage forest products companies in Michigan, and attract new forest products companies to locate in the state, including bioenergy-based companies (e.g. wood pellets, biofuels).
6. Promote logger and other industry education programs, including education for new sustainable forestry practices.
7. For the purposes of providing a stable supply of fiber and diverse forest conditions, strive to achieve balanced-age and size-class distributions of commercial forest cover types across ecoregional landscapes (taking into account HCVAs and in some cases SCAs).
8. Generally manage early-successional cover types (comprised of shade intolerant aspen, paper birch, jack and red pine, and black oak) as even-aged stands with balanced age-class distributions across the landscape, consistent with the suitability of the site.
9. Generally manage mid-successional cover types (comprised of intermediate shade tolerant white pine, yellow birch, white and red oak, and black spruce) as all-aged stands with all-aged class distributions across the landscape, consistent with the suitability of the site.
10. Generally manage late-successional cover types (comprised of shade tolerant sugar maple, beech, hemlock, balsam fir, white cedar, and white spruce) as all-aged stands with all-aged class distributions across the landscape, consistent with the suitability of the site.
11. While also considering social and economic values, use ecological site potential as a guiding principle for determining the suitability of species habitats in forest vegetation management decisions.
12. Use the rates of growth and management objectives for pulpwood vs. sawlog production in the application of rotation lengths.
13. Strive to maintain and improve the provision of ecosystem services.

General Objectives:

1. Projections and sustainability of harvests are based upon inventory growth and regeneration data, site index models, and desired future conditions, while also dependent upon changing market and resource product demands.
2. Use the Kotar Habitat Type Classification System (Burger and Kotar 2003) to make informed decisions on the site suitability of upland forest vegetation. Where the Kotar system is not currently available, soils and other information will be used.
3. Once desired conditions of species composition and age-class structure have been achieved, demonstrate through harvest and growth records that the volume harvested during any 10-year span does not exceed the net growth accumulated over that same period.
4. Assess the severity and effect of cervid herbivory on forest regeneration.

Objectives for Specific Cover Types:

1. Aspen: Manage aspen primarily for pulpwood production. Work toward balancing the age class distribution of the aspen cover type by increasing prescriptions in the 30–39 and 40–49 year age classes over the next decade.
2. Aspen: On sites where aspen is well suited, prescribe and treat stands in the 70–89 year ages classes to preclude conversion to later successional types. Allow natural succession on 70–89 year aspen stands on sites where aspen is poorly suited and where Kotar analysis and developing understory composition indicates a proclivity for dominance of another cover type.
3. Northern hardwoods: Generally manage the northern hardwood cover type as all-aged stands with an emphasis on quality saw log production, while balancing economic productivity and biodiversity demands.
4. Northern hardwoods: Assess the costs and benefits of operating on a continuous inventory cycle for the management of northern hardwoods.
5. Northern Hardwoods: Where adequate seed trees are present, encourage the natural regeneration of hemlock within northern hardwood communities and to encourage the restoration and expansion of mixed hemlock/white pine and mixed hemlock/yellow birch communities within regional landscapes, through the employment of nurse logs and soil scarification. Where inadequate seed trees remain in areas where hemlock was historically present and where browse pressure is within limits favorable for successful recruitment, to under-plant hemlock in mesic northern hardwood and white pine communities.
6. Jack pine: Manage jack pine primarily for pulpwood production. Reduce the stock of over-mature jack pine in the 70–79 and 80–89 year ages classes, while operating within the framework of the (draft) Kirtland's Warbler Breeding Range Conservation Plan (Michigan Department of Natural Resources et al. 2014).
7. Red pine: Manage red pine primarily for quality pole and saw log production. Balance the age class distribution of the red pine cover type at approximately 25,000 to 30,000 acres per class, by increasing regeneration harvests to over 2,000 acres per year over the next decade.
8. Oak: Work toward retaining oak species for hard mast and saw log production and balancing the age class distribution of the oak cover type by increasing the number of regeneration cuts in the 70–79 and 80–89 year age classes.
9. Oak: Retain white pine or other mixed deciduous components in mixed oak stands.
10. Paper birch: Encourage the natural regeneration of paper birch cover type where adequate seed trees are present, through the employment of patch clearcuts followed by prescribed fire for suitable seedbed preparation.
11. Lowland hardwoods: Balance the age class distributions of lowland hardwood and balsam poplar cover types, by increasing harvests within the 60–69, 70–79, and 80–89 year age classes for balsam poplar and the 70–79 and 80–89 year age classes of even-aged lowland hardwood stands.
12. Hemlock/yellow birch: Encourage the retention and regeneration of hemlock and yellow birch within the lowland hardwood cover types through the employment of nurse logs and soil scarification.
13. Spruce-fir: Work toward greater balance in the age class distribution of the spruce-fir cover type, through increased harvests within the 70–79 and 80–89 year age classes.
14. Spruce-fir: Encourage the retention, restoration and expansion of spruce and fir within other cover types based upon site suitability, landscape and wildlife habitat considerations.
15. Northern white cedar: Work toward recruiting younger age classes of the northern white cedar cover type by encouraging regeneration through the judicious use of prescribed fire, vegetative reproduction (layering) and other experimental methods.
16. Tamarack: Encourage regeneration and the recruitment of younger age classes for the tamarack cover type.
17. Black spruce: Balance the age class distribution of the black spruce cover type by increasing harvests in the 70–79 and 80–89 year age classes, within the context of other DNR objectives including the provision of winter wildlife habitat.
18. Black spruce: Work toward recruiting younger age classes of the black spruce cover type by encouraging regeneration through the judicious use of prescribed fire and vegetative reproduction (layering).
19. Mixed swamp conifers: Balance the age class distribution of the mixed swamp conifer cover type by increasing harvests in the 70–79, 80–89, 90–99, and 100+ year age classes, within the context of other DNR objectives including the provision of winter wildlife habitat.

20. Mixed swamp conifers: Work toward recruiting younger age classes of the mixed swamp conifer cover type by encouraging regeneration through the judicious use of prescribed fire and vegetative reproduction (layering).
21. White pine: Where biodiversity goals do not preclude, increase regeneration harvests of the white pine cover type as planted stands reach the 100+ year rotational age class over the next decade.
22. White pine: Where advanced natural regeneration is already present in the understory, allow the recruitment of white pine within mixed oak, red pine, aspen and to a lesser extent jack pine stands. Where inadequate seed trees are present, to under-plant white pine in mesic northern hardwood and post-thinned red pine stands.

Objectives for Stakeholder Relations:

1. Carry out biennial surveys of forest products firms to facilitate the compilation of USDA Forest Service timber product output reports.
2. Meet with representatives of forest resource stakeholder groups and participate in associations of mutual interest (e.g., USDA Forest Service, and Forest Management Advisory Council).
3. Participate in wood product use and marketing programs and meetings.
4. Maintain a wood products manufacturers' directory.
5. Endeavor to advance sustainable forestry practices on private, nonindustrial lands through collaboration with and support for assistance programs for such lands.
6. Participate in the Sustainable Forestry Initiative's Statewide Implementation Committee.
7. Collaborate with other major land owners in landscape-level plans when such opportunities arise.
8. Evaluate local and regional economic effects of DNR timber sales as part of DNR inventory and timber sale decision making processes.
9. Identify the nature and size of effects from conflicts over forest uses, and values and possible resolutions to minimize these conflicts.
10. Maintain and communicate realistic appraisals of timber inventories and harvest trends.
11. Communicate the social, economic, and ecological benefits of a working forest as part of its sustainable forestry management.
12. Encourage the development of uses for salvaged ash trees by industry.

Standards:

1. Part 511, Commercial Forests, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, and the administrative rules thereof
2. DNR Policy and Procedure 32.22-06, Forest Type Mapping Instructions and Type Symbols, issued July 11, 2005
3. DNR Policy and Procedure 32.22-07, Forest Management, issued July 11, 2005
4. DNR FRD Policy and Procedure 241, Reforestation, issued October 26, 1999
5. DNR FRD Policy and Procedure 251, Sale and Removals of Timber, issued March 1, 2000
6. DNR FRD Policy and Procedure 251a, Sale and Removals of Timber, Visual Management, issued February 28, 2002
7. DNR FRD Policy and Procedure 441, Operations Inventory and Compartment Review Procedures, issued January 19, 2000
8. DNR Forest Certification Work Instruction 1.5 – Social Impact Considerations and Public Involvement Processes
9. DNR Forest Certification Work Instruction 1.6 – Forest Management Unit Analysis
10. DNR Forest Certification Work Instruction 1.7 – State Forest Timber Harvest Trends
11. DNR Forest Certification Work Instruction 2.1 – Reforestation
12. DNR Forest Certification Work Instruction 7.1 – Timber Sale Preparation and Administration Procedures

Monitoring criteria.–

Statewide Criterion 2 – Ecosystem Condition and Productivity, Indicators 2.1, 2.2, 2.6

Statewide Criterion 3 – Social/Cultural/Spiritual, Indicator 3.2

Statewide Criterion 5 – Ownership Patterns, Indicators 5.1, 5.3

Statewide Criterion 6 – Economic Health, Indicators 6.1, 6.2, 6.3

Statewide Criterion 7 – Institutional Processes, Indicator 7.1

Guidelines:

1. Use DNR Silvicultural Guidelines for developing management prescriptions.
2. Include in the compartment review process (Standard 3 above) an assessment of social, biological, and economic conditions to include:
    - Common vegetation cover types, animals, and their habitats
    - Unique, vulnerable, rare, and threatened plant communities
    - Sensitive, threatened and endangered species and their habitats
    - Water and fishery resources
    - Soil resources
    - Natural disturbance regimes
    - Habitat connectivity and landscape-level mosaics
    - Potential successional pathways, as identified using the Kotar Habitat Type Classification System (Burger and Kotar 2003).
3. The current ecological conditions supported by these factors should be compared with both historical conditions and desired future conditions within a landscape context along with consideration of social and economic values. The assessment should be used to develop management options and silvicultural practices that will achieve long-term desired future conditions for social and economic values and maintenance of the ecological functions and productivity of the forest.
4. Consider that landform, localized climate, soils, topographic aspect, growth-limiting nutrient factors, localized precipitation rates, and forest canopy cover can create micro-climates that possess different hydrologic properties and support different forest communities across the forest landscape. The Kotar Habitat Type Classification System should be used to assist in determining site suitability when considering which tree species are best adapted to specific sites and local hydrologic conditions.
5. Manage red pine stands in accordance with the direction provided by Guidelines for Red Pine Management (Michigan Department of Natural Resources 2006a).
6. Apply DNR Within-Stand Retention Guidelines (Michigan Department of Natural Resources 2006b) to all silvicultural prescriptions to maintain or foster spatial and temporal diversity and complexity of stand structure.
7. Promote prompt reforestation and manage both early and late successional forests to provide carbon sequestration service to the biosphere.
8. The rate of harvest of forest products should not exceed levels that can be biologically sustained. One measure of the sustainability of harvest levels is based upon growth and regeneration data and rates of harvest and removals (less mortality), and limits are modified by desired future conditions of the forest.
9. The average size of clearcut harvests over the state forest system should not exceed 120 acres.
10. Follow Forest Certification Green-Up Guidelines (dated July 12, 2006), in the management and regeneration of all clearcut stands.
11. Clearcut harvests to remove dead or dying trees resulting from insect and disease epidemics, wildfire or other natural disturbances (salvage or sanitation harvests), or for special management areas (such as Kirtland's Warbler habitat) may require the implementation of alternative measures to comply with green-up guidelines and the SFI green-up performance measure, which must be justified and documented on the Pre-Timber Sale Checklist.

12. Use results of ongoing forest health monitoring activities on state forestland, including annual aerial surveys, periodic pest- and host-specific detection and evaluation surveys for indigenous and exotic pests (e.g., redheaded pine sawfly, jack pine budworm, sirex woodwasp, and emerald ash borer), and long-term monitoring and analysis plot networks (Michigan Impact Monitoring System, beech bark disease, ash decline) in developing management prescriptions.

Table 4.1 Projected harvest level by cover type and management areas aggregated over this 10-year planning period for the state forest in the northern Lower Peninsula ecoregion (Department of Natural Resources 2012 inventory data).

Species	Percentage of State Forest Land	Current Acreage	Hard Factor Limited Acres	Manageable Acres	Projected 10-Year Final Harvest Acres	Projected 10-Year Partial Harvest Acres	Projected Acreage at End of Planning Period
Aspen	24	496,754	32,491	464,263	102,132	0	496,754
Jack Pine	10	207,084	16,528	190,669	24,356	0	206,971
Northern Hardwood	10	215,204	17,053	197,551	2,018	62,091	215,804
Oak	10	201,067	65,755	135,312	11,522	28,377	201,067
Red Pine	8	167,896	14,621	154,362	37,095	55,583	166,809
Lowland Open/Semi-Open Land	7	138,187	1,165	137,022	0	0	138,187
Lowland Deciduous	5	99,201	69,790	29,411	2,412	800	99,201
Upland Open/Semi-Open Land	5	104,070	12,200	91,870	0	0	104,070
Cedar	4	77,881	77,936	-55	0	0	77,881
Lowland Conifers	4	89,842	72,048	17,794	1,880	0	89,842
Lowland Aspen/Balsam Fir	2	41,957	21,195	20,762	3,384	0	41,957
Mixed Upland Deciduous	2	46,626	4,511	42,115	7,116	8,113	46,626
White Pine	2	40,088	3,057	37,031	8,146	12,626	40,088
Lowland Mixed Forest	1	11,791	9,454	2,337	121	0	11,791
Natural Mixed Pines	1	26,209	1,923	24,286	2,309	7,359	26,209
Upland Mixed Forest	1	21,014	2,236	18,178	3,190	4,770	21,614
Misc. Other (Water, Local, Urban)	1	27,174	3,056	24,118	0	0	27,174
Hemlock	0	1,456	72	1,384	0	249	1,456
Lowland Spruce/Fir	0	8,978	7,301	1,677	106	0	8,978
Paper Birch	0	3,431	2,001	1,430	291	0	3,431
Planted Mixed Pines	0	6,536	40	6,496	1,038	1,712	6,536
Tamarack	0	7,882	6,322	1,560	117	0	7,882
Upland Conifers	0	2,791	182	2,609	1,064	768	2,791
Upland Spruce/Fir	0	7,064	2,200	4,864	1,856	0	7,064
Total	**100**	**2,050,183**	**443,137**	**1,607,046**	**210,153**	**182,448**	**2,050,183**

Table 4.2 Projected harvest level by cover type and management areas aggregated over this 10-year planning period for the state forest in the eastern Upper Peninsula ecoregion (Department of Natural Resources 2012 inventory data).

Species	Percentage of State Forest Land	Current Acreage	Hard Factor Limited Acres	Manageable Acres	Projected 10-Year Final Harvest Acres	Projected 10-Year Partial Harvest Acres	Projected Acreage at End of Planning Period
Lowland Open/Semi-Open Land	19	197,964	0	197,964	0	0	197,964
Northern Hardwood	12	123,444	5,279	118,165	0	49,640	123,444
Aspen	11	117,222	9,481	107,741	4,666	0	117,222
Cedar	11	112,721	4,075	108,646	1,896	0	112,721
Jack Pine	9	99,341	5,933	93,408	4,464	0	99,341
Red Pine	7	76,278	6,582	69,696	4,827	20,446	76,278
Lowland Conifers	7	71,264	20,364	50,900	7,511	0	71,264
Upland Open/Semi-Open Land	4	43,040	0	43,040	0	0	43,040
Lowland Spruce/Fir	3	37,079	9,003	28,076	3,579	0	37,079
White Pine	3	30,569	3,006	27,563	4,029	7,390	30,569
Lowland Deciduous	3	28,640	5,927	22,713	2,443	0	28,640
Misc. Other (Water, Local, Urban)	2	20,807	5	20,802	0	0	20,807
Lowland Aspen/Balsam Poplar	2	16,269	3,932	12,337	1,322	0	16,269
Upland Spruce/Fir	1	13,861	2,791	11,070	1,631	0	13,861
Upland Conifers	1	11,043	195	10,848	2,475	3,099	11,043
Upland Mixed Forest	1	10,843	292	10,551	1,498	2,694	10,843
Paper Birch	1	10,425	5,883	4,542	437	0	10,425
Tamarack	1	9,580	5,375	4,205	730	0	9,580
Natural Mixed Pines	1	9,523	553	8,970	929	2,715	9,523
Lowland Mixed Forest	1	9,001	625	8,376	1,387	0	9,001
Mixed Upland Deciduous	1	8,952	191	8,761	1,680	2,282	8,952
Hemlock	1	6,936	1,292	5,644	0	425	6,936
Oak	0	3,690	518	3,172	283	793	3,690
Planted Mixed Pines	0	464	0	464	87	114	464
Total	**100**	**1,068,956**	**91,300**	**977,656**	**45,873**	**89,597**	**1,068,956**

Table 4.3 Projected harvest level by cover type and management areas aggregated over this 10-year planning period for the state forest in the western Upper Peninsula ecoregion (Department of Natural Resources 2012 inventory data).

Species	Percentage of State Forest Land	Current Acreage	Hard Factor Limited Acres	Manageable Acres	Projected 10-Year Final Harvest Acres	Projected 10-Year Partial Harvest Acres	Projected Acerage at End of Planning Period
Aspen	28	246,797	15,304	231,493	44,780	0	246,797
Northern Hardwood	18	162,935	12,967	149,968	0	63,652	162,935
Cedar	10	83,865	4,540	79,325	0	0	83,865
Lowland Conifers	9	81,308	44,053	37,255	4,538	0	81,308
Lowland Open/Semi-Open Lands	8	68,318	0	68,318	0	0	68,318
Lowland Spruce/Fir	3	29,131	12,019	17,112	2,888	0	29,131
Jack Pine	3	26,910	773	26,137	1,345	0	26,910
Lowland Deciduous	3	23,876	9,975	13,901	1,972	0	23,876
Upland Open/Semi-Open Lands	3	23,674	0	23,674	0	0	23,674
Red Pine	2	21,549	4,326	17,223	3,641	5,647	21,549
Upland Spruce/Fir	2	21,344	7,086	14,258	1,407	0	21,344
Misc. Other (Water, Local, Urban)	1	12,315	1	12,314	0	0	12,315
Mixed Upland Deciduous	1	11,050	1,462	9,588	2,242	2,269	11,050
White Pine	1	10,582	1,303	9,279	1,015	2,584	10,582
Tamarack	1	9,285	4,458	4,827	868	0	9,285
Hemlock	1	9,163	1,583	7,580	0	1,449	9,163
Oak	1	8,154	2,077	6,077	991	1,470	8,154
Upland Mixed Forest	1	8,043	1,605	6,438	650	1,288	8,043
Lowland Aspen/Balsam Poplar	1	6,882	1,679	5,203	786	0	6,882
Paper Birch	1	5,482	3,486	1,996	495	0	5,482
Upland Conifers	1	4,999	460	4,539	1,371	1,398	4,999
Natural Mixed Pine	0	3,554	110	3,444	400	889	3,554
Lowland Mixed Forest	0	3,202	382	2,820	1,070	0	3,202
Planted Mixed Pines	0	367	0	367	20	2	367
Totals	100	882,785	129,652	753,133	70,482	80,649	882,785

5.2 High Conservation Value Areas

HCVAs are areas that have been recognized for their contribution to specific conservation values, objectives and ecological attributes, or significant social values through a recognized DNR process. Examples of recognized DNR processes include NRC orders, DNR director's orders, and Legislative action (i.e. statute). These processes all have a public involvement or participation component. Consideration of additional types of High Conservation Value Areas will be accomplished through periodic revision of this plan and the public input mechanisms that are associated with the revision and review process.

Note: The operations inventory/compartment review process also has a public involvement/participation component but it is not being used to establish HCVAs. It is used to identify SCAs that may become HCVAs in future planning iterations.

5.2.1 Legally Dedicated Natural Areas, Wilderness, or Wild Areas

Legally dedicated natural areas, wilderness or wild areas are established under authority of Part 351, Wilderness and Natural Areas, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended .Within the state forest system, there are currently six legally dedicated NAs totaling 6,503 acres (Table 5.3). There are six other legally dedicated NAs upon other DNR-managed lands in the northern Michigan landscape: the Presque Isle River and the Union Springs Scenic Sites in the Porcupine Mountains Wilderness State Park; the Thompson's Harbor NA in Thompson's Harbor State Park; the Besser Natural Area in Rockport State Park; the Wagner Falls Scenic Site, and the Laughing Whitefish Falls Scenic Site.

There is currently no legally dedicated wilderness or wild areas located upon the state forest. There is one legally dedicated wilderness area that is located upon other DNR lands in the northern Michigan landscape, that being the 42,903 acre Porcupine Mountains Wilderness Area in the Porcupine Mountains Wilderness State Park.

Natural areas, wilderness and wild areas provide recreational sites for persons who appreciate such undeveloped areas for their inherent or intrinsic ecological values, by offering unique opportunities for solitude or primitive and unconfined types of recreation. In this manner they can provide economic opportunities for local communities. They also provide valuable and important research and educational opportunities.

Management Direction

Per statute, not more than 10% of lands under the control of the DNR may be dedicated as natural areas, wilderness, or wild areas.

The primary management objectives for NAs are for recreation and the preservation of flora and fauna, or biotic, geologic or scenic features of educational or scientific value.

A thorough inventory of floral and faunal species composition and community structure, and the identification of natural ecological processes are a priority in these areas.

Stewardship activities in NAs are limited by statute, but include active maintenance and restoration, or allowing natural ecological processes to occur without interference. Active management methods and techniques may include prescribed burns, invasive species control, brush control, planting of native plant species, and other forms of ecological restoration. Monitoring of management activities is necessary to evaluate the effectiveness of stewardship activities.

The primary management objectives for wilderness and wild areas are for recreation, and for ecological, geological, scientific, scenic, or natural history values.

Stewardship activities in wilderness and wild areas are minimal and generally limited by statute to allowing natural ecological processes to occur without interference.

Standards:

1. Part 351, Wilderness and Natural Areas, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, and the administrative rules thereof
2. DNR Policy and Procedure 26.27-04, Wilderness and Natural Areas, dated July 11, 2005
3. Land Use Order of the Director 4.41
4. Natural Areas Strategic Plan (Michigan Department of Natural Resources 2000b)
5. DNR Forest Certification Work Instruction 1.4 - Biodiversity Management on State Forest Lands
6. DNR Forest Certification Work Instruction 3.1 - Forest Operations
7. DNR Wildlife Division Process for Nomination, Review and Dedication of Natural Areas, issued November 30, 2001

Guidelines:

1. Maintain or restore natural areas, wilderness and wild areas so as to preserve their natural ecological and social values.
2. Develop site conservation and management plans for state natural areas and incorporate planned stewardship activities into annual work plans.
3. Employ the voluntary cooperation and support of interested citizens and conservation groups in the management of natural areas, wilderness and wild areas.
4. Use field surveys and public nomination processes to identify representative areas with high quality natural communities and/or unique scenic or recreational features for consideration as potential wilderness, wild or natural areas.

5.2.2 Ecological Reference Areas

Ecological Reference Areas (ERAs) serve as models of ecological reference within the state. They are higher quality examples of functioning ecosystems that are primarily influenced by natural ecological processes. ERAs occur primarily upon DNR-administered lands but may also occur upon other ownerships including National Forests, National Parks, National Wildlife Refuges, conservancy lands, and some local government lands. ERAs located on DNR-administered lands conform to the requirements of Criterion 6.4 for Representative Sample Areas in the Forest Stewardship Council certification standard, and Objective 4 for Forests with Exceptional Conservation Value in the Sustainable Forestry Initiative certification standard.

ERAs are based upon a nationally recognized biological inventory system (NatureServe) and database (Michigan Natural Feature Inventory) of known natural community sites (Element Occurrences). They are framed in the context of the natural community types (Appendix I). ERAs are comprised of two categories:

1. Common Communities. A representative selection of natural communities with a Global (G) or State (S) Rank of S3 (vulnerable and less sensitive to typical forest management practices), G4 and S4 (apparently secure and uncommon), and G5 and S5 (secure and common), and an Element Occurrence (EO) Rank of A or B (The site is an 'excellent or good' example of the natural community), and;

2. Rare Communities. All natural communities with a Global (G) or State (S) Rank of G1 and S1 (critically imperiled), G2 and S2 (imperiled), and G3 (vulnerable), and S3 (vulnerable and more sensitive to typical forest management practices), with an Element Occurrence (EO) Rank of A, B, C, or D.

There are 635 designated ERAs on 243,919 acres across on all ownerships in the state, with 454 ERAs totaling 116,397 acres located on state forestland and 95 ERAs totaling 72,156 acres on other DNR-managed lands. Precise location and associated data for each ERA is provided in the DNR Geographic Decision Support Environment.

Aside from their ecological values, ERA uses also include socioeconomic uses such as recreation, research and education.

A public and transparent review and approval process to update the network of ERAs will occur every 5 years.

Management Direction

The primary management objectives for ERAs are to identify, assess, preserve and enhance/restore natural ecological conditions and processes.

A thorough inventory of floral and faunal species composition and community structure and the identification of natural ecological processes are a priority in ERAs.

ERAs will generally not be managed for timber harvest. Management activities or prescriptions in Ecological Reference Areas are limited to low impact activities compatible with the defined attributes and values of the community type, except under the following circumstances:

1. Harvesting activities where necessary to restore or recreate conditions to meet the objectives of the ERA, or to mitigate conditions that interfere with achieving the ERA objectives. In this regard, forest management activities (including timber harvest) may be used to create and maintain conditions that emulate an intact, mature forest or other successional phases that may be under-represented in the landscape; and

2. Road building only where it is documented that it will contribute to minimizing the overall environmental impacts within the FMU and will not jeopardize the purpose for which the ERA was designated.

Threats such as fire, natural or exotic pests or pathogens may warrant other management measures.

Management activities may include active maintenance and restoration, or simply allowing natural ecological processes to occur without interference. Active management methods and techniques may include prescribed burns, invasive species control, brush control, planting of native plant species, and other forms of ecological restoration.

Standards:

1. DNR Forest Certification Work Instruction 1.4 - Biodiversity Management on State Forest Lands
2. DNR Forest Certification Work Instruction 3.1 – Forest Operations

Guidelines:

1. Encouraged and allowed to continue the function of natural ecological processes.
2. Where significant disruption to ecological processes has occurred, take corrective action to restore natural processes.
3. Implement programs to eradicate invasive plants and animals which can cause severe disruption to native communities.
4. Use community abstracts developed by the Michigan Natural Features Inventory as additional reference in the identification and management of ERAs.

5.2.3 Natural Rivers

Natural rivers are established under authority of Part 305, Natural Rivers, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. The process for establishing a natural river and the natural river district (land adjacent to the river) includes nomination, development of a management plan, public hearings and action by the DNR director. Each Natural River has a river specific approved management plan and administrative rules.

Natural Rivers preserve, protect and enhance our state's finest river systems for the use and enjoyment of current and future generations. Natural rivers are located on both public and private lands. There are eleven natural rivers that are partially located in the state forest: the Fox and Two Hearted rivers in the Upper Peninsula; and the Au Sable, Betsie, Boardman, Jordan, Pere Marquette, Pigeon, Pine, Rifle and Upper Manistee rivers in the northern Lower Peninsula. The dedicated zoning district of these natural rivers covers 45,049 acres of the state forest.

The maintenance of natural rivers is important for the recreational fishery and recreational boating industries, which are significant economic sectors for many areas of the state.

Management Direction

The primary management objectives for natural rivers are for boating and fishing recreation, fish and wildlife habitat and corridors, and for aesthetic, floodplain and water quality values.

Commercial harvest in the native vegetation buffer (a 10,450 acre subset of the zoning district) is generally prohibited in order to retain trees that provide cover, large woody debris, and aesthetic values. Exceptions for proposed harvest prescriptions should follow the appropriate natural river management plan and associated administrative rules.

Standards:

1. Part 305, Natural Rivers, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, and the administrative rules thereof
2. DNR Policy and Procedure 26.27-03, Natural Rivers, issued July 11, 2005
3. DNR Policy and Procedure 39.21-20, Beaver Management, issued July 11, 2005
4. DNR FRD Policy and Procedure 251, Sale and Removal of Timber, issued March 1, 2000
5. DNR Forest Certification Work Instruction 3.1 – Forest Operations
6. State Natural River Plans.

Guidelines:

1. Recreational related structures should be limited within natural river zones.
2. Use interim Guidelines for Evaluating Riparian Management Zones on state lands (Michigan Department of Natural Resources 2004b).

5.2.4 Critical Dunes

Critical dunes are established under authority of Part 353, Sand Dunes Protection and Management, Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Critical dunes are located upon both public and private lands throughout northern Michigan. There are 15 critical dune areas on state forestlands that provide a total of 9,290 acres of habitat, with additional acres located upon other public and private lands throughout northern Michigan. Many state parks, national lakeshores and coastal areas of the state forest contain exemplary occurrences of sand dunes (parabolic, perched, linear, and traverse dunes). Rare community types include open dunes, wooded dune and swale complexes, sand/gravel beaches, interdunal wetlands, and Great Lakes barrens.

These features are a significant drawing force for many popular forms of recreation and the presence of these features are a considerable factor in many local economies throughout the state.

Management Direction

The primary management objectives for critical dunes are the maintenance of dune ecosystems, the preservation of rare habitats and species, and for low-impact recreation.

Management needs to recognize the ecological factors that are essential to the creation and maintenance of dunes, which include: a presence of abundant sand; strong winds blowing in a relatively consistent direction; water level fluctuation of Great Lakes; and vegetation to accumulate and stabilize sand. Activities that disrupt or destroy any of these factors are undesirable and can threaten the long-term viability of dune ecosystems.

A permit from DEQ is required for developmental (including contour changes), silvicultural, and recreational activities in areas identified as critical dunes. Commercial timber management and non-designated ORV use is not allowed within critical dune areas without a DEQ Permit.

Where resource preservation is compatible with recreational uses, existing programs should be continued and new programs should be implemented to offer these social and economic services to the public.

Standards:

1. Part 353, Sand Dunes Protection and Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, and the administrative rules thereof
2. DNR Forest Certification Work Instruction 1.4 - Biodiversity Management on State Forest Lands
3. DNR Forest Certification Work Instruction 3.1 – Forest Operations

Guidelines:

1. Protect, enhance, and restore rare and imperiled natural communities located within critical dune areas.
2. Design recreational facilities for low-impact use and should blend with the natural character of dune features.
3. Limit access trails and incorporate boardwalks and stairs for traversing areas sensitive to disruption or with high slopes that are prone to erosion.
4. Take positive action to control and direct pedestrian use which can cause severe disruption to natural dune processes.
5. Limit vegetation management in critical dunes to enhancement or restoration work.
6. Where significant disruption to ecological processes has occurred, take corrective action to restore natural processes.
7. Implement programs to eradicate invasive plants and animals which can cause severe disruption of natural dune processes.

5.2.5 Dedicated Habitat Areas

A Dedicated Habitat Area (DHA) identifies a geographic area on the landscape where there is an emphasis on species-specific habitat, with a long-term goal of ensuring that these species are conserved as examples of our state's biodiversity. These include:

1. Habitat areas for threatened or endangered species, such as the Kirtland's warbler and piping plover, in association with species management plans that have been developed in cooperation with the U.S. Fish and Wildlife Service and other federal land managing entities such as the U.S. Forest Service; and
2. Habitat areas for representative species requiring interior core forest habitat (in conformance with the requirements of Indicator 6.4.e for Representative Sample Areas in the Forest Stewardship Council certification standard), including American marten, cerulean warblers, red-shouldered hawks, and northern goshawks.

Species recovery plans have been developed in cooperation with the U.S. Fish and Wildlife Service and with other federal land managing entities such as the U.S. Forest Service, for various threatened and endangered species. The intent is to increase and stabilize the populations of specific species to levels and conditions where threats to their continued existence are satisfactorily mitigated. This is typically done through management of essential habitat.

DHAs (essential habitat) are designated for the Kirtland's Warbler and Piping Plover, both federal- and state-endangered bird species. Essential habitat in the Kirtland's Warbler Management Area in the northern Lower Peninsula Regional State Forest Management Plan, totals 90,700 acres. There are 6 Piping Plover DHAs on state forestland, totaling 8,217 acres.

Nesting areas for other species such as the Bald Eagle and Red-shouldered Hawk are also identified for some areas of the state forest.

There are 35 DHAs on DNR-managed lands for species requiring interior core forest habitat, totaling 114,914 acres (Table 5.4).

Significant economic potential for ecotourism is often present in local communities in the vicinity of dedicated species recovery areas, particularly for endemic species such as the Kirtland's Warbler.

Management Direction

DHA essential habitat areas for Kirtland's warbler and piping plover will be managed in accordance with approved species recovery plans, as prescribed in land use orders of the director. Secondary objectives, such as timber, other commodity production, or recreation access are constrained by limitations and vegetative objectives as specified in the

recovery plan. Forest management and timber harvesting activities (including prescribed fire) may be conducted to maintain, restore or create the composition and structural forest conditions necessary to provide the habitat needs of the specific species, using silvicultural techniques to emulate the frequency and severity of natural disturbance regimes.

DHAs for representative species requiring interior core forest habitat will be managed for timber production, consistent with natural disturbance regimes, and forest composition and structure required for the species of interest, specifically.

1. Areas that also have some other designation (such as an Ecological Reference Area, Natural Area, or Natural River) shall be managed for those purposes following management direction provided in DNR policies, and procedures and plans.
2. For all other areas, forest management and timber harvesting activities (including prescribed fire) should be used to create and maintain the compositional and structural conditions that emulate an intact, mature forest or other successional phases that provide necessary habitat for interior core species.

Specific emphasis is given to minimizing fragmentation of the forest by limiting the size, spatial distribution, and number of forest openings to that characteristic of the natural disturbance regimes associated with the specific forest type. This may be accomplished through the use of temporary access roads, by minimizing the number and size of permanent access roads and trails, and/or by mitigating the impact roads, trails, and pathways through the maintenance of forest canopy closure over such infrastructure.

Standards:

1. Part 365, Endangered Species Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended
2. The Endangered Species Act of 1973, Public Law 93-205, 87 Stat. 884
3. The DNR will cooperate with the U.S. Fish and Wildlife Service and other pertinent public and private organizations in the management of designated critical habitat areas.
4. Land Use Orders of the Director 3.8, 3.9, 3.10 and 4.29
5. DNR Forest Certification Work Instruction 1.4 - Biodiversity Management on State Forest Lands
6. DNR Forest Certification Work Instruction 3.1 – Forest Operations
7. (Draft) Kirtland's Warbler Breeding Range Conservation Plan (Michigan Department of Natural Resources et al. 2014).
8. 2003 Piping Plover Recovery Plan
9. 2006 (Draft) Karner Blue Habitat Conservation Plan
10. 2014 (Draft) Eastern Massasauga Candidate Conservation Agreement with Assurances

Guidelines:

1. Use species abstracts developed by the Michigan Natural Features Inventory as additional reference in the management of dedicated species recovery areas.
2. Follow Forest Certification Green-Up Guidelines (dated July 12, 2006), in the management and regeneration of Kirtland's warbler essential habitat.

5.2.6 Dedicated Management Areas

Dedicated management areas are established through the land use orders of the director for specific purposes. There are currently thirteen dedicated management areas in the state forest (Table 5.5).

The primary uses of these areas include dispersed, nonintrusive recreation, such as hunting, trapping, wildlife viewing, hiking, cross country skiing, and snowshoeing.

These uses also have a positive influence upon the local economies in which they are located. Forest management prescriptions are permissible, within the consideration of all ecological and socioeconomic values and uses. These also make a contribution to local economies in the form of forest products. The primary social economic management

objective for dedicated management areas is to continue to maintain and improve the quality of such resources is for non-motorized, dispersed recreation.

Management Direction

The primary management objective for dedicated management areas is a function of their dedicated purpose as stated in the land use orders of the director. Dedicated and prohibited uses as stated in the specific land use order shall provide the basis of management direction for each area. Management direction shall also be provided by any management plan developed for each specific area.

Standards:

1. DNR Forest Certification Work Instruction 3.1 – Forest Operations
2. DNR Forest Certification Work Instruction 6.2 – Integrating Public Recreational Opportunities with Management on State Forest Lands
3. Sand Lakes Quiet Area Management Plan, dated December 21, 1982
4. Land Use Orders of the Director 3.21, 4.16, 4.19a, 4.20, 4.24 and 4.25

Guidelines:

1. Use permissions and limitations contained in approved management plans to guide management activities within dedicated management areas.

5.2.7 Coastal Environmental Areas

Coastal environmental areas (CEAs) have been established under authority of Part 323, Shorelands Protection and Management, Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. CEAs are located upon both public and private lands throughout the state. There are 33 dedicated CEAs upon the state forest that total approximately 1,280 acres, concentrated in Alpena, Mackinac, Chippewa, Delta and Baraga counties.

Preservation of coastal marshes within CEAs is important for the protection and maintenance of habitat for reptiles and amphibians, critical fisheries spawning and refuge habitat, as well as providing habitat for migratory and non-migratory bird species. Studies and surveys conducted by the DNR and others have recorded over 25 fish species, 12 mammal species, and 131 bird species using these valuable coastal habitats. In addition, typically unseen and overlooked species which are equally essential for maintaining healthy fish and wildlife populations are also provided protection under this coastal designation. Many EAs contain rare Great Lakes marshes, but other important habitats such as upland ridges and islands are also included.

The maintenance of viable populations of fish and bird species are important for the recreational and commercial fishery and recreational hunting industries, and for migratory bird watching, which are significant economic sectors for these and many other areas of the state.

Management Direction

The primary management objective for CEAs is for fisheries and migratory bird habitat and for ecological values in compliance with the statute and promulgated administrative rules.

Standards:

1. Part 323, Shorelands Protection and Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, and the administrative rules thereof
2. Fisheries Division Policies and Procedures 02.01.006 Shoreline Modification; Coastal Wetland Protection
3. DNR Forest Certification Work Instruction 1.4 – Biodiversity Management on State Forest Lands
4. DNR Forest Certification Work Instruction 3.1 – Forest Operations

5. A permit from the Michigan Department of Environmental Quality is required for dredging, filling, grading, other alterations of the soil, alterations of the natural drainage, alteration of vegetation used by fish or wildlife, or both, including timber harvest in identified colonial bird nesting areas and the placement of permanent structures in EAs. Activities which do not require a permit include maintenance of existing dikes, and timber harvest if outside a colonial bird nesting area.
6. Commercial timber management will not occur within EAs.

Guidelines:

1. Where significant disruption to ecological processes has occurred, take corrective action to restore natural processes.
2. Implement programs to eradicate invasive plants and animals in CEAs, which can cause severe disruption of coastal wetland ecology.
3. Design recreational facilities for low-impact use and blend them with the natural character of the shoreline.
4. Limit access trails and incorporate boardwalks for traversing areas sensitive to disruption.

Table 5.3. Legally-dedicated natural areas in the state forest (in acres; DNR data).

Site name	Type of area	Recognition	Mgmt. unit	County	Acres
Bois Blanc Island—mixed forest	natural area	LD	Gaylord	Mackinac	993
Bois Blanc Island—Snake Island/Mud Lake	natural area and TNC natural area registry	LD TNC	Gaylord	Mackinac	272
Bois Blanc Island—north shore	natural area	LD	Gaylord	Mackinac	833
Carney Fen	natural area	LD	Escanaba	Menominee	3,510
Little Brevort Lake Scenic Site	natural area	LD	Sault Ste. Marie	Mackinac	736
Roscommon Red Pines Nature Study Area	natural area and national natural landmark	LD NNL	Roscommon	Roscommon	159
				Total acres:	6,503

Table 5.4.Dedicated Habitat Areas in the state forest for species requiring interior core forest habitat (in acres; DNR data).

Name	Forest Type	Region	Management Unit	Acres
Betsie River	Lowland Mixed Forest	NLP	Traverse City FMU	1,052
Cathead Bay	Upland Deciduous Forest	NLP	Cadillac PMU	742
Craig Lakes	Upland Deciduous Forest	WUP	Western Upper Peninsula PMU	257
Deadstream Swamp	Lowland Coniferous Forest	NLP	Roscommon FMU	1,291
Dollar Lake	Upland Deciduous Forest	EUP	Sault Ste. Marie FMU	1,413
Fourth Lake	Upland Deciduous Forest	EUP	Sault Ste. Marie FMU	2,170
Gogomain Swamp	Lowland Coniferous Forest	EUP	Sault Ste. Marie FMU	4,322
Grass Lake	Lowland Coniferous Forest	NLP	Traverse City FMU	957
Green Swamp	Lowland Coniferous Forest	NLP	Atlanta & Pigeon River Country FMUs	3,713
Grindstone Creek	Upland Deciduous Forest	NLP	Pigeon River Country FMU	447
Groveland Mine	Upland Mixed Forest	WUP	Crystal Falls FMU	341
Hughes Swamp	Lowland Mixed Forest	SLP	Southwestern LP WMU	1,703
Jordan River Valley	Upland Deciduous Forest	NLP	Gaylord FMU	3,410
Keweenaw Point	Upland Mixed Forest	WUP	Baraga FMU	757
Le Vasseur Creek	Lowland Coniferous Forest	WUP	Gwinn FMU	666
Lighthouse Point	Upland Mixed Forest	NLP	Gaylord FMU	1,935
Little Presque Isle	Upland Mixed & Deciduous Forest	WUP	Gwinn FMU	3,118
Lost Lake	Upland Mixed Forest	WUP	Crystal Falls FMU	558
Minnehaha Swamp	Lowland Coniferous Forest	NLP	Gaylord FMU	969
North Summer Island	Upland Deciduous Forest	EUP	Shingleton FMU	1,340
Platte Lake	Lowland Coniferous Forest	NLP	Traverse City FMU	1,025
Porcupine Mountains	Upland Deciduous Forest	WUP	Western Upper Peninsula PMU	49,225
Pretty Lakes	Upland Mixed Forest	EUP	Newberry FMU	2,245
Sand Lakes	Upland Mixed Forest	NLP	Traverse City FMU	2,992
Simmons Woods	Upland Mixed Forest	EUP	Sault Ste. Marie FMU	9,919
Skegemog Swamp	Lowland Coniferous Forest	NLP	Traverse City FMU	1,242
Skidmore Branch	Lowland Coniferous Forest	WUP	Escanaba FMU	1,830
Solon Swamp	Lowland Coniferous Forest	NLP	Traverse City FMU	1,517
Sturgeon Bay	Upland Mixed Forest	NLP	Gaylord PMU & Gaylord FMU	2,713
Summer Meadow Creek	Lowland Mixed Forest	WUP	Gwinn FMU	4,444
Tahquamenon River	Upland Deciduous Forest	EUP	Eastern Upper Peninsula PMU	2,433
Thomas Lake	Upland Deciduous Forest	WUP	Gwinn FMU	892
Tin Shanty Hardwoods	Upland Mixed & Deciduous Forest	NLP	Pigeon River Country FMU	1,859
Two-Hearted River	Lowland Mixed Forest	EUP	Newberry FMU	723
Werners Creek	Lowland Deciduous Forest	WUP	Gwinn FMU	697
			WUP Region Sub-Total	**62,783**
FMU=Forest Management Unit PMU=Park Management Unit WMU=Wildlife Management Unit			**EUP Region Sub-Total**	**24,564**
			NLP Region Sub-Total	**25,863**
			SLP Region Sub-Total	**1,703**
			GRAND TOTAL	**114,914**

Table 5.5.Dedicated management areas in the state forest (in acres; DNR data).

Area	Forest management unit	Land use order	Acreage
Baraga Plains Waterfowl Management Area	Baraga	3.21	2,503
DeWard Tract	Traverse City, Gaylord, and Grayling	4.9	4,441
Gladwin Field Trial Area	Gladwin	4.19a	4,749
Green Timber Management Unit	Pigeon River Country	4.34	6,258
Jordan River Valley	Gaylord	4.8	21,304
Kawkawlin Creek Flooding	Gladwin	4.32	2,742
Lame Duck Foot Access Area	Gladwin	4.20	13,818
Little Presque Isle Property	Gwinn	4.30	3,134
Mason Tract	Grayling	4.16	4,353
Munuscong Wildlife Area	Sault Ste. Marie	4.14	14,700
Sand Lakes Quiet Area	Traverse City	4.25	2,996
Simmons Woods	Sault Ste. Marie	4.28	10,352
Skegemog Lake Wildlife Area	Traverse City	4.24	2,421
		Total acres:	93,771