

Chapter IV

Forest Management Direction



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Forest Management Direction

Chapter IV contains:

- Forestwide goals, objectives and direction
- Management area descriptions, direction, standards and guidelines
- A schedule of activities to be achieved by management area during the first plan period

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Introduction

Management direction contains both Forestwide and management area direction.

Each management area contributes to the achievement of the desired future condition of the Forest.

The mix of management areas, with different long-term desired conditions constitutes a major portion of this Forestwide management direction.

In aggregate, the mix and arrangement of management areas and the schedule of activities by management area will provide an appropriate level of outputs and services in an efficient manner.

Forestwide direction consists of goals, objectives and standards and guidelines which are applicable to the entire Forest. Management area direction consists of the objectives, the associated management practices, and standards and guidelines specific to individual areas of the Forest. The Forest Plan Management Area Map, which displays the location of each management area, is also part of the management direction. It can be found in the map folder accompanying the Final EIS and Forest Plan.

Forestwide Management Goals Specific to Management Problems

Forestwide management goals respond to the five major management problems on the Ottawa National Forest.

- Problem 1 - Transportation
- Problem 2 - Wildlife
- Problem 3 - Landownership
- Problem 4 - Vegetation
- Problem 5 - Wilderness

The goals are listed below along with the problem(s) that they respond to.

Goal Statement - Provide a high degree of biological and physical variety and long-term flexibility to minimize risk and uncertainty about the future while satisfying near-term objectives.

Responds to Problems 1, 2, 4, and 5.

Goal Statement - Maintain a mix of forest conditions over time to provide a diverse mix of timber products, habitats for wildlife species, and settings for a variety of recreation opportunities.

Responds to Problems 1, 2, 4, and 5.

Goal Statement - Provide a variety of vegetative community types by maintaining a mix of cover types of different age classes, to create a variety of habitat conditions for game and nongame species of wildlife and to provide for the long-term production of a mix of timber products approaching the demand level.

Responds to Problems 2 and 4.

Goal Statement - Manage the northern hardwood type with a mixture of uneven-aged and even-aged management to provide a variety of northern hardwood vegetative communities (species, size structure, age class) which produce a full range of wildlife and recreation benefits and a variety of timber products. Emphasize uneven-aged management Forestwide with particular emphasis in areas of high visual resource sensitivity, areas managed for semiprimitive recreation opportunities, and for production of high quality hardwood sawtimber and veneer. Provide for even-aged management to increase mid-tolerant hardwood species on suitable sites.

Responds to Problems 2 and 4.

Goal Statement - Maintain a moderate to high amount of aspen type to provide a sustained level of habitat for white-tailed deer and ruffed grouse and to supply a sustained level of aspen timber products which approaches the amount demanded.

Responds to Problems 2 and 4.

Goal Statement - Provide an adequate amount of coniferous thermal cover for white-tailed deer and other wildlife species such as blackburnian warbler that require this important habitat component.

Responds to Problems 2 and 4.

Goal Statement - Coordinate the location and schedule of vegetative management practices to provide for increased wildlife-based recreation benefits and assure a steady flow of timber products to market.

Responds to Problems 2 and 4.

Goal Statement - Emphasize natural reforestation practices to reduce cost, improve species diversity, and provide for a more natural appearance of the landscape.

Responds to Problems 2 and 4.

Goal Statement - Provide for limited use of chemicals for vegetation management purposes where it is the most cost effective method and potential adverse impacts can be mitigated.

Responds to Problems 2 and 4.

Goal Statement - Provide an economically efficient transportation system by providing an amount of road and mix of road standards that serve a variety of uses for which the values produced (market and nonmarket) over time are in excess of the cost.

Responds to Problem 1.

Goal Statement - Provide, in the long-term, a network of roads that will minimize the total amount of road needed through transportation planning conducted within an integrated resource management process.

Responds to Problem 1.

Goal Statement - Provide for construction of roads that favor a mix of road standards, emphasizing lower standard roads and application of traffic management strategies to minimize operation and maintenance cost. Emphasize higher standard roads on areas of the Forest where season of woods operations is longer and the cost of road construction is low relative to the standard of road. Emphasize lower standard roads in areas of the Forest where the season of woods operation is short, where road costs are high, where recreation uses would be greatly enhanced, and in areas managed for semiprimitive recreation opportunities.

Responds to Problem 1.

Goal Statement - Provide intermittent access to semiprimitive areas; use low road densities and lower road standards; close roads when not being used for removal of forest products or administrative purposes.

Responds to Problem 1.

Goal Statement - Provide for a variety of recreation opportunities, by meeting a range of ROS class conditions. Emphasize roaded natural ROS class while providing moderate amounts of semiprimitive motorized and semiprimitive nonmotorized ROS classes. The mix of ROS classes should meet expected demand for a variety of dispersed and developed recreation activities and also provide habitat for a variety of wildlife species including those that require remoteness such as the gray wolf, barred owl, and black bear.

Responds to Problems 1 and 2.

Goal Statement - Provide for an appropriate amount and location of potential wilderness by recommending Sturgeon Gorge Roadless Area for wilderness designation and the Sylvania and Cyrus H. McCormick Experimental Forest roadless areas for wilderness study.

Responds to Problem 5.

Goal Statement - Manage temporary openings to create conditions that produce favorable benefits to wildlife, recreation, and timber production while meeting visual quality objectives compatible with the sensitivity of use areas, travel routes and water bodies.

Responds to Problems 2 and 4.

Goal Statement - Establish a landownership adjustment program and policy for the Forest where the long-term landownership goal is to consolidate National Forest System lands.

Responds to Problem 3.

Goal Statement - Establish a more efficient landownership pattern by exchanging uneconomical, isolated tracts of National Forest System land for tracts that are adjacent to existing National Forest System lands.

Responds to Problem 3.

Goal Statement - Provide for land exchanges to assist in the development and expansion of local communities.

Responds to Problem 3.

Forestwide Objectives to Respond to Management Problems

The following objectives represent the Forest Plan's response to Forestwide management problems. These objectives are the quantifiable means of carrying out the goal statements listed above.

Objective - Maintain a moderate to high acreage of aspen type and thermal cover in areas of the Forest with the greatest potential for improving habitat for deer and grouse, and increasing wildlife-based recreation. Increase the long-rotation conifer component at a very modest rate. Regenerate swamp conifer and hemlock types at a very modest rate. Provide moderate to high amounts of hardwood sawtimber and aspen products.

Measure	Quantity (thousands of acres)	
Suitable aspen acreage	138	
Thermal cover acreage 1/	150	
	(million cubic feet per year)	(million board feet per year)
Average annual timber production (First time period)		
Aspen products	4.1	26.0
Hardwood sawtimber	1.8	9.7
Total timber	13.1	78.0

1/ Includes productive forest cover types of swamp conifer, hemlock, balsam fir and jack pine.

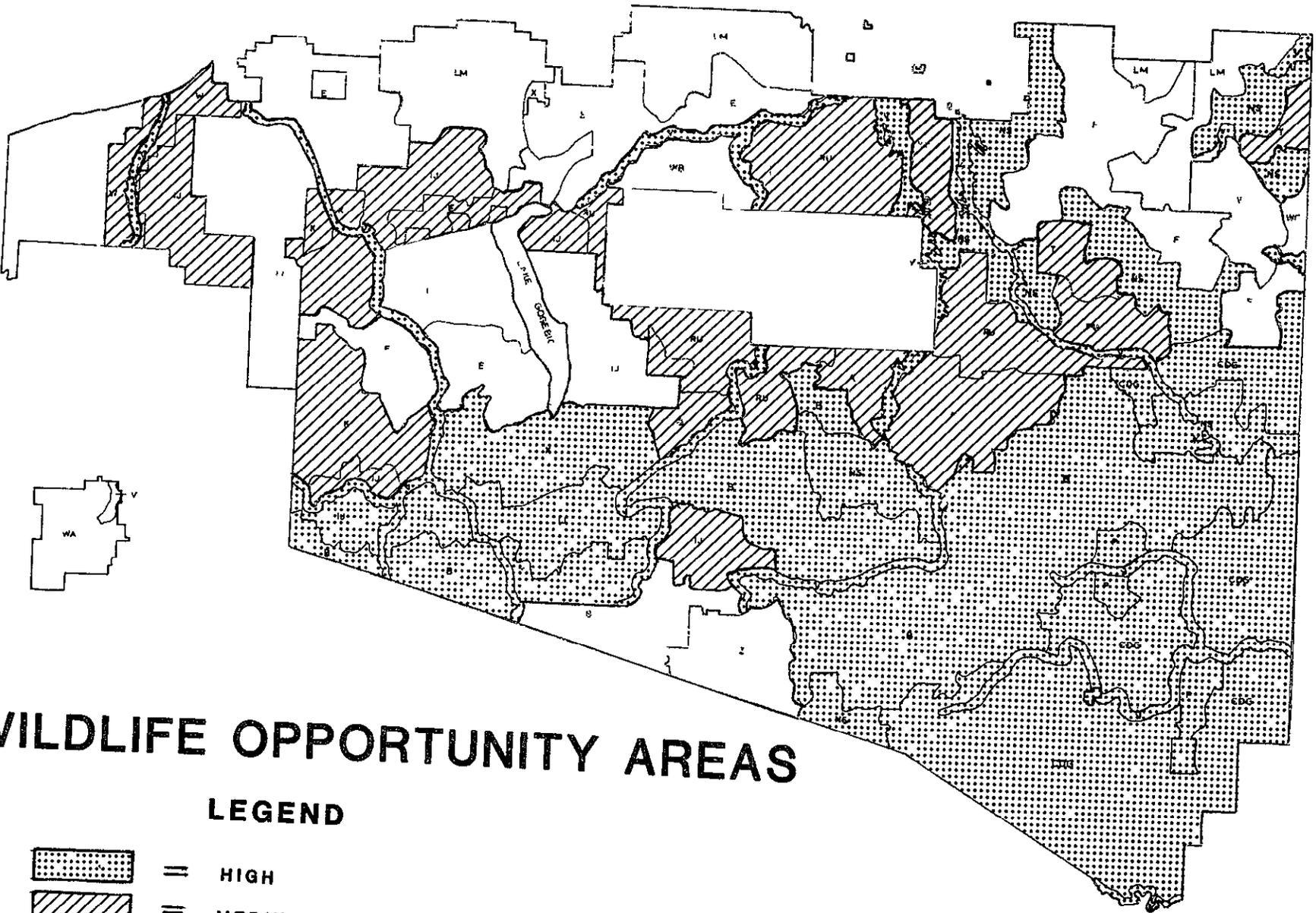
Objective - Manage northern hardwoods to provide a mix of uneven-aged and even-aged conditions. Uneven-aged management of hardwoods is emphasized Forestwide with particular emphasis in semiprimitive areas and areas of high visual resource sensitivity and for the production of high quality hardwood sawtimber and veneer. Even-aged management of hardwoods and intensive even-aged silvicultural practices on selected sites are to be carried out to maintain or increase diversity of tree species and to provide a broad diversity of wildlife habitat within areas of the Forest with the greatest potential to maintain mid-tolerant trees.

Measure	Quantity (thousands of acres)	Percent of Type
Suitable uneven-aged hardwood management acreage	165	60
Suitable even-aged hardwood management acreage	113	40

Objective - Emphasize aspen and conifer cover in high and medium wildlife opportunity areas. Emphasize management practices to enhance wildlife habitat on high and medium wildlife opportunity areas.

Measure	Quantity (acres of regeneration/year)
Average annual acreage of aspen regeneration by wildlife opportunity area (First time period)	
High opportunity areas	1,660
Medium opportunity areas	962

FIGURE 4.1



WILDLIFE OPPORTUNITY AREAS

LEGEND

-  HIGH
-  MEDIUM
-  LOW

Figure 4.1 delineates wildlife opportunity areas of the Forest which represent different levels of potential benefits in response to management practices which enhance wildlife habitat and wildlife-based recreation, particularly those associated with deer and grouse. The ratings of high, medium, and low are based on the relative benefits provided from management practices. Ratings are based on:

- Habitat/suitability.
- Ease of expansion and maintenance of a desired condition.
- Suitable climatic factors (mostly snowfall).
- Historic recreation use.
- Proximity to local population centers.

Objective - Emphasize natural regeneration. Reduce the amount of artificial reforestation from recent levels. Reduce the amount of chemical use from recent levels.

Measure	Quantity (acres of treatment/year)
Average annual acreage of natural reforestation with site preparation (First time period)	3,800
Average annual acreage of natural reforestation without site preparation (First time period)	5,540
Average annual acreage of artificial reforestation (First time period)	530
Average annual acreage of conifer release (First time period)	750
Average annual acreage of conversion to spruce, red and white pine (First time period)	300

Objective - Emphasize the roaded natural ROS class. Provide a modest amount of semiprimitive motorized and semiprimitive nonmotorized recreation opportunities. Emphasize low standard roads Forestwide and apply traffic management strategies to minimize operation and maintenance costs. Maintain low road densities in semiprimitive areas.

Measure	Quantity
	(thousands of acres)
ROS Class	
Roaded natural	711
Semiprimitive motorized	51
Semiprimitive nonmotorized	164
	(Miles per year)
Average miles per year of local road construction by standard (First time period)	
Winter only	12
Winter/summer-dry	10
Summer normal	8
Total	30

Objective - Recommend Sturgeon Gorge for wilderness designation and Sylvania and Cyrus H. McCormick Experimental Forest for wilderness study.

Measure	Quantity
	(acres)
Recommended wilderness designation and wilderness study acreage	50,026

Objective - Increase the acreage of temporary opening while meeting visual quality objectives, with emphasis on aspen, balsam fir and jack pine clearcutting and even-aged hardwood management.

Measure	Quantity
	(average acres per year)
Temporary openings (First time period)	
Clearcuts	4,860
Other (seed/removal)	1,470
Total	6,330

Objective - Increase the acreage of permanent upland openings while meeting visual quality objectives with emphasis on northern hardwood management.

Measure	Quantity
	(average acres per year)
Permanent upland openings (First time period)	300

Forestwide Management Goals and Direction for Resource Programs

The following goals, arranged by resource area, provide additional management direction. These goals are needed to support the goals and objectives that respond to specific management problems. (For more specific resource management direction, see Forest standards and guidelines.)

Range (2200) Encourage use of the forage resource. Treat individual requests for grazing on a case-by-case basis.

Cultural Resources (2300) Identify, evaluate, and protect significant historic and prehistoric sites on National Forest lands to preserve for future generations significant historic and scientific resources.

Complete cultural resource inventories of all Ottawa National Forest lands by the year 2010.

Work closely with the Michigan State Historical Preservation Officer under the U.S. Secretary of the Interior's most recent standards and guidelines for archaeology and historic preservation. Coordinate with the State Historic Preservation Plan when developed.

Recreation (2300) Encourage and promote cooperation with local governments, Michigan Department of Natural Resources, private enterprise, and user groups in the development and management of recreation facilities and opportunities.

Provide opportunities and conditions that will minimize motorized and nonmotorized recreation user conflicts.

Protect and enhance scenic values, especially those adjacent to travel corridors, recreation use areas, and water bodies, by meeting visual quality objectives.

Protect the existing quality and characteristics of Wild/Scenic Inventory Rivers until they are studied.

Provide for an appropriate amount of wilderness and/or wilderness study.

Timber (2400) Provide a nondeclining, sustained yield of timber.

Provide for a long-term mix of species and products with emphasis on hardwood products.

Manage the vegetation of the Forest to meet integrated resource management objectives consistent with land capabilities.

Provide a mix of timber sale sizes and species/products which are consistent with the range of purchaser demands and are economically efficient to prepare and administer.

Manage the vegetation and associated resources of the Forest at a level of intensity consistent with demand and in a manner that is economically efficient.

Emphasize vegetation management practices in areas of the Forest that are most economically efficient to manage due to existing access, lower cost of practices, or higher benefit values produced.

Reduce risk of insect and disease outbreaks through application of integrated pest management principles.

Provide for firewood gathering on National Forest lands.

Soil, Water
and Air
(2500)

Minimize detrimental soil disturbance and erosion.

Maintain soil productivity.

Design management activities to minimize impacts on water quality and other riparian values.

Manage riparian areas to give preferential consideration to riparian-dependent resources. Cumulative effects of management practices will not adversely impact water quality.

Continue to cooperate with other government resource management agencies in a unified resource protection effort.

Wildlife (2600)

Protect and enhance habitat for endangered and threatened, and sensitive plant and wildlife species.

Continue to cooperate with the Michigan Department of Natural Resources when planning and implementing wildlife projects.

Provide vegetative diversity that will support viable populations of existing native mammals, birds, reptiles, and amphibians.

Manage white-tailed deer and ruffed grouse habitat at an intensity that will support favorable hunting populations, with emphasis placed in areas of greatest opportunity.

Emphasize natural vegetative conditions through integrated vegetation management over structural habitat improvement or direct habitat improvement.

Accomplish habitat management objectives to the extent possible through commercial timber sales.

Encourage and promote cooperation with local governments, private enterprise, sportsmen's clubs, and other user groups to plan and develop wildlife habitat opportunities such as wetlands.

Fisheries
(2600)

Provide habitat to maintain viable populations of native and desired non-native fish species.

First priority will be given to improving the quality of fishing in lakes with recreation developments and on top-quality trout streams. Other lakes with high fisheries potential may be managed to provide quality fishing.

Coordinate fisheries management projects with the Michigan Department of Natural Resources.

Encourage and promote cooperation with local governments, private enterprise, sportsmen's clubs, and other user groups to plan and develop fish habitat and other related projects.

Minerals &
Geology (2800)

Minimize capital investments within areas that have a high potential for mineral development.

Provide for adequate exploration access to ensure that most of the important deposits can be discovered and inventoried. Operating plans (exploration, development, and extraction) will be evaluated on a case-by-case basis and approved as appropriate.

Research
Natural Areas
(4000)

Manage the existing (McCormick) and proposed (Sturgeon River and Sylvania) research natural areas (RNAs) in accordance with the standards and guidelines in the Forest Plan to maintain the natural conditions.

Continue to locate candidate RNAs with emphasis on the under-represented SAF cover types and significant aquatic, geological, or other biotic areas.

Coordinate the effort to locate new RNAs with the Forest's Ecological Classification System inventory.

Land
Adjustment
(5400)

Purchase or exchange land or interest in lands to significantly reduce landline survey and other administrative maintenance costs, meet increased demands for Forest resources, and comply with public laws and regulations.

Facilities
(7300)

Maintain facilities to protect health and safety of the public.

Reestablish and monument all Forest property corners and landlines by the year 2050.

Transportation
System (7700)

Maintain a system of arterial, collector, and local roads in coordination with other governmental agencies to provide safe and efficient access for land management and the public benefit.

Develop transportation facilities consistent with the integrated resource management objectives of the management area.

Schedule of Forestwide Outputs, Practices, and Conditions

The following tables summarize the outputs, practices and conditions that will be provided to accomplish the management goals of the Forest Plan described in the previous section.

Table 4.1
 Forestwide Vegetative Composition After 20, 50, and 150 Years by Suitable and
 Unsuitable Forest Land 1/

Vegetative Type	Existing	Year from Now		
		20	50	150
(thousands of acres)				
<u>Total Acres</u>				
Northern hardwoods	423	422	424	422
Aspen and paper birch	186	183	162	162
Spruce - red and white pine	58	67	71	73
Balsam fir and jack pine	84	81	96	96
Hemlock	28	28	28	28
Swamp conifer	57	55	55	55
Other 3/	90	90	90	90
Total	926	926	926	926

Total Suitable Forest Acres

Even-aged management hardwoods	114	113	115	113
Uneven-aged management hardwoods	165	165	165	165
Aspen and paper birch	162	158	138	138
Spruce - red and white pine	47	57	60	62
Balsam fir and jack pine	43	40	55	55
Hemlock	14	14	14	14
Swamp conifer	17	15	15	15
Total	562	562	562	562

Total Unsuitable Forest Acres 2/

Northern hardwoods	144	144		
Aspen and paper birch	24	24		
Spruce - red and white pine	11	11		
Balsam fir and jack pine	41	41		
Hemlock	14	14		
Swamp conifer	40	40		
Other 3/	90	90		
Total	364	364		

1/ Refer to Forest Plan Table B.1, Chapter VI B-4, and EIS Glossary, Chapter VII.

2/ Acreage of unsuitable acres by vegetative type may change through time due to natural succession. However, a projection of these changes has not been made.

3/ Other lands include water, nonforest land, and Forest land which is unsuitable due to inadequate information.

Table 4.2
 Forestwide Acreage Assigned to Management Prescriptions

Management Prescriptions	Total Acreage (thousands of acres)	Unsuitable Acreage (thousands of acres)	4/
1.1	69.3 2/	19.6	
2.1	359.7 2/	109.5	
3.1	56.0 2/	13.5	
3.2	141.3 2/	44.4	
4.1	62.6 2/	23.6	
4.2	13.7 2/	3.5	
5.1			
6.1	60.9 2/	21.7	
6.2	50.7 2/	16.8	
7.1	0.9 2/	0.5	
8.2	2.7	2.7	
9.1	50.0 1/	50.0	
9.2	52.4 3/	52.4	
9.3	5.8	5.8	
Total	926.0	364.0	

- 1/ Includes research natural area of 3,600 acres in the Cyrus H. McCormick Experimental Forest which would be maintained as an RNA and the proposed Sturgeon Gorge and Sylvania RNAs.
- 2/ Includes scattered acreage of not suited forest land.
- 3/ Does not include Yellow Dog and Sturgeon River corridors in the McCormick and Sturgeon Gorge roadless areas.
- 4/ Unsuitable acreage includes forest land that is not suited for timber production in addition to the acreage of water and nonforested land. Refer to Forest Plan, Appendix B, Timber Resource Land Suitability.

Table 4.3
 Forestwide Acres of ROS Classes

ROS Class	Acreage (thousands of acres)
Roaded natural	711
Semiprimitive motorized	51
Semiprimitive nonmotorized	164 1/

1/ Includes 50,026 acres of recommended wilderness designation and wilderness study.

Table 4.4
 Forestwide Wildlife and Fishing Recreation Visitor Days Capacity

Recreation Type	Time Period		Capacity (thousand RVDs per year)
Wildlife recreation	Planned	1	109
	Projected	2	110
		3	110
		4	110
		5	110
Fishing recreation	Planned	1	126
	Projected	2	147
		3	165
		4	182
		5	191

Table 4.5
 Forestwide Capacity of Recreation Visitor Days by Dispersed and Developed Types and
 ROS Class

<u>Recreation Type/ROS Class</u>	<u>Time Period</u>		<u>Capacity</u> (thousand RVDs per year)
Dispersed/Roaded natural	Planned	1	1,490
	Projected	2	1,490
	Projected	3	1,490
	Projected	4	1,490
	Projected	5	1,490
Developed Recreation	Planned	1	250
	Projected	2	281
	Projected	3	322
	Projected	4	351
	Projected	5	388
Dispersed/Semiprimitive motorized	Planned	1	29
	Projected	2	29
	Projected	3	29
	Projected	4	29
	Projected	5	29
Dispersed/Semiprimitive nonmotorized 1/	Planned	1	42
	Projected	2	42
	Projected	3	42
	Projected	4	42
	Projected	5	42
Wilderness	Planned	1	18
	Projected	2	18
	Projected	3	18
	Projected	4	18
	Projected	5	18

1/ Does not include wilderness RVDs.

Table 4.6
 Average Annual Timber Sale Program by Species Product Group
 Average Annual Yield by Decade 1/

Species/Product	Time Period	Average Annual Yield				
		1	2	3	4	5
		(thousand cubic feet)				
	Current 2/	Planned	Projected			
Hardwood sawtimber	1,482	1,800	2,410	4,135	4,980	6,190
Hardwood pulpwood	1,743	4,270	7,390	6,485	6,960	2,770
Aspen products	2,891	4,100	4,590	5,405	5,895	6,500
Softwood sawtimber	926	1,555	2,645	4,470	5,920	8,070
Softwood pulpwood	2,209	1,375	1,955	1,780	2,060	2,290
Total all products	9,251	13,100	18,990	22,275	25,810	25,820

1/ Total average annual yield of product from all vegetative types combined.

2/ Current level is based on average annual volume sold over the period 1980-1984.

Table 4.7
Forestwide Summary of Management Practices by Vegetative Type

Practice	Unit of Measure (average annual)	Current	Time Period				
		Level 8/ Planned	1	2	3	4	5
				Projected			
Harvest 1/							
Clearcut							
Aspen-paper birch	Acres	3,015	3,280	3,090	3,390	3,600	4,660
Balsam fir-jack pine	Acres	1,618	1,000	960	700	910	800
Spruce - red & white pine	Acres	32	100	150	200	315	1,040
Northern hardwoods 2/	Acres	<u>152</u>	<u>480</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>
TOTAL Clearcut	Acres	4,817	4,860	4,300	4,390	4,925	6,600
Shelterwood Seed Cut							
Northern hardwoods	Acres	197	690	500	500	500	500
Hemlock	Acres	67	90	110	140	180	180
Swamp conifer 3/	Acres	88	30	40	50	80	400
Balsam fir-jack pine	Acres	-	300	300	200	800	600
Spruce-red & white pine	Acres	<u>-</u>	<u>00</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>
TOTAL Shelterwood seed cut		350	1,210	1,050	990	1,660	1,780
Shelterwood Removal Cut							
Northern hardwoods	Acres	-	100	690	500	500	500
Hemlock	Acres	-	50	90	110	140	180
Swamp conifer	Acres	15	30	30	40	50	80
Balsam fir-jack pine	Acres	-	30	300	300	200	800
Spruce-red & white pine	Acres	<u>-</u>	<u>50</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>
TOTAL Shelterwood removal cut	Acres	15	260	1,210	1,050	990	1,660
Shelterwood - Other 4/							
Aspen-paper birch	Acres	76	50	250	80	600	50
Balsam fir-jack pine	Acres	<u>60</u>	<u>30</u>	<u>30</u>	<u>30</u>	<u>30</u>	<u>30</u>
TOTAL Shelterwood-other	Acres	136	80	280	110	630	80
Selection							
Northern hardwoods	Acres	1,424	3,800	7,000	8,000	7,800	8,000
Commercial Thinning							
Northern hardwoods	Acres	4,365	1,960	2,330	1,720	3,520	1,540
Spruce-red & white pine	Acres	<u>1,025</u>	<u>940</u>	<u>1,000</u>	<u>870</u>	<u>880</u>	<u>1,880</u>
TOTAL Commercial thinning		5,390	2,900	3,330	2,590	4,400	3,420
TOTAL All harvest	Acres	12,132	13,110	17,160	17,130	20,405	21,540
Reforestation 5/							
Artificial							
Hemlock	Acres	0	30	30	30	30	30
Spruce - red & white pine	Acres	855	400	500	300	340	1,040
Balsam fir-jack pine	Acres	<u>105</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>150</u>	<u>140</u>
TOTAL Artificial reforestation	Acres	960	530	630	430	520	1,180

Table 4.7 (continued)

Practice	Unit of Measure (average annual)	Current Level 8/	Time Period				
			1 Planned	2	3 Projected	4	5
<u>Reforestation (continued)</u>							
Natural (With Site Preparation) 6/							
Aspen-paper birch	Acres	2,330	2,300	2,100	2,300	2,500	3,200
Balsam fir-jack pine	Acres	310	620	600	500	1,000	800
Spruce-red & white pine	Acres	30	100	100	100	100	100
Hemlock	Acres	20	90	110	140	180	180
Swamp conifer	Acres	10	-	-	-	-	-
Northern hardwoods	Acres	100	690	430	300	300	300
TOTAL Natural reforestation with site preparation	Acres	2,800	3,800	3,340	3,340	3,780	4,580
<u>Precommercial Thinning 5/</u>							
Northern hardwoods	Acres	1,750	150	150	150	150	150
<u>Release 5/</u>							
Northern hardwoods	Acres	190	150	150	150	150	150
Spruce - red & white pine	Acres	1,120	750	500	300	300	780
TOTAL Release	Acres	1,310	900	650	450	450	930
<u>Local Road Construction 7/</u>							
Winter only	Miles	-	12	17	12	5	2
Winter/dry summer	Miles	-	10	16	8	4	2
Summer normal	Miles	-	8	13	7	4	1
TOTAL Local road construction	Miles	41.2 9/	30	46	27	13	5

1/ Harvest acreages are in terms of existing vegetative types.

2/ Hardwood clearcuts are planned for conversion to aspen or conifers.

3/ Includes minor acreages of strip and patch clearcutting.

4/ Removal of overstory from existing established regeneration.

5/ Reforestation, precommercial thinning, and release are in terms of regenerated vegetative types.

6/ Does not include acres of natural regeneration where no site preparation activity is needed or planned. Approximately 5,450 acres per year will be regenerated naturally without site preparation in the first time period including that accomplished by 3,800 acres of hardwood selection cutting.

7/ Planned local road construction includes new construction on new road locations and construction on existing old road locations which were not included as "existing roads" in the planning/analysis data base. An estimated 60 to 90 percent of local road construction will be constructed on existing old road locations.

8/ Current level is based on the average annual acreage of the practice over the period 1980-1984.

9/ Current level of road construction is based on MAR accomplishments for road construction with public works or purchaser credit funds over the period 1981-1984. No breakdown by standard was available.

Table 4.8
 Forestwide Summary of Resource Program Outputs

Resource Program	Unit of Measure (average annual)	1 Planned	Time Period			
			2	3	4	5
			Projected			
Arterial & collector road reconstruction	Miles	10	14	10	4	4
Bridge & major culvert reconstruction or replacement	Projects	1	1	1	1	1
Property boundary location	Miles	50	50	50	50	50
Land exchange	Acres	3,000	1,000	1,000	1,000	1,000
Rights-of-way	ROWs	1-2	1-2	1-2	0-1	0-1
Wild/Scenic inventory river studies	Studies	1	1	-	-	-
Dam inspection and reconstruction	Projects	3	3	3	3	3
Cultural resource evaluation and assessment	Acres	40,000	40,000	-	-	-
Facilities construction/reconstruction	Projects	1-2	1.0	1.0	1.0	1.0
Trails (construction/relocation)	Miles	40 1/	40 1/	-	-	-

1/ Emphasizes completion of the North Country National Scenic Trail.

Forestwide Standards and Guidelines

The Forestwide standards and guidelines are the management direction that guide the implementation of management practices anywhere on the Forest. They state the bounds or rules within which those practices will be carried out to achieve the planned objectives and requirements in all management areas.

Forest standards and guidelines are presented in three sections: (1) applicable to all management areas, (2) applicable to vegetation management practices, and (3) for specific management prescriptions. To properly use this package, it is necessary to become familiar with each of these sections and their interrelationships. For an individual project, key elements of that project should lead the user to pertinent subject headings. However, this package is not intended to serve as a manager's "cookbook." The user will have to integrate standards and guidelines from each of these sections into project development.

These standards and guidelines were not designed to replace professional judgment and common sense. They represent rules which, on average, satisfy the intent of the direction statements. Adjustments to these standards and guidelines may be needed to better fit the particular case or place on the Forest.

All standards and guidelines within this document appear in the following format:

- Left column - Subject Headings. The numbers preceding the resource titles correspond to the chapter numbers in the Forest Service Manual.
- Text at left margin - General Direction. These statements give the general direction on the management of resources.
- Indented text - Standards and Guidelines. These statements establish the specific requirements to be met in implementing the general direction for management of the resources.

1300

Administration

Require Forest Supervisor approval of projects occurring on National Forest System lands or waters for educational (either classroom or individual) or scientific purposes, including public opinion surveys, fish or wildlife population studies, soil disturbance, collection of plants or plant parts, boring or blazing trees, flagging, marking, or staking of study plots.

Provide for technology transfer between Districts, Supervisor's Office, and other Lake States Forests with emphasis on timber management and wildlife.

Coordinate all site-related research and administrative studies with Ecological Classification System. Locate study plots within Ecological Classification System permanent plots or within representative Ecological Land Type Phase map units.

1600 Information
Services

Carry out an information program that creates an informed public. Work to achieve informed public consent during implementation of the Forest Plan and its programs.

Seek public involvement in the development and implementation of this and succeeding land and resource management plan, and especially during the integrated resource management process.

Coordinate information activities with nearby National Forests, other federal agencies, user groups, and other public and private organizations especially for promotion of available recreation facilities and opportunities.

Assign District Rangers responsibility for maintaining contacts with local units of government that are affected by Forest management practices.

Assure the availability of information needed to provide visitors and users with satisfying and safe experiences within the Forest.

Share responsibility for maintaining key public contacts identified with other Michigan and Wisconsin National Forests.

Implement public information and education programs to reduce the number, intensity, and cost of conflict-producing and resource-damaging situations.

Provide public information and programs to enhance understanding and appreciation of threatened and endangered wildlife such as the gray wolf, bald eagle, and peregrine falcon.

During implementation of the Forest Plan, contact interested and affected individuals or groups such as adjacent landowners regarding specific projects such as clearcutting, for which they may have a particular concern.

1800 Human and
Community
Development

Ensure that individuals, organizations, minorities, and communities within the Forest participate in its management.

Identify forest and range-related opportunities that will help individuals and local communities enhance their self-sufficiency and their feeling of social well-being by participating in human resource and other programs available on the Forest.

Identify opportunities in which individuals and volunteer organizations can assist in the management of the Forest.

Do not allow resource management activities to preclude the right of American Indians to express and exercise their traditional religion.

1900 Land and
Resource
Management
Planning

Vegetation Management Follow the guidelines outlined in National Forest Landscape Management, Volume 2, Chapter 2 "Utilities," Chapter 3 "Range," Chapter 4 "Roads," Chapter 5 "Timber," and Chapter 6 "Fire" in the design of management practices.

Use native species when restoring disturbed areas, providing vegetative screening, or improving wildlife habitat.

Water-Influenced Landscapes Manage water-influenced landscapes and riparian areas with practices that are consistent with resource conditions, management objectives, and designated water use.

NEPA Process Develop all projects in accordance with this land and resource management plan direction.

Complete an environmental analysis for all proposed projects using the Ottawa Environmental Factors Checklist. (See FSM 1950).

Use the results of the analysis to determine what documentation is required based on the standard Forest Service NEPA procedures (see FSM 1950 and NEPA Procedures Handbook (FSH 1909.15)).



2100
Environmental
Management

Air Quality Identify present and potential impairment of Forest resources attributable to air pollution. Coordinate with regulatory agencies and seek to have emissions reduced as needed to protect Forest resources.

Equipment used in management activities will have EPA approved air pollution control devices.

Advise the Regional Forester about potential effects of or need for state redesignation proposals.

Coordinate with the State of Michigan (1) to control impacts of air pollution on Forest and (2) to implement strategies needed to mitigate Forest's management resource practices.

Continue to monitor selected lakes and cooperate with North Central Forest Experiment Station (Forest Service research) and other agencies or organizations on determining atmospheric deposition (acid rain) effects with the Forest.

Noise Limit road construction, timber harvesting, and mechanized reforestation site preparation practices to periods of time throughout the year when conflict with recreation users will be minimized near or adjacent to areas, such as developed recreation sites, the North Country National Scenic Trail, semiprimitive recreation management areas, wilderness study areas, Forest communities, and other appropriate areas.

Pesticide Use Use pesticides only after analysis of alternatives clearly demonstrates that pesticide use is essential to meet management objectives. The analysis will consider the environmental acceptability, economic efficiency, and biological effectiveness of available alternatives. Alternatives include silvicultural, mechanical, manual, prescribed fire, biological, chemical, and regulatory treatments. Include all projects originated by cooperators, permittees, contractors, and others working on National Forest System lands.

Complete pesticide use environmental analysis for vegetation, roadside brushing, and wildlife/fish projects, annually or as needed, with an interdisciplinary team appointed by the Forest Supervisor and document results in accordance with NEPA.

Use only pesticides registered by the Environmental Protection Agency (EPA) in full accordance with the Federal Insecticide, Fungicide, Rodenticide Act as amended, except as otherwise provided in regulations, orders or permits issued by the EPA. In addition, certain pesticide uses require Regional Forester approval.

Apply pesticides in agreement with regulations developed by the Michigan Department of Agriculture.

Limit use of herbicides, pesticides, rodenticides, or other chemical agents in management activities to times and places where possible transport to or by surface water is minimal, except as approved by the EPA for application into or adjacent to lakes and streams.

Conduct soil-site investigations for use of chemicals in areas with suspected shallow watertables, rapid permeability, perched watertables, or other environmentally sensitive conditions, except as approved by the EPA for application into or adjacent to lakes and streams.

Obtain Regional Forester approval for each use of sodium cyanide for predator control, and other pesticide use for which specific approval authority may be reserved by the Regional Forester.

Coordinate with organizations and individuals in pest control programs.

Coordinate with Michigan Department of Natural Resources - Fisheries in chemical treatment of lakes and manual removal of roughfish. Potential impacts on fish-dependent birds, particularly loons, eagles, and osprey, will be considered when planning chemical treatments and manual removals.

Coordinate with county and township boards, Michigan Department of Natural Resources, and adjacent private landowners in application of pesticides.

2300 Recreation Management

Recreation Opportunities

Generally, all land management activities within the management area will conform to the appropriate Recreation Opportunity Spectrum (ROS) class. Exceptions would be isolated management activities that have only short-term impacts and are considered desirable to meet other resource management objectives.

Unless public need has been demonstrated, no new recreation developments will be planned.

National
Scenic Trails

Manage the North Country National Scenic Trail.

Manage the North Country National Scenic Trail in accordance with the requirements and management policies found in the Comprehensive Plan for Management and Use dated September 1982, prepared by the National Park Service.

Manage under visual management system Sensitivity Level I.

Except for administrative purposes, prohibit the use of motorized or wheeled vehicles and horses.

Develop additional trailheads in locations where monitoring indicates a need to provide for access, public health, safety, and resource protection.

National
Recreation
Trails

Manage the Gorge & Potawatomi, Mile Post Zero, and Agonikak (snowmobile) National Recreation trails in accordance with the commitments associated with their designation.

Prohibit the use of motorized vehicles and horses on the Gorge & Potawatomi and Mile Post Zero National Recreation trails.

Manage under visual management system Sensitivity Level I.

Hiking Trail
Development
and
Management

The completion of the North Country National Scenic Trail is high priority. No new hiking trails will be constructed except where existing developments must be relocated and where short side trails from the existing system to vistas or other unique features would enhance the recreation experience.

Manage trails to be compatible with the Recreation Opportunity Spectrum (ROS) class of the management area.

Manage all Forest trails at Level I (see FSM 7723 Ott. Supp. 3, 6/84) except as follows:

Level II

- State Line Trail.
- Lake Ottawa Interpretive Trail.
- North Country National Scenic Trail from Conglomerate Falls to East Rainbow Falls.
- North Country National Scenic Trail-Sturgeon River segment.
- Teepee Lake Hiking Trail.
- Beaver Lodge Trail.
- Cascade Falls Lower Trail.
- Sylvania Visitor Information Center Interpretive Trail.
- Norway-Nesbit Loop Trail.

Level III

- None.

Locate trails and associated facilities on soil-site conditions that minimize construction and long-term maintenance costs and where they do not create undesirable soil and water impacts.

Emphasize cooperator and volunteer involvement in the construction and maintenance of trails.

Except for National Scenic and Recreation trails, obliterate and remove from Forest transportation system records those system trails for which monitoring indicates little or no use.

Monitor use of all Forest trails to a Reliability Level IV (see RIM Handbook, FSH 2309.11).

Coordinate trail development and management with the Michigan Department of Natural Resources on National Forest System lands adjacent to State of Michigan lands.

Submit trail proposals to Michigan Department of Natural Resources for review and comment whenever potential for impact on the lands or activities of the State of Michigan exists.

Cross-Country
Ski Trails

Cross-country skiing is permitted on all hiking trails including the North Country National Scenic Trail and the Gorge & Potawatomi and Mile Post Zero National Recreation trails.

Hiking trails not designed for cross-country skiing will not be designated or maintained (groomed) for this use.

Manage designated cross-country ski trails.

Emphasize cooperator and volunteer involvement with other government agencies, private enterprise, and user groups in the development, operation, and maintenance of designated cross-country ski trails.

Limit Forest involvement in new cross-country ski trail development to granting special use permits and entering cooperative agreements.

Grooming of trails will generally not be done by the Forest Service.

Require that designated cross-country ski trails be developed and maintained according to Ottawa National Forest standard criteria (see FSM 7723) and ROS setting guidelines.

Favor the location of designated cross-country ski trails within roaded natural Recreation Opportunity Spectrum (ROS) areas. Avoid locating new cross-country ski trails

within wilderness, wilderness study, and research natural areas (MAs 5.1 and 9.1). Plan the location of cross-country ski trails within semiprimitive ROS areas on a case-by-case basis.

Require permittees or cooperators to monitor trail use and report user numbers. 

Obliterate and remove from the Forest system those ski trails for which monitoring indicates little or no use.

Monitor all Forest ski trails to a Reliability Level IV (see RIM Handbook, FSH 2309.11).

Off-Road
Vehicles, All-
Terrain
Vehicles, and
Snowmobiles

- Allow off-road vehicles (ORVs), all-terrain vehicles (ATVs), and snowmobiles to use National Forest System lands except:
- On areas, roads, and trails designated or posted closed in wilderness (MA 5.1).
 - In semiprimitive nonmotorized areas except where specific roads or trails are designated or posted open (MA 6.1).
 - In semiprimitive motorized areas except where roads or trails are designated or posted closed (MA 6.2).
 - In Black River Recreation Area except areas, roads, or trails posted closed (MA 7.1).
 - In special management areas (MA 8.2).
 - In areas being protected for wilderness study and research natural areas and wild/scenic river corridors being evaluated except roads and trails posted or designated open.
 - In MAs 1.1, 2.1, 3.1, 3.2, 4.1, 4.2, 6.2, and 9.3 except on designated areas, roads, and trails on that part of the Forest south of M-28 and east of M-64 from March 1 annually to snow melt to protect nesting of bald eagles.

Designated areas, roads, and trails may be limited to specific kinds of uses or may be closed to ORV use.

Review Forest Supervisor's closure orders covering areas, roads, and trails annually and revise as needed.

Emphasize cooperation and volunteer involvement with other government agencies, private enterprise, and user groups in the development, operation, and maintenance of the off-road vehicle trail system.

Grant authority needed for ORV, ATV, and snowmobile trail construction, operation, and maintenance to the State of Michigan following joint approval of specific trail proposals.

Cooperate in the maintenance and administration of trails included on the approved trail systems of the State of Michigan, within the limits of individual authority, funding, and public need, as formalized by project agreements with the Michigan Department of Natural Resources.

In accordance with order of the Forest Supervisor, coordinate ORV, ATV, and snowmobile management policies with those in effect on adjacent state and private lands.

Maintain and annually update a road closure map, trail closure map, and snowmobile trail map.

Provide Forest snowmobile maps for public distribution.

Visual
Resources

Emphasize management of visual resources in all foreground areas of Ottawa National Forest visual management system Sensitivity Levels I and II travel routes, use areas, and water bodies to meet the visual quality objectives displayed in the matrix for each management area listed under 2300 Recreation Management - Visual Quality.

Design all projects to meet the visual quality objectives considering the standards and guidelines described in National Forest Landscape Management, Volume 1, Chapter 1 and Volume 2, Chapters 2, 3, 4, and 5.

Cultural
Resources

Locate, inventory, evaluate, and protect all cultural resources on National Forest System lands that could qualify for the National Register of Historic Places.

Nominate eligible properties to the National Register of Historic Places and develop management plans for their preservation and maintenance.

Schedule the inventory of cultural resources on all National Forest System lands, giving priority to areas with high potential for disturbance.

Consult with Native American or other ethnic groups in a manner consistent with the Advisory Council on Historic Preservation "Guidelines for Consideration of Traditional Cultural Values in Historic Preservation Review."

Cultural resource standards and inventory processes are designed to conform with the U.S. Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation and in accordance with the Memorandum of Agreement (MOA) between the Michigan State Historic Preservation Officer (SHPO) and the National Forests located in Michigan.

For projects involving the sale, exchange, or interchange of lands under the "Small Tracts Act" (P.L. 97-465; 96 STAT. 2535), consult the Programmatic Memorandum of Agreement between the USDA Forest Service, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers (1985).

Projects requiring cultural resource inventory prior to implementation include, but are not limited to, the

construction or expansion of roads, bridges, wildlife and fisheries ponds, reservoirs, sand and gravel pits, parking areas, and trails; the implementation of timber sales and decking areas; oil, gas, mineral, and sand and gravel explorations that require the development of drill pads, roads, trails, and test pits; the construction of new structures individually or within groups of existing structures, or the remodeling of existing structures that are at least 50 years old and may meet the eligibility criteria for the National Register of Historic Places.

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A

Non-ground disturbing activities that do not impact known cultural resources, and that include, but are not limited to, wilderness use, dispersed recreation, pesticide application, and routine maintenance of roadways and trails currently in use may be implemented without survey or evaluation.

Design cost-effective survey strategies, utilizing locational modeling and thematic studies to improve efficiency.

As a minimum requirement, conduct an inventory for any area prior to any earth-disturbing activity, land exchange, or other undertaking that could have an effect on cultural resources.

Guidelines for possible "no effect" undertakings are designated in concurrence with the MOA between the Michigan SHPO and the National Forests in Michigan.

Complete cultural resource inventories of all Ottawa National Forest lands by the year 2010.

For each inventoried cultural resource that may meet the criteria, conduct an evaluation to determine its eligibility for inclusion on the National Register of Historic Places.

Schedule and conduct evaluations if a project will have any effect on a cultural resource potentially eligible for the National Register of Historic Places. Schedule and conduct evaluations if the responsible official and SHPO disagree on whether a cultural resource is potentially eligible for the National Register of Historic Places.

Evaluation procedures, including thematic approaches, are designed and carried out in accordance with the MOA between the Michigan SHPO and the National Forests in Michigan.

Schedule evaluations in a timely manner (before the project can proceed) when a proposed project cannot be delayed or relocated, or if properties are deteriorating and have not been evaluated.

Conduct evaluations on a thematic basis (e.g., early logging, mining, and homesteading) to improve cultural resource management efficiency.

A determination of effect must be carried out in the event that a cultural resource determined eligible for or included on the National Register of Historic Places cannot be avoided, or the project delayed, and if the proposed project could affect the property either beneficially or adversely.

Determination of effect process is carried out in consultation with the Michigan SHPO in accordance with 36 CFR 800.

A consultation with the SHPO and Advisory Council on Historic Preservation is in order when it is determined that project will affect an eligible site and the project cannot be relocated or modified to avoid the site.

Unavoidable destruction of eligible sites must conform to processes designated by the National Historic Preservation Act and outlined in 36 CFR 800.

Design projects to avoid, minimize, or mitigate adverse effects on potentially significant cultural resources. In-place protection of inventoried potentially eligible properties is the minimum requirement until site significance is determined.

Assess the nature and degree of damage to cultural resources due to vandalism, visitor use, and natural deterioration. Identify and implement protective measures.

Prevent or mitigate deterioration that affects the significant qualities of cultural resources that are eligible for the National Register of Historic Places.

Develop protection and mitigation measures on a case-by-case basis.

Field measures include, but are not limited to, signing, road closure, fencing, vegetative screening, and withholding location information.

Maintain the integrity of potentially significant cultural resources.

Issue antiquities permits to qualified academic institutions or other organizations for the study and research of cultural resource sites. Permit activities that are consistent with policy and management objectives.

Curate and store all artifacts recovered on the Forest at Michigan Technological University, Department of Social Sciences, Houghton, Michigan, by agreement.

Allow excavation or removal of artifacts by others from cultural resource sites only by permit.

Monitor the implementation and effectiveness of protection and mitigative measures prescribed for cultural resources.

Conduct on-site visual inspection as needed or required.

Interpretive
Services

Develop interpretive programs and materials that support Forest activities and programs and explain the correlation of resource management direction to public interests and concerns. Base these programs on audience analysis as well as land manager's needs.

Design interpretive programs and material that can be incorporated into or used with material developed for visitor information at visitor contact points.

When appropriate, provide on-the-ground interpretation of management activity such as signs explaining a management practice along major travel routes.

Provide resource people or material for use in interpretive and environmental education programs conducted by others.

Provide maps, interpretive messages and/or interpretive material such as brochures at visitor contact points.

Identify opportunities for both on-site and off-site interpretation of cultural resources considering significance (national, state, local), accessibility, and protection needs.

Enhance and interpret selected cultural resources to provide opportunities for appreciation of the nation's cultural heritage.

Interpretation of cultural resources should be compatible with the material character and management area's purpose.

Recreation
Special Uses

Retain and manage all existing summer home groups under the provisions of the authorizing special use permits.

Maintain in place those existing recreation residences occupying National Forest System land under special use permit that do not constitute a hazard to Forest resources and do not endanger the health, safety, or well being of the permittee or the public.

Recreation residences in established summer home groups will continue to be a valid use of National Forest System land. New recreation residence groups will not be approved.

Permits will not be issued for unoccupied lots in established summer home groups.

In the event recreation residence improvements are destroyed by natural forces or fire, the special use permit will be terminated and the lot will be restored to a natural condition.

Recreation residences will not be used for commercial purposes or year-round use to the exclusion of a permanent home elsewhere.

Existing improvements will be maintained in a manner compatible with the forest environment.

2500 Water and
Soil Resource
Management

Plans and
Inventory

Maintain a current inventory and evaluate potential watershed improvement projects as described in FSM 2520.

Integrate all soil and water resource inventory information into the Ecological Classification System.

Correlate all soil and water resource inventory information with adjacent Lake States National Forests.

Provide for lake monitoring to detect changes from baseline data already on hand for Kildeer, Skyline, Tepee, Bob, Golden, James, Hager, and Norway lakes primarily on productivity and impacts of atmospheric deposition (acid rain).

Use the Ecological Classification System to identify resource capability, specify management limitations, and identify appropriate mitigating measures for all management prescriptions and practices. Supplement ECS information with soil and/or water management support services whenever more detailed or specific information is needed.

Riparian Area

Riparian areas include aquatic and riparian ecosystems, floodplains, wetlands, and a special attention zone (NFMA regulations, Sec. 219) extending approximately 100 feet horizontally from the edge of perennial streams, lakes, and other water bodies.

Preserve the beneficial values of floodplains and wetlands, protect public safety, reduce nonpoint pollution, and be cost efficient in the construction, management, protection, maintenance, and rehabilitation practices in all areas of structures and facilities.

Review riparian area practices on a case-by-case basis to ensure that the practice is compatible with the riparian area and the practice has a low risk for the following:

- Causing detrimental temperature or water chemistry changes.
- Introducing pesticides into surface and groundwater.
- Depositing undesired sediment.

- Blocking stream flow.

Avoid practices that cause detrimental changes in visual quality, water quality, fish and wildlife habitat, and soil productivity.

Minimize risk of flood loss, restore and preserve floodplain values, and protect wetlands.

Use filter or buffer strips to prevent soil, nutrient, or pesticide movement into lakes and streams. Filter strip width will vary according to the soil, slope, vegetation, and type of practice.

Obtain State of Michigan review of all water-related projects as specified in the Memorandum of Understanding between the three National Forests of Michigan and the Michigan Department of Natural Resources. Obtain U.S. Army Corps of Engineer permits for water-related projects when required.

Watershed
Disturbance

Apply management practices that will not accelerate the aging or eutrophication of any lake or stream. Design management activities adjacent to lakes, streams, and wetlands to maintain streambank and shoreline stability.

Restore disturbed areas, such as borrow pits and mineral developments, so they meet the management objectives of the area.

Salvage and store topsoil so that the topsoil can be replaced as portions of the disturbed area are restored.

Create waterbodies during restoration only if surface runoff and soil conditions permit.

Treat all disturbed areas that are subject to erosion for erosion prevention within the growing season in which the disturbance occurs.

When obliterating roads or closing temporary roads, use erosion control practices outlined in Watershed Improvement Handbook (FSH 2509.15) and Soil and Water Conservation Handbook (R-9 FSH 2509.22).

Give particular attention to Landtype Association (LTAs) 1, 5, 6, 13, 16, 18, and 20 using an erosion prevention practice preferably within the growing season in which the disturbance occurs. Follow techniques presented in Watershed Improvement Handbook (FSH 2509.15) and Soil and Water Conservation Handbook (R-9 FSH 2509.22).

Use erosion control practices for roads, skid trails, and other intensive soil-disturbing uses on the following Landtype Associations (LTAs) when slopes exceed the following:

Slope	LTA
>5%	1, 4, 14, 14a, 15
>2%	2, 3, 5, 6, 7, 9, 10, 11, 12, 13, 16, 17, 19

Consider enhancement of soil productivity when opportunities are economically feasible.

Rehabilitate soil and water resource improvement projects with materials, structures, and design to be compatible with the Recreation Opportunity Spectrum setting of the area and appropriate to meet visual quality objectives for the area.

Obtain county review under State of Michigan Act 347 (The Soil Erosion and Sedimentation Control Act) for all activities other than silvicultural activities that disturb more than one acre or are within 500 feet of a lake or stream. Refer to Chapter IV, Forestwide Standards and Guidelines, 1300 Administration, 1900 Land and Resource Management Planning, 2100 Environmental Management, 2300 Recreation Management, 2800 Minerals, and Geology, 7700 Transportation System; Forestwide Vegetative Management Standards and Guidelines and the specific management prescriptions.

2600 Wildlife
Habitat
Management

Management Indicator Species	Monitor population trends of management indicator species and determine relationships to habitat changes in order to indicate the effects of management activities.
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Management Indicator Species

Mammals

- Black bear
- White-tailed deer

Birds

- Common loon
- American bittern
- Ruffed grouse
- Osprey
- Bald eagle
- Goshawk
- Barred owl
- Blackburnian warbler

Fish

- Brook trout
- Smallmouth bass
- Northern pike

Forest Plan Objectives for Habitat of Management
Indicator Species

<u>Species</u>	<u>Long-Term Objective</u>
Deer	To maintain population (1980 level) of about 22,000 deer (estimated): <ul style="list-style-type: none">- Manage at least 138,000 acres of aspen/paper birch type.- Maintain at least 150,000 acres of thermal cover (hemlock/swamp conifer/balsam fir-jack pine types).- Maintain at least 8,700 acres of existing permanent upland openings with a long-term goal of 24,000 acres of permanent upland openings.
Bear	To maintain population: <ul style="list-style-type: none">- Manage at least 448,000 acres of habitat with less than 1.5 mi./sq.mi. of roads open to public travel by passenger vehicles during July and August of most years.
Loon	Protect and maintain existing common loon breeding territories (51 known lakes). Inventory and manage potential breeding territories, other bog lakes relatively free of human disturbance with: <ul style="list-style-type: none">- Islets or isolated bays having grassy or mossy shoreline and poor predator access.- Adequate forage base, especially yellow perch.

Objectives for Habitat of MIS (continued)

<u>Species</u>	<u>Long-Term Objective</u>
Bittern <u>1/</u>	<p>Inventory and maintain existing American bittern breeding territories.</p> <p>Maintain or improve potential breeding territories, open wetlands:</p> <ul style="list-style-type: none">- Large areas of sedge meadows having emergent vegetation (sedges, cattails, rushes), for nesting (4,700 acres).- Shallow marsh having open water areas for feeding (7,600 acres).- Other wetlands (27,900 acres) with potential for improvement.
Osprey <u>2/</u>	<p>Retain and manage 10 existing osprey breeding areas (about 1,000 acres) on National Forest System lands (10-year average 1975-1984).</p> <ul style="list-style-type: none">- Prohibit controllable disturbances within approximately 330 feet of each osprey nest.- Prohibit significant changes in the landscape with approximately 660 feet of each osprey nest.- Restrict management practices that result in adverse disturbance of nesting birds within 1,320 feet of each osprey nest. <p>Locate and designate at least 10 additional potential breeding areas (about 1,000 acres):</p> <ul style="list-style-type: none">- Free from human disturbance.- Within or adjacent to open water, deep marsh, or bog areas.- Within 1 mile of major rivers.- With supercanopy white pine.- Potential for creation of deep marsh.
Eagle <u>2/</u>	<p>Retain 31 existing bald eagle breeding areas (about 6,200 acres) on National Forest System lands (10-year average, 1975-1984).</p> <p>Locate and designate at least 34 additional potential breeding areas (about 7,000 acres including open water):</p> <ul style="list-style-type: none">- Free from human disturbance.- Within 1/2-mile of a lake of at least 200 acres.- With supercanopy white pine or yellow birch.- Potential for creation of deep marsh.

Objectives for Habitat of MIS (continued)

Species	Long-Term Objective
Goshawk 1/	To maintain viable populations: <ul style="list-style-type: none"> - Maintain at least 240,000 acres of pole timber to mature sized forest.
Barred 1/ owl	Increase suitable barred owl habitat to 37,500 acres of mature and old growth hardwoods, red pine, upland spruce, hemlock, and swamp conifers: <ul style="list-style-type: none"> - Having cavity trees 20"+ DBH for nesting. - Having mixed or coniferous woods for roosting and hiding. - In riparian habitat or near open country for hunting.
Ruffed grouse	To maintain population (1980 level): <ul style="list-style-type: none"> - Maintain at least 16,000 acres of 0-10 year aspen/paper birch regeneration well distributed over managed aspen areas.
Black- burnian warbler 1/	To maintain viable populations: <ul style="list-style-type: none"> - Maintain at least 40,000 acres of pole timber to mature sized hemlock and swamp conifer forest.
Brook trout	Maintain suitable brook trout spawning and feeding habitat: <ul style="list-style-type: none"> - An estimated 1,200 miles of cool-water streams. - Stable and vegetated stream banks. - Silt-free spawning gravel stream bottoms.
Small- mouth bass	Maintain suitable smallmouth bass spawning and feeding habitat: <ul style="list-style-type: none"> - An estimated 38,000 acres of meso-trophic lakes that are deep and clear, of moderate productivity with extensive gravel or rubble shoals, sunken logs in near-shore areas, and pH of 5.7+ for reproduction. - An estimated 355 miles of streams and rivers greater than about 35 feet that are cool and clear with abundant shade and cover, deep pools, moderate current, and gravel or rubble substrate.

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Objectives for Habitat of MIS (continued)

Species	Long-Term Objective
Pike	Maintain suitable northern pike spawning and feeding habitat: <ul style="list-style-type: none">- An estimated 41,000 acres of meso-trophic and eutrophic lakes.- An estimated 108 miles of warm-water streams.- Marshy spawning areas.- Maximum surface water temperature less than 30°C.- Large populations of white suckers (preferred prey).

1/ Habitat objectives for these species, whose population/habitat inventories are not well known, are based on the minimum viable population analysis.

2/ Habitat objectives for eagles and osprey are based on the population objectives (existing plus potential) and an average feeding area (open water) of about 200 contiguous acres per territory.

In cooperation with Michigan Department of Natural Resources, monitor population trends and habitat conditions of management indicator species.

Assess the impact of management practices on management indicator species and their habitat.

Identify, schedule, and carry out management practices to achieve population and habitat objectives for management indicator species.

See Chapter V, Implementation, Monitoring, and Evaluation, Table 5.2, NFMA Monitoring Requirements, for the management indicator species monitoring action program which is included as part of the Forest annual program of work.

See Appendix Volume, Appendix I, Management Indicator Species, Table I.1, Management Indicator Species Habitat and Guild, for list of wildlife and fish species associated with each management indicator species.

Endangered,
Threatened,
and Sensitive
(ET&S)
Species

Protect endangered and threatened plant and animal species and their habitats.

Endangered and threatened animal species of the Ottawa National Forest are listed below. (There are no federally listed plant species endemic to this area.)

Status 1/	
Mammals	
Gray wolf	E
Birds	
Bald eagle	T
Peregrine falcon	E

- 1/ Status codes:
E Federally endangered
T Federally threatened

Population recovery objectives:

Species	Recovery Objective
Gray wolf	4 packs (24 animals)
Bald eagle	65 active pair
Peregrine falcon	1 active pair

Habitat objectives:

Gray wolf - An area totaling at least 256,000 acres has been designated on Forest work maps for the purpose of assisting in recovery of the gray wolf. The area encompasses parts of management areas 2.1, 3.2, 6.2, and 9.1 in the southern part of the Forest.

Ensure that all open road densities are less than 1 mile of open road per square mile in the area.

Maintain or improve habitat for deer as the prey base within the area.

Bald eagle - Designate essential habitat and management plans for existing bald eagle breeding areas for formal approval.

Essential habitat of bald eagle:

- Is that area considered necessary for continued survival and recovery of the species and is described in breeding area plans.
- Is considered to encompass a minimum of 640 acres at each nest site and may include private as well as public land.
- Should correspond to legal landlines or survey descriptions to facilitate listing and identification

in public documents, but the configuration of essential habitat of each breeding area may vary.

- Includes Region 9 management constraints for 330-, 660-, and 1320-foot management zones described below.
- Includes all aquatic and terrestrial habitat used for foraging and essential features of air, water, land, and solitude necessary for the breeding pair, including active and alternate nest sites, major fishing waters, and roost and perch trees.

The actual nest structure(s) does (do) not need to be at the center of the area nor must the area be in any particular configuration.

In areas of high nesting density, a larger single unit or essential habitat may be more appropriate than several smaller ones.

Prohibit controllable disturbances within approximately 330 feet of each eagle nest except those necessary to protect the nest.

Prohibit significant changes in the landscape within approximately 660 feet of an eagle nest.

Restrict management activities that result in adverse disturbance to nesting birds when the activities occur within approximately 1320 feet of an eagle nest during the nesting season.

Identify and manage potential nest trees (two or three if possible) within each active bald eagle nesting area. Bald eagles in this area usually nest in white pine (51 percent) or yellow birch (34 percent) with mean diameters of 32" DBH, usually on a topographic break or type change, and most often (85 percent) within 1 mile of a lake 200 acres or larger, from Forest bald eagle nest records, Form R9-2600-8.

Coordinate with Michigan Department of Natural Resources and U.S. Fish and Wildlife Service to determine and take appropriate action to eliminate the causes of recurring bald eagle nest failures.

Identify, establish, and protect at least 34 potential bald eagle breeding areas, in addition to current active breeding areas.

Potential breeding area specifications:

- Relatively free from human disturbance (that is, away from resorts, highways, and developed recreation areas).
- Within 1/2 mile of a large lake (200 acres or larger).
- Preferably stocked or suitable for stocking with supercanopy white pine or yellow birch.

- Well dispersed throughout portions of management areas meeting these specifications.
- Which meet or exceed criteria for existing essential habitat.

Limit management practices within potential breeding areas generally to those practices that avoid disturbance to nesting birds during the nesting period (similar to 660- to 1320-foot zone around active nests).

Within potential breeding areas prior to timber harvest, designate a minimum of eight supercanopy white pine or yellow birch trees per breeding area to be retained. Ensure a continuous supply of nest trees for the future.

Peregrine falcon - Designate for special management a potential hacking (release) site for the peregrine falcon in the Trap Hills area. Restrict road or trail construction as necessary. Review proposed road and trail building and other management activities in the vicinity of the site with the U.S. Fish and Wildlife Service as part of consultation procedures prior to implementation.

Protect sensitive species and their habitat as designated by the Regional Forester.

Seven animals and seventeen plants have been recommended for Regional Forester sensitive species status. The Forest will protect any sensitive species and their habitats that are included on the Regional Forester's list to be issued following completion of all forest plans in Region 9. (Refer to Appendix Volume, Appendix H for more information.)

Recommended Sensitive Species

Mammals

Marten
Lynx

Birds

Common loon
Osprey
Red-shouldered hawk
Merlin

Fish

Lake sturgeon

Plants

Arenaria macrophylla, big-leaf sandwort
Calamagrostis lacustris, a reedgrass
Calypso bulbosa, fairy slipper
Carex assiniboinensis, a sedge

Recommended Sensitive Species (continued)

Collinsia parviflora, small flowered collinsia
Dryopteris felix-mas, male fern
Gentiana linearis, closed gentian
Gratiola lutea, hedge-hyssop
Myriophyllum farwellii, water milfoil
Nuphar microphylla, yellow water-lily
Orchis rotundifolia, small round-leaved orchid
Oryzopsis canadensis, rice grass
Panax quinquefolius, ginseng
Pellaea atropurpurea, purple cliff-brake
Petasites sagittatus, sweet coltsfoot
Pterospora andromedea, pinedrops
Woodsia obtusa, blunt-lobed woodsia

In cooperation with Michigan Department of Natural Resources, put into motion a process of recovery planning for plant and animal species identified on the Regional Forester's list of regionally sensitive species, including extirpated species that should be restored, but not including species for which the Forest cannot assume responsibility for management and recovery (i.e., species known to be irregular, occasional, casual, accidental, or hypothetical to this area).

Watch List
Species

In cooperation with Michigan Department of Natural Resources, maintain a watch list of species that occur or may occur on the Ottawa National Forest.

Include those species for which more information is needed to determine suitability for selection as management indicator species.

Include other species of concern in Michigan which do not meet criteria for inclusion in Regional Forester's sensitive species program and which are not already listed as management indicator species. Include species for which additional information is needed to address concerns about status and occurrence.

Watch List Species of the Ottawa National Forest

<u>Species</u>	<u>Status</u>
Mammals	
Gray squirrel	1/
Beaver	1/
Fisher	1/
Eastern cougar	
Bobcat	1/
Moose	
Birds	
Great blue heron	2/
Northern harrier (marsh hawk)	1/ 2/
Sharp-shinned hawk	

Watch List Species (continued)

Species	Status
Birds (continued)	
Cooper's hawk	
Broad-winged hawk	1/ 2/
Spruce grouse	2/
Sharp-tailed grouse	1/
Sandhill crane	1/
American woodcock	1/
Black-backed woodpecker	1/ 2/
Eastern bluebird	1/ 2/
Golden-winged warbler	1/ 2/
Magnolia warbler	1/ 2/
Chestnut-sided warbler	1/ 2/
Pine warbler	1/ 2/
Kirtland's warbler	
Lincoln's sparrow	1/ 2/

Plants

<u>Adlumia fungosa</u> , climbing fumitory	SC
<u>Arethusa bulbosa</u> , dragon's mouth	SC
<u>Callitriche hermaphroditica</u> , water-starwort	SC
<u>Callitriche heterophylla</u> , water-starwort	SC
<u>Carex arcta</u> , a sedge	SC
<u>Carex pallescens</u> , pale sedge	SC
<u>Clematis verticillaris</u> , purple clematis	SC
<u>Cryptogramma stelleri</u> , cliff-brake	SC
<u>Cypripedium arietinum</u> , ram's-head lady-slipper	SC
<u>Dryopteris assimilas</u> , shield fern	SC
<u>Littorella americana</u> , a plantain	SC
<u>Salix pellita</u> , a willow	SC
<u>Sisyrinchium strictum</u> , blue-eyed grass	SC
<u>Spiranthes casei</u> , Case's ladies'-tresses	SC

- 1/ Species was recommended to be studied further as a result of the Management Indicator study.
- 2/ Species was also included in Forest viable population study.
- 3/ Status code:
SC - Designated as of special concern in Michigan.

In cooperation with the Michigan Department of Natural Resources and local cooperators, periodically assess population trends of those watch list species to be studied further to determine suitability for selection as management indicator species.

Maintain reliable observations of other watch list animals and their breeding activities.

Observations of watch list animals by Forest personnel usually will be incidental to other project activities.

Encourage participation by volunteer cooperators.

Maintain records of observations at the Ranger District.

Report summaries of watch list animal observations in annual Ranger District Wildlife and Fish Reports.

Manage breeding area of great blue heron colonies.

Prohibit controllable disturbances within approximately 330 feet of each great blue heron colony except those necessary to protect the nest or colony.

Prohibit significant changes in the landscape within approximately 660 feet of a great blue heron colony.

Restrict management activities that result in adverse disturbance to nesting birds when the activities occur within 1,320 feet of a great blue heron colony.

Support Michigan Department of Natural Resources programs for recovery of lake sturgeon (Fisheries Research Report No. 1883).

Determine watch list plant populations on National Forest System lands.

Schedule ECS/SRI surveys of site units within the vicinity of the Forest where watch list plants have been verified (are of record) on sites similar to federal lands.

Cooperate and assist public agencies, organizations, and individuals who can contribute to identification and location of State-listed plant species and other species of special concern in Michigan.

Use professional botanical surveys of these site units within the Forest. Require survey project leader to have demonstrated skills in taxonomy and ecology of listed plants and unique habitats because listed plant species occurrence is predictably uncommon to rare and is on unique habitats not identified in current inventories. These botanical surveys will have a dual purpose of verifying species occurrence and of reinforcing microhabitat (site unit) description and selection.

Wildlife

Refer to Chapter IV, Forestwide Standards and Guidelines, 1900 Land and Resource Management Planning, Vegetation Management, for additional standards and guidelines relating to wildlife habitat management.

Place low priority on direct habitat improvement that could otherwise be obtained with integrated practices unless the project can be accomplished with minimal investment, such as with

volunteers, cooperating agencies, groups, or as specified in the integrated resource management prescription for the project.

Forest openings emphasis for wildlife will be on temporary openings (clearcuts) created through vegetative management activities accomplished through timber sales.

Upland openings are constructed primarily through timber sales in areas where management objectives cannot be met through temporary openings. They are generally permanent forest openings maintained for multiple resource benefits. Include existing permanent openings on unsuitable lands and adjacent private lands when analyzing the need for permanent upland openings.

Describe local species-habitat relationships and integrate wildlife information into Ecological Classification System (ECS) interpretations.

Identify vertebrate wildlife species and their habitats on ECS permanent plots and other areas.

Identify habitats that require protection prior to implementing adjacent resource management practices.

Existing wetlands will be protected under the provision of Executive Order 11990 (Protection of Wetlands). An inventory of wetland types and acreages will be maintained for each management area and locations for potential wetland improvement projects documented during the implementation phase of the Forest Plan. Inventories of potential wetland improvement projects such as low-head dams to create marshes and nesting structures will be made available to interested cooperators such as Ducks Unlimited, Michigan Habitat Foundation, Michigan Audubon Society, and others. These projects will be coordinated with local clubs, the Michigan DNR, local governments, and other interested agencies such as the U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

Fish

Coordinate all fisheries habitat management activities with the Michigan Department of Natural Resources. Review project proposals jointly to determine funding and leadership roles annually.

In cooperation with the Michigan Department of Natural Resources and others, periodically conduct creel census to monitor fishery demand, utilization, and benefits.

Manage lake or stream habitats and fish populations in cooperation with the Michigan Department of Natural Resources, to provide for high-quality recreation fishing and wildlife uses of fish.

Use fish population manipulation practices consistent with resource conditions and management prescriptions for the management area.

First priority for fisheries management will be on lakes with recreation developments and on high quality trout streams. Other lakes with a high fisheries potential and limited or reduced standard access may be managed to provide a high quality fishing experience.

Conduct lake or stream surveys, including fish population surveys, before fish habitat improvements are prescribed or carried out.

Emphasis in lake fisheries for mixed and/or warm-water species will be for self-sustaining populations and balanced predator-prey conditions to provide "quality-size fish" (see Glossary).

Emphasis in lake fisheries for cold-water species will be for maintenance and improvement of existing trout lakes.

Emphasis in Michigan Department of Natural Resources-designated trout waters less than 18 feet wide will be for recruitment of trout.

Maintain or restore fish population balance, to the extent practical, through habitat and access manipulation. The remaining 2600 Wildlife Habitat Management - Fish standards and guidelines apply to management areas 1.1, 2.1, 3.1, 3.2, 4.1, 4.2, 6.1, 6.2, and 9.3. Refer to management prescription standards and guidelines for management areas 5.1, 7.1, 8.2, 9.1, and 9.2 for the standards that apply to those areas.

Construct fish shelters and/or fish attractors where appropriate to decrease natural mortality of gamefish and increase fishing morality of panfish.

Construct walleye spawning reefs:

- Size of 1/1000 of area of lake.
- Where adult walleye are present.
- Where needed to provide spawning habitat.

Place half-log cover in top-quality trout streams where natural cover is insufficient for trout. Place bank cover (brush) where natural cover is insufficient for immature trout. Anchor bank cover to prevent debris jams. Half-log placement will be the primary method for fish cover improvement on trout streams.

In trout streams where reproduction of trout is clearly limited by sediment bedloads, a combination of bank stabilization, roadbed erosion prevention, and sediment traps will be considered to decrease sedimentation and increase trout production.

Alder removal should only be practiced on streams where summer temperatures are very cold, or where replacement of the riparian shade is planned through release of existing trees or by planting. Protect existing riparian

vegetation such as mature cedar, hemlock, and hardwoods (except aspen) to ensure both shade and recruitment of logs and rootwads to the stream.

Construct spawning riffles in top-quality trout feeder streams that lack quality spawning areas.

Remove inactive beaver dams.

Assist Michigan Department of Natural Resources efforts to control beaver populations.

In existing or potential top-quality trout streams, removal of active beaver and beaver dams will be coordinated with wildlife resources including, but not limited to, threatened and endangered species, waterfowl, and the furbearers themselves. The Michigan Department of Natural Resources will coordinate and approve all these activities.

Cooperate and work with the Michigan Department of Natural Resources in carrying out fish manipulation practices when requested.

Use chemical, mechanical, or manual means to adjust fish species populations.

Where stunted populations occur or where rough fish are severely competing with valuable gamefish or panfish:

- Thin problem species.
- Stock with predator species as necessary.
- Monitor results.

2700 Special Use Management

Other Special Uses

Authorize special use permits that are compatible with management prescriptions, that are in the public interest, and cannot reasonably be accommodated on non-National Forest System land.

Locate special uses so that adverse effects on desired forest conditions are minimized.

Minimize cost of processing special use applications by requiring applicants to bear or share the cost of cultural resource surveys, environmental analysis, and other activities related to application processing.

Generally, when more than one special use is located in a proximity, require joint use of access roads whenever practical.

Consult with local units of government before authorizing land uses that could create demand for increased public services.

Require commercial outfitting or guiding services based or conducted on National Forest System land to obtain permits. Consider applications for other special uses involving National Forest System lands, including utility corridors; transmission lines; radio and television transmission towers; wind, solar, and hydropower generation sites; and others on an individual basis and consistent with the management prescription and visual resource VQOs for the management area.

2800 Minerals
and Geology

Mineral
Exploration

All National Forest System lands shall be available for nonsurface-disturbing exploration.

Private
Minerals

In land management decisions, make provisions for private mineral owners to make reasonable use of the surface in exercising rights defined by deed and public law (see Land Manager's Handbook on Minerals Management, FSH 2809.11).

Act within 60 days upon requests for permits and other authorizations needed for the exercise of nonfederal mineral rights (see FSM 2835).

Common Variety
Minerals

Assess the local supply/demand situation.

Develop Ottawa National Forest inventory of common variety mineral materials.

Complete an Order 3 inventory as part of the ECS-SRI throughout the Forest with an Order 2 survey done on those Ecological Landtype units found to be most likely to contain common materials. Priority of Order 2 survey is LTA 6, 12, 13, 17, 18, 19, 14b, 14a, 1, 3, 14, 4, 7, 2, 9, 11, 5, 15, 16, 20, 10.

Make common minerals available to the public and to local, state, and federal government agencies where reasonable protection of or mitigation of effects on other resources is ensured, and adequate volumes are available. Document in pit plan (see FSM 2850).

Prohibit extraction of common variety mineral materials in LTAs 6, 12, 13, 15, 16, 17, 18, and 19 except for administrative purposes, for limited quantities that may be given to local units of government for use on public roads within the Forest boundary, and for sales of 10 cubic yards or less to local residents.

A pit operating plan will be prepared and kept current prior to the extraction of mineral materials from National Forest System land.

- The Forest Service will prepare pit operating plans with interdisciplinary input for community and common-use pits.
- Permittee or contract holder will prepare such plans for single user pits, subject to Forest Service approval.
- Include a pit operating plan as a part of all Forest Service contracts where mineral material sources are designated in the contract and are located on National Forest System lands.
- For Forest Service in-service projects, a pit operating plan will normally be approved prior to working in a mineral material source.



Authorize the disposal of mineral materials by sale, free-use permit, inclusion as a mineral materials source in a contract, or for the direct use of the Forest Service.

Charge fair market value for all mineral materials disposed of by sale.

Grant free use of mineral materials for Forest Service contracts and maintenance agreements.

Mineral materials may be given without charge to any federal, state, county, or local government provided the applicant shows to the satisfaction of the authorizing officer that such materials will be used for a public project. Such a donation shall not be made when the applicant owns or controls an adequate supply of materials in the area of demand.

Reclamation costs for community pits or common-use areas shall be borne by the Forest Service.

Oil/Gas and
Hardrock
Minerals

Exploration of oil/gas and hardrock minerals will be permitted in accordance with the Forestwide Environmental Assessment dealing with these minerals dated June 1985 and August 1986 approved by the Regional Forester.

3400 Forest Pest
Management

Use integrated pest management methods to minimize or prevent the development of pest problems. Where pest problems are unavoidable, select the solution that provides the most beneficial method, based on objectives, effectiveness, safety, environmental protection, and cost.

Control household pests in recreation areas. Remove pest infested trees that could cause property damage or injury in developed recreation sites.

4000 Research

Inform and/or consult the appropriate division of the North Central Forest Experiment Station whenever National Forest System lands or waters are to be used for significant educational, administrative, or research studies and when an area has been nominated for study for consideration to be recommended as a Research Natural Area.

4060 Research Natural Areas

Locate potential candidate Research Natural Areas primarily through the Forest's Ecological Classification System. The objective is identify unique geologic, aquatic, Society of American Foresters cover types, and other biotic conditions.

5100 Fire Management

Suppress all wildfires.

Review annually, and revise as necessary, agreements for fire detection and suppression of wildfire on National Forest System lands by cooperating firefighting agencies, including the cooperative agreement with the State of Michigan and local fire departments, which are listed in the Ottawa National Forest Fire Management Action Program.

Emphasize fire prevention. Cooperate with the Michigan Department of Natural Resources to reduce human-caused fire occurrence.

Maintain the Ottawa National Forest Fire Management Action Program in accordance with FSM 5121.1.

Guide fire detection, suppression, fire control strategies, equipment, and manpower placement in accordance with the Ottawa National Forest Fire Management Action Program.

Dispatch initial attack forces through the Forest dispatcher located at the Watersmeet Ranger District Office when a fire is reported.

Notify the State of Michigan of any wildfire and federal or private prescribed burning within the National Forest Protection area. Keep the State of Michigan informed on the commitment of firefighting equipment and personnel.

Review and coordinate the Ottawa National Forest Fire Program with the Michigan Department of Natural Resources.

Burning permits will be issued in cooperation with the State of Michigan and will comply with state regulations.

Notify the State of Michigan and the appropriate local township of all permits issued within the State's protection area.

Agreements for fire detection and suppression on National Forest System lands by cooperating firefighting agencies must define suppression action that will be commensurate with established management prescriptions and fire suppression action plans.



5300 Law
Enforcement

Provide law enforcement commensurate with the frequency, severity, and type of violations committed.

Adjust Cooperative Law Enforcement agreements in accordance with tri-year evaluations of Forest law enforcement needs and the quality of service available.

At all facilities, apply recommended security measures that are cost efficient in relation to risk and value of potential loss.

Emphasize prompt, thorough investigation and appropriate law enforcement action on major timber trespass cases.

Minor cases of timber trespass, such as cutting or damaging trees in recreation areas, will be responded to with a level of investigation and enforcement action commensurate with the situation.

Investigate fire trespass cases with qualified fire investigators.

Follow Good Host principles in law enforcement activities.

Refer all fish and game law violations to the Michigan Department of Natural Resources conservation officers.

Enforce bridge load limits and spring load restrictions through cooperation with local law enforcement agencies.

Emphasize the enforcement of road closures.

5400
Landownership

Surface
Ownership

Use landownership adjustment authority to modify and improve landownership patterns.

Adjust landownership where consolidation and acquisition is desirable and in areas where exchange would be in the public interest.

Satisfy one or more of the following purposes in land adjustments (purchase or exchange):

- Adjustment accomplishes objectives of public law or regulation.
- Adjustment is needed to meet demand for National Forest System resources.
- Adjustment results in more efficient landownership patterns.
- Adjustment results in lower resource management costs.

Acquire only the interest needed to achieve land management objectives.

Land exchanges must be in the public interest. Cumulative effects of the exchange program will be monitored to see how the program is meeting the objectives of improving economic efficiency; enhancing wetland and riparian values, wildlife habitat, cultural resources, and public recreation needs; and minimizing floodplain risk.

Give priority to land purchase and exchanges to acquire land or interest in land that:

- Is critical habitat of endangered or threatened fish, wildlife, or plant species.
- Is needed for the completion of activities or programs of national significance, such as the North Country National Scenic Trail.
- Is needed to protect wildlife, fish, and wetland values.
- Has cultural or historical values that are threatened or whose value would be enhanced by public ownership.
- Is within proposed wilderness.
- Is needed for public recreation purposes.
- Meet demand for Forest resources.

Acquire conservation easements rather than fee ownership to the extent practical where existing private land use is providing or can provide the desired condition for wildlife habitat, scenic river corridors, open areas, or other resource management objectives.

Avoid encumbering land available for exchange with land uses that compromise land exchange opportunities.

In exchange of lands, give priority to the offering of:

- Land that is suited to and needed for community development and other public purposes.
- Lands whose retention would require unusually high investments for landline location, access, and other management activity.

Obtain access needed for Forest management purposes. Coordinate access needs with those of other public and private landowners.

Subsurface
Ownership

Subordinate or acquire subsurface rights when all of the following conditions exist:

- Conflicts between surface values and mineral activities cannot be mutually resolved.
- The public benefits from the surface values exceed the cost of acquiring subsurface rights.
- The cost is consistent with budget priorities.

A

7100 Landline
Location

Prior to implementation of management projects, locate, survey, post, and mark adjacent National Forest System boundaries in accordance with standard Forest land surveying operations (see FSM 7153).

Locate, survey, post, and mark first those National Forest System boundaries where highest resource program benefits can be achieved, where National Forest System land adjoins corporate lands and lands administered by other public agencies, where further landownership adjustment is unlikely, where activities on adjacent private or other governmental lands may threaten the recreation experiences or resources of the National Forest System tract, and/or where adjacent landowners are likely to be sensitive to land management practices and ownership boundaries.

Use the following priorities for completing land survey projects:

1. Search for and monument corners.
2. Run compass boundary lines where National Forest System land adjoins corporate lands and lands administered by public agencies.
3. Reestablish corners.
4. Mark lines and corners to standard.

7300 Buildings
and Structures

Provide buildings and structures needed to support resource management objectives.

7400 Public
Health and
Pollution
Control

Water Supply

Drinking water may be provided at developed recreation, interpretive, and administrative sites. If provided, it must meet federal and state regulations and be protected to ensure its continued quality.

Solid Waste

Dispose of refuse generated or deposited on National Forest System lands through community or areawide systems that meet federal, state, and local regulations.

Cooperate and coordinate with local government agencies in the location and development of needed solid waste disposal facilities.

Emphasize and promote use of carry-in/carry-out method of disposal.

Waste Water Treatment

Septic wastes from developed recreation, administrative, and interpretive sites will be treated at the site or transported off site to a federal and state approved wastewater treatment system.

7700
Transportation
System

Roads

Maximize use of existing roads.

Emphasize the use of road design and construction standards that are no greater than needed to meet the intended use.

Locate and construct all roads on suitable sites maximizing economy of road haul, design, construction, and maintenance by minimizing cuts and fills (lays lightly on the land), providing for off-road drainage, and meeting visual quality objectives.

Coordinate transportation planning activities with state, county, township, and local government units. Review project proposals and plans jointly to determine leadership and funding roles and approvals.

Coordinate road construction and road maintenance activities with state, county, township, and local governments where both agencies have an interest in the facility.

Avoid construction of new collector roads; the collector system of roads is essentially in place.

Reconstruct existing collector roads to the standard needed for land management practices considering safety, erosion control, improvement of load-bearing capacity, and reduction of travel and maintenance costs.

Reconstruct short stretches of road to improve alignment and avoid private property.

In accordance with management prescriptions, provide road development and management including road closures that conforms to the appropriate Recreation Opportunity Spectrum (ROS) Class (see Forest Plan Appendix F) and special wildlife habitat management requirements for the management area.

Identify system road needs through a joint transportation planning effort involving District staff, Engineering, and other resource staff on a management or opportunity area basis utilizing the integrated resource management process. Document the final decision.

■ A ■

Identify all existing roads. Determine those needed for administration and public use. Obliterate unneeded roads in an orderly and cost-effective manner as projects are scheduled in those areas.

Place any road needed long-term on the transportation system. Use the transportation system planning process to identify and design transportation needs to serve long-term management.

For each arterial or collector road to be constructed or reconstructed (including Forest Highways that meet this definition), identify corridors up to 1/2 mile wide within which the road will be located.

Design and construct collector and local roads so they are suitable for transporting forest products and accommodating a planned motorized recreation use.

Arterial roads will be, as a minimum, designed and constructed for transporting forest products and accommodating planned motorized recreation use; will be open; and will be maintained for safe and moderately convenient travel suitable for passenger cars (maintenance level 3 or higher).

Rebuild arterial and collector roads that are open to public travel as necessary to permit safe and moderately convenient travel on road surfaces suitable for passenger cars.

Repair or replace bridges and major culverts to state legal load-limit standards.

All temporary roads will be planned and constructed to be revegetated.

Accomplish revegetation of temporary roads to control erosion immediately following the closure of the road, preferably during the same growing season the disturbance occurs.

Revegetation of other temporary roads will be accomplished in a reasonable period of time, not to exceed 2 years, after the termination of the contract, lease, or permit.

Refer to 2500 Water and Soil Resource Management - Watershed Disturbance for additional direction and standards and guidelines.

Road fill will be removed from rivers, flood plains, and wetlands when road abandonment takes place to reestablish natural flow and riparian values.

Consider natural surface and subsurface drainage patterns in road location and designing.

In general, strive to avoid crossing perennial streams with temporary roads.

Locate new roads outside riparian areas whenever possible. Relocate or remove existing roads occurring within these landscapes, if feasible, or manage the roads with seasonal closures.

Avoid constructing roads across other ownerships except when the existing road is on a suitable location, can serve Forest needs, and an easement can be obtained or when locations across National Forest System lands are not economical and difficult to meet resource management objectives.

Minimize the number of local roads with direct access to Sensitivity Level I and II arterial and collector roads, given considerations for cost effectiveness and visual quality objectives.

Avoid construction of roads over existing hunter or fisherman trail access where possible and efficient.

The Forest Service will consider construction of local roads with appropriated funds in the following situations:

- Where multiple timber sales are planned to be operated in the same time frame using the same local road system.
- Where long-term multiresource needs require an initial investment that exceeds that justifiable for the initial project.

Road Design Standards

Design all roads to meet the following standards:

To cross riparian areas:

- The minimum possible area is used. Do not align roads to pass through the long axis of the riparian area.
- Suitable fish passage is provided.
- Water flows are diverted from roads and trails to minimize erosion and prevent sediment from reaching the stream.
- Approaches to stream crossings are stabilized during and after construction and revegetated to prevent erosion and possible sedimentation.

When riparian areas cannot be avoided:

- Roads will be designed, constructed, and maintained to minimize blockage of expected high water.
- Gravel or blacktop surfacing, sediment ponds, and other erosion control measures will be used where needed to prevent erosion/sedimentation from occurring.
- Minimize disturbance to streambed when depositing fill material for bridges and culverts.
- Wherever possible, borrow material will be obtained from outside the riparian area.
- Unsuitable excavated material from road construction will not be deposited in lakes, streams, or wetlands.

Existing collector roads will be rebuilt to meet current or projected needs:

- To improve load-bearing capacity.
- To correct drainage problems.
- To reduce unsafe driving conditions.
- To reduce excessive maintenance.
- To increase design speed.
- To reduce user costs.

To construct local roads:

- Refer to Figures 4.2 and 4.3-Typical cross sections for local roads.
- Use the minimum amount of earthwork.
- Design speed will usually be less than 15 mph.
- Usually single lane except two lanes within recreation sites.
- Surface width will be 10 to 14 feet except within recreation sites 10 to 20 feet.
- Turnouts optional, usually not intervisible, depending upon traffic management.
- Minimum horizontal alignment is generally 100-foot radius.
- Maximum gradient is usually less than 12 percent.
- Minimum clearing limit may be 0 to 3 feet horizontally beyond fill slope or cut slope.
- Disposal of construction slash and unsuitable excavation material is consistent with the visual quality objective of the area.
- Construct drainage as needed to minimize maintenance and to protect resources.
- Normally, natural revegetation is acceptable, except that large cuts and fills are seeded and mulched.
- Roads may be closed with natural materials or gates meeting standards of the Manual on Uniform Traffic Control Devices (FSH 7109.31). When gated, a parking space or turn-around will be provided.
- Apply surfacing as needed for intended use and local condition.

To construct temporary roads:

- Refer to Figure 4.3-Typical cross section for temporary roads.
- Lay lightly on the land with a minimum of earthwork.
- Available only during period of use for which it was constructed, most commonly during timber sale.
- Obliterated after use.
- Design speed is usually less than 10 mph.
- Single lane.
- Normally, native surface.
- Surface width will be 10 to 14 feet.
- Minimum horizontal alignment.
- Maximum gradient is usually less than 12 percent.
- Clearing width is generally less than 24 feet.
- Residue disposal is consistent with the visual quality objective of the area.
- Do not block natural and installed drainages.
- Install drainage as needed to protect resources.

To obliterate temporary roads:

- Remove drainage structures and all fills associated with drainages to original elevations to permit normal maximum flow of water.
- Eliminate road ditches and shape disturbed areas.
- Return the area to vegetative production.
- Provide cross drainage and stabilize exposed surfaces to minimize movement of sediment from road to stream.
- Seed and mulch as needed.
- Effectively block the road to normal passenger vehicle traffic.

Road
Maintenance

Provide maintenance, resource protection, and drivability commensurate with road use, the recreational setting, and experiences associated with the management area.

Maintain roads for safe and moderately convenient travel suitable for passenger cars (at least maintenance level 3) if passenger car travel is intended, for limited passage of traffic (maintenance level 2) if passage of vehicles is limited, or for basic custodial care to keep drainage functional and the road stable (maintenance level 1) if closed to vehicular traffic (see FSM 7721.11).

Provide adequate safety, regulatory, directional, and informational signs for the traveling public.

Install signs in the following priorities:

1. Warning and regulatory signs on arterial roads.
2. Warning and regulatory signs on collector roads.
3. Route markers on arterial roads.
4. Directional signs on arterial roads.
5. Route markers on collector roads.
6. Directional signs on collector roads.
7. Route markers on local roads.
8. Informational and geographic identification signs on arterial and collector roads, especially those with

high recreation use (see Manual on Uniform Traffic Control Devices (FSH 7109.13) and Sign Handbook (FSH 7109.11)).

Road Closure

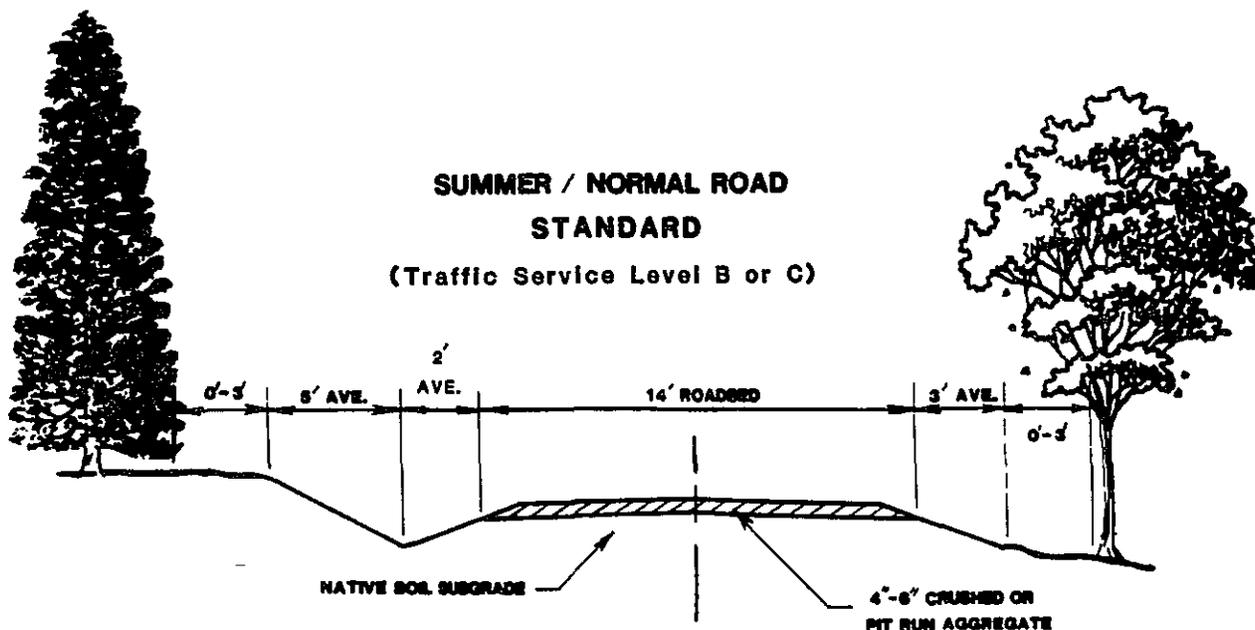
Roads may be closed to public use, restricted by vehicle type, or restricted by season of use.



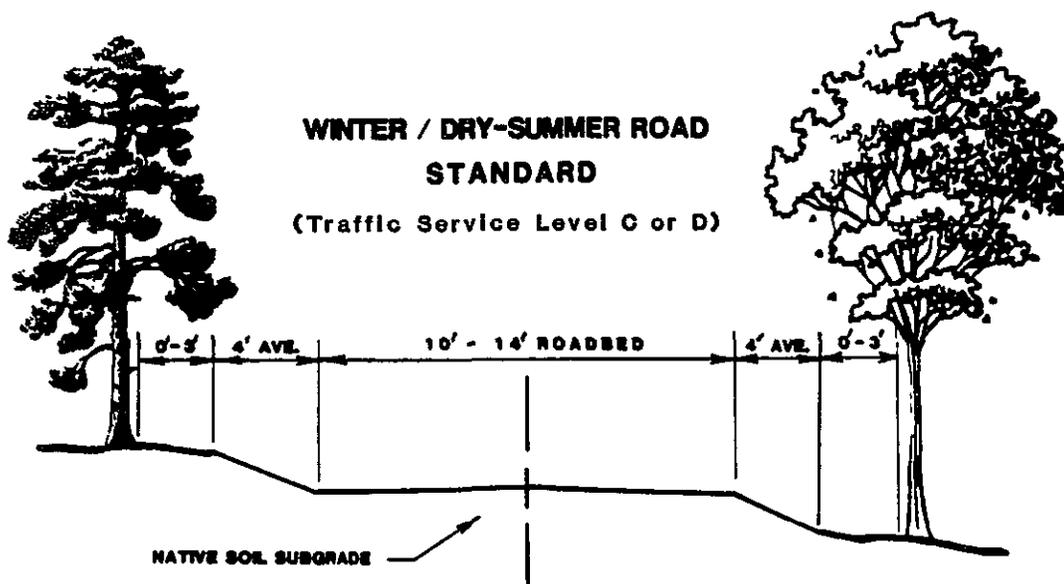
Close all new and existing local roads as necessary to meet road density requirements of 1 mile per square mile of open roads to passenger vehicles (2- and 4-wheel drive) in areas of the Forest where management is to provide habitat for wildlife species requiring remoteness. Emphasis will be on closing these roads during the fall hunting seasons (September through December).

Control access to winter or winter/dry weather roads where needed to prevent damage to the roadway and to protect the resources. Control as necessary during periods of use by a temporary device such as a gate. Control access between periods of use by blocking the road with a ditch, berm, large boulders, stumps, gate, or other means.

FIGURE 4.2 TYPICAL CROSS SECTIONS FOR LOCAL ROADS



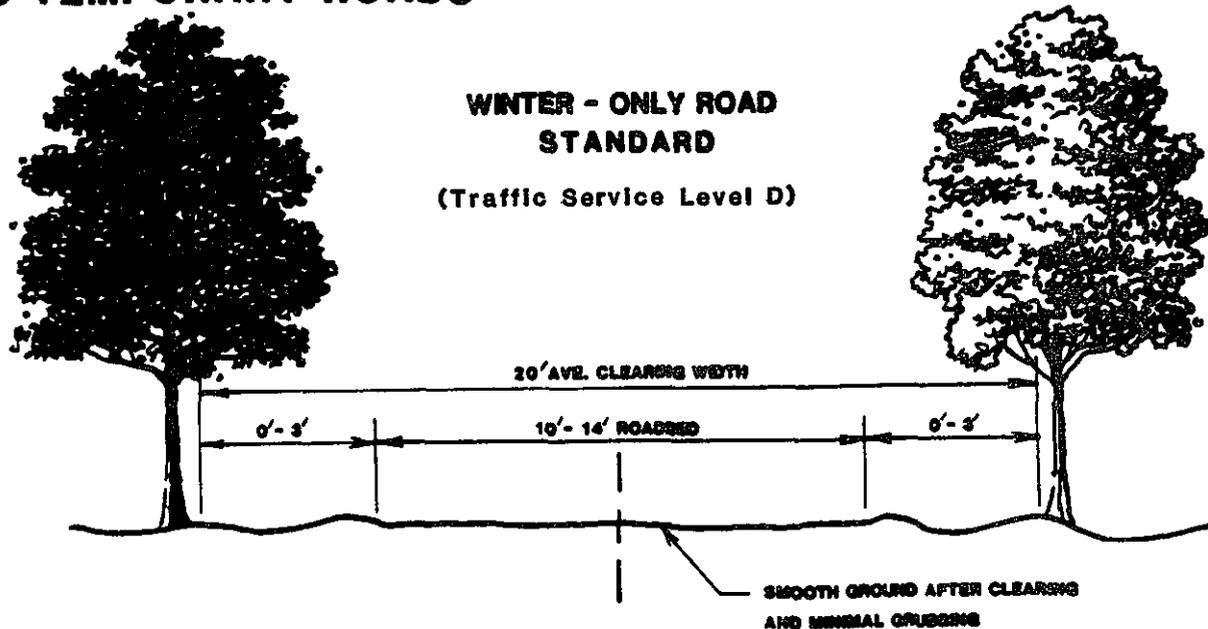
Roads that can be used all year with the exception of spring breakup and extremely wet periods. These roads are Traffic Service Level B or C. ^{1/} The roads are constructed primarily from native soils, but some segments may be constructed with borrow material. Ditching is used only where needed to provide a drained roadbed and to protect the resources. Culverts or pipes are used for cross-drainages. Aggregate surfacing is used except where native soils are adequate to support traffic.



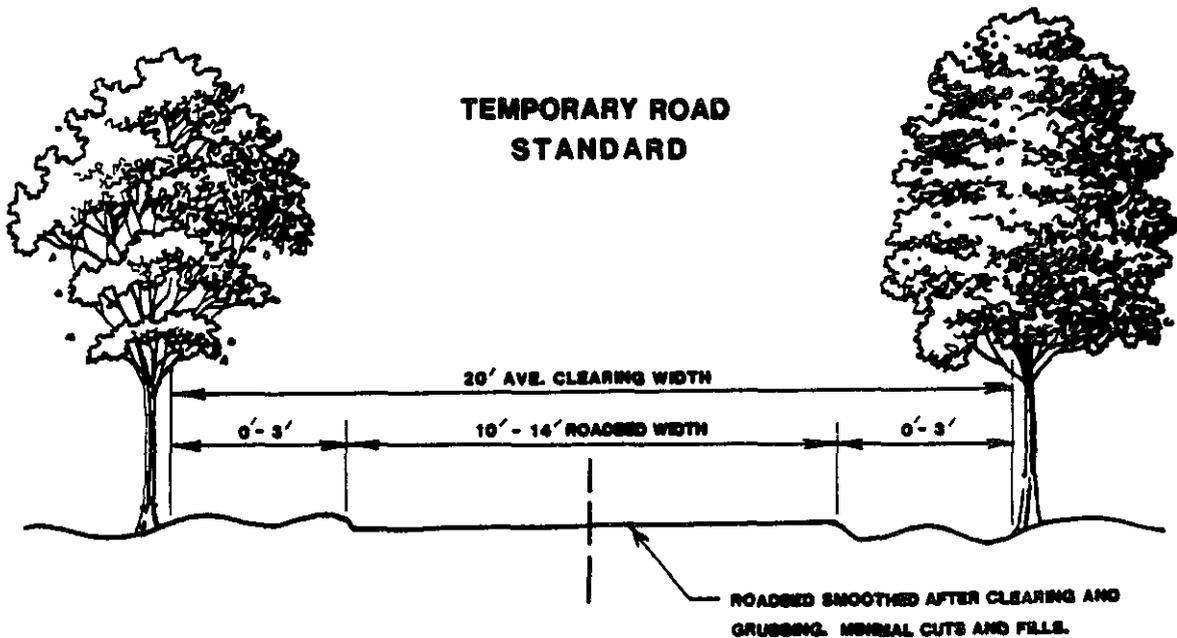
Roads that can be used during the winter in a frozen condition or during dry periods in the summer. These roads are Traffic Service Level C or D. ^{1/} The roads are constructed primarily from native soils, but some segments may be constructed with borrow material. Ditching may be used where needed to provide a drained roadbed and to protect the resources. Culverts or pipes are used for most cross-drainages. Aggregate surfacing is used only on steep grades or to stabilize soft areas.

^{1/} For descriptions, refer to USDA-Forest Service publication "National Forest Roads for All Uses," Eastern Region, 1985.

FIGURE 4.3 TYPICAL CROSS SECTIONS FOR LOCAL AND TEMPORARY ROADS



Roads are constructed by leveling native soils and topsoil after clearing activities. These roads can only be used during the winter when the roadbeds are frozen. These roads are Traffic Service Level D. ^{1/} Ditching is used only where needed to protect the resources. Culverts or pipes are only used for watercourses that are flowing in the winter, or where they are needed to protect the resources. No aggregate surfacing is used.



Roads are constructed by leveling the native soils after clearing and grubbing activities. Cut and fill depth are kept to a minimum. Ditches, drainage structures, and outsloping are used only where needed to maintain a dry roadbed and to protect the resources. After use of the road is complete, all drainage structures are removed and ruts and berms are removed or graded to return the land within the clearing width to as natural an appearance as possible. Water bars, cross ditches, and seeding is employed as needed to minimize resource damage and to promote a natural appearance. The former road is blocked to prevent further use, and the land is allowed to return to production.

^{1/} For descriptions, refer to USDA-Forest Service publication "National Forest Roads for All Uses," Eastern Region, 1985.

Forestwide Vegetative Management Standards and Guidelines

The Forestwide vegetative management standards and guidelines are the part of the management direction designed to guide any Vegetative management practices implemented on the Forest. These apply in addition to the Forestwide standards and guidelines and the requirements of a particular management area prescription.

1900 Land and
Resource
Management
Planning

Vegetation
Management

If vegetation management is planned for the area, ensure diversity of vegetation on the management area.

VEG

Provide a mix of openings, regeneration, old growth, mast, wetlands, forage, thermal cover, and other vegetation types, interspersed to meet objectives within the range of composition desired for the management area.

Where possible, space habitat components throughout the management area, considering desired future condition, existing vegetation, and adjacent lands.

Manage timber stands to retain selected inclusions of hemlock, oak, cedar, paper birch, black cherry, and aspen. The preferred method for leaving trees in clearcuts or regenerated shelterwood cuts is in groups. Thin around the residual wildlife trees to promote crown development and general tree vigor. Individual leave trees in the above areas must be windfirm and resistant to sunscald or dieback under exposed conditions. On appropriate soil-sites at final harvest, plan for regeneration of inclusions of these species.

Regenerate paper birch where site conditions are suitable to retain the type, where such stands are visible from travel routes, and within and adjacent to use areas.

Manipulate the vegetation canopy in and along streams to provide water temperatures within the prescribed ranges for the fisheries objective.

Avoid falling snags unless there is good reason for taking one out, such as to remove a safety hazard or in site preparation for artificial regeneration.

Eastern hemlock and hemlock/hardwood clumps, particularly with yellow birch present, are excellent choices for leave groups and offer long-term opportunities for cavity and nesting habitat.

2400 Timber
Management

Silvicultural
Systems

Harvest cutting methods must be consistent with the silvicultural system for the desired forest type to be managed.

Implement harvest practices consistent with the objectives of the management area. Use standard practices such as single-tree selection, group selection, shelterwood, seed tree, and clearcutting as appropriate. Refer to Appendix C in the Forest Plan for clearcutting rationale and additional discussion of harvest cutting methods.

The following table displays the harvest cutting methods considered appropriate for regeneration or conversion to each of the major forest types on the Ottawa National Forest. The harvest cutting methods are expressed in terms of the desired forest type which is to be regenerated by one of the appropriate harvesting cutting methods. The desired forest type which is regenerated may be the same as the existing type or it may be converted from a different type.

Harvest Cutting Methods by Desired Forest Type

Desired Forest Type 1/	Clear-cutting 2/ 3/	Shelter-wood 2/	Selection	Strip
Aspen	X			
Paper birch		X		
Sugar maple		X	X	
Mixed upland hardwood/hemlock		X		
Lowland hardwoods		X	X	
Jack pine	X			
Red pine	X			
White pine		X		
White spruce-fir	X	X	X	X
Balsam fir	X	X	X	X
Lowland conifer	X	X		X
Nonforest openings and uses	X			

1/ The desired forest type is the type to be regenerated through maintenance of an existing type or converted from another forest type. For example: conversion of hardwood to aspen would utilize harvest cutting methods for aspen (clearcutting).

2/ Clearcut and shelterwood may include intermediate cuts during the rotation of the stand.

3/ Clearcutting may be used to convert a forest type where clearcutting is not indicated to one where clearcutting is indicated. For example, the mixed upland hardwood type may be clearcut to convert to aspen, jack pine, red pine, white spruce-fir, or balsam fir types. White pine may be clearcut to convert to aspen, jack pine, red pine, white spruce-fir, or balsam fir types.

Silvicultural Practices

This direction supplements silvicultural guides to accommodate local conditions and to achieve and maintain the desired vegetative condition, once that desired condition is determined for a specific site (see Compartment Prescription Handbook, FSH 2409.21d, Chapter 290).

The determination of desired condition requires management considerations such as:

- Vegetative composition objective for the management area.
- Existing vegetative type.
- Spatial distribution of vegetative types within the management area.
- Potential soil-site productivity for suitable vegetative types based on Ecological Classification System information.
- Relative costs and benefits of alternatives.
- Ability to manage and protect.
- Need for intrastand diversity.

The following guides are presented in terms of the desired forest type to be regenerated and/or managed. Therefore, the guides for a given forest type (such as aspen) would apply for existing aspen stands being maintained or regenerated to aspen, and would also apply to stands of any other existing type (such as hardwoods) that is to be converted to a desired forest type (such as aspen).

Aspen

Final Harvest

Regenerate existing aspen, or convert another type to aspen by clearcutting using full-tree, tree-length, or shortwood logging methods.

Rotation ages for existing and regenerated aspen are:

Stand	Range	Average
	(years)	
Existing aspen	40-90	64
Regenerated aspen	40-70	54

Minimum parent stand stocking requirements for regeneration to aspen are 50 aspen trees (20 sq.ft. basal area) per acre.

Generally, harvest and prepare sites for regeneration year-round. When regenerating aspen from a parent stand with sparse aspen stocking, harvest and site preparation should be scheduled during late fall and winter conditions.

Consider conversion to other forest types on sites with potential site index less than 55 for aspen.

Avoid skidding with mechanized equipment after the second growing season following clearcutting.

Intermediate Harvest

Generally, commercial thinnings of aspen will not be practiced. A single commercial thinning may be scheduled on sites with potential site index 70 or better for aspen for the production of sawtimber and veneer. If scheduled:

- Thin at 30 to 40 years of age.
- Maintain residual stand of 80 to 90 sq.ft. basal area per acre after thinning.

Reforestation

Favor natural regeneration of sprout-origin stands. If planting is to be done, use genetically improved aspen. After clearcutting, if the residual crown cover is 15 percent or greater, schedule site preparation to encourage aspen sprouting:

- Schedule site preparation before the second growing season following final harvest.
- Reduce crown cover of residual trees 2 inches and larger in diameter to less than 5 percent of the area.

Timber Stand Improvement

Consider release of established aspen stands if site preparation was not accomplished.

Precommercial thinning of aspen may be scheduled if the following actions are taken:

- Justify project with an economic analysis.
- Schedule stands with site index 80 or better for aspen.
- Schedule at 10 to 15 years of age, any season of the year.
- Leave residual stocking of 550 to 1,000 trees per acre. Favor trees with good growth and resistance to pest problems (for example, hypoxylon canker, white trunk rot, and others).

Paper Birch

Final Harvest

Regenerate existing paper birch stands or convert other types to paper birch using the two-cut shelterwood method.

Rotation ages for existing and regenerated paper birch are:

Stand	Range	Average
	(years)	
Existing paper birch	40-90	64
Regenerated paper birch	40-70	54

Favor winter logging to reduce root damage and damage to regeneration.

Mark the shelterwood seed cut (first cut) to maintain residual stocking of 70 percent to 80 percent of the crown cover.

Schedule the shelterwood removal cut (second cut) to remove residual overstories after seedlings attain a minimum height of 3 feet and a minimum of 5,000 well-spaced seedlings per acre.

Intermediate Harvest

Consider commercial thinning at 40 to 65 years of age on sites with site index of 56 or greater for paper birch. Maintain residual stand of 90 to 100 sq. ft. basal area per acre after thinning.

Reforestation

Schedule site preparation immediately prior to the shelterwood seed cut, preferably after leaf-off and prior to snowfall.

Expose 50 percent or more mineral soil in site preparation activities. Use fire or methods such as small dozer with blade, disking, or disk trenching that incorporate surface organic and mineral soil and reduce undesired competition.

Use supplemental seeding as needed to ensure an adequate amount of regeneration.

Plant paper birch on a limited basis primarily for visual resource enhancement.

Timber Stand Improvement

Generally, precommercial thinning is not used.

Release of paper birch may be scheduled to enhance the visual resource.

Sugar Maple

Final Harvest

Regenerate existing sugar maple stands or convert another type to sugar maple (stands that are 75 percent or more sugar maple) with either uneven-aged or even-aged management methods, using any logging method that will not degrade the site or cause excessive damage to residual trees.

Consider the following criteria in developing a mix of even-aged and uneven-aged sugar maple stands:

- Management emphasis of the management prescription (for example, management prescription 2.1 emphasizes uneven-aged management).
- Even-aged management will be favored on low quality sites.
- Even-aged management will be favored in areas adjacent to thermal cover.
- Even-aged management may be favored on sites with potential to establish and maintain midtolerant species.
- Uneven-aged management may be favored in visual resource areas of high sensitivity and in semiprimitive motorized or nonmotorized areas.
- Uneven-aged management may be favored on sites that have strong successional trends to sugar maple.
- Uneven-aged management will be favored on sites where hazards or limitations exist for even-aged management harvest methods.
- Other ecological factors (for example, soil productivity, soil moisture relationships).

Even-aged Management

Regenerate sugar maple stands managed even-aged using the two-cut shelterwood method.

Rotation ages for sugar maple stands managed even-aged are:

<u>Stand</u>	<u>Range</u>	<u>Average</u>
	<u>(years)</u>	
Existing sugar maple	70-180	124
Regenerated sugar maple	60-130	96

Schedule the shelterwood removal cut after seedlings attain a minimum height of 3 feet and a minimum of 5,000 well-spaced seedlings per acre.

Uneven-aged Mangement

Regenerate sugar maple stands managed uneven-aged using the individual-tree-selection practice.

For stands managed uneven-aged, there is no restriction on acreage of selection cuts within any one 10-year period. Work toward the desired stand structure over two or more cuts.

Marking guides will be prepared for each stand to be cut under uneven-aged management.

Marking guides will be based upon the integrated resource management objective for the area, existing stand structure, species composition, site potential, and the appropriate level of management intensity to achieve management objectives.

For example, a stand-structure objective with 10-year reentry interval could be:

<u>Diameter Class</u>	<u>Basal Area</u>
<u>(diameter-breast-height)</u>	<u>(square feet)</u>
20" to 24"	20
16" to 18"	25
12" to 14"	20
6" to 10"	20

The marking guide should include the stand structure objectives (residual basal area by diameter class), maximum tree diameter, planned cutting cycle length, and sawtimber volume to be removed (see General Technical Report NC-39 and Research Paper NC-199, NCFES).

Intermediate Harvest

For stands managed even-aged, intermediate cuts are generally scheduled to upgrade the stand and increase tree growth:

- Marking guides will be prepared for each even-aged stand to be thinned.
- Normally, thin at 10- to 20-year intervals, beginning as soon as the stand is operable.
- Avoid thinning during the sap-flowing season.
- Strip thinning may be acceptable for the first entry.

Initial Harvest for Previously Unmanaged Stands - Even-aged or Uneven-aged

The following applies to previously unmanaged upland hardwood stands with a management objective of either even-aged or uneven-aged management. The stands are predominantly pole-sized with an average DBH of main canopy trees 10 inches or less. Included may be stands that had previous partial management such as aspen removed or TSI.

Even-aged

Emphasis is on crown release of up to 75 crop trees per acre (up to 100 of the stand if predominantly yellow birch).

Residual basal area will be at the minimum stocking level found in General Technical Report NC-39 NCFES, Figure 6, page 21.

Reducing stocking to this low level will be done one time. The next cut in about 20 years will maintain a residual stocking of 90 percent crown cover.

Uneven-aged

Emphasis is on crown release of up to 53 crop trees per acre and the creation of 5 to 8 regeneration holes per acre in the canopy. Each hole should be 25 to 40 feet in diameter.

Residual basal area will be at the minimum stocking level found in General Technical Report NC-39 NCFES, Figure 6, page 21.

The next cut in about 20 years will follow the stand structure objectives for uneven-aged management.

Reforestation

Favor natural regeneration of seed-origin stands with both uneven-aged and even-aged management.

For stands managed even-aged, residual trees to be retained after thinning and shelterwood seed cut should be of desirable species and form to be the seed source. Site preparation to prepare a seedbed is usually unnecessary with the shelterwood seed cut.

Timber Stand Improvement

Removal of any trees overtopping reproduction is desirable.

Weeding and cleaning of sugar maple is not applicable.

Precommercial thinning may be scheduled in stands that will not be merchantable within 10 years. Thin once per rotation. If scheduled, release 50 to 70 acceptable crop trees per acre, providing about 5 feet of crown-growing space on 3 to 4 quarter-faces per tree:

- At 25 to 40 years of age.
- When average diameter-at-breast-height is less than 7 inches.
- Any season of the year.
- On sites with site index greater than 60 for sugar maple.
- Where bud moths are a problem, maintain dense stands to encourage straight, unforked trees. Thinning should be made so that sugar maple trunks are shaded to discourage attack by maple borer.

Mixed Upland Hardwoods/Hemlock

Final Harvest

Regenerate existing stands of mixed hardwood and hemlock stands or convert other types to mixed hardwood or hemlock (stands that are less than 75 percent sugar maple) with even-aged management methods, using any logging method that will not degrade the site or cause excessive damage to residual trees.

Regeneration is usually by two-cut shelterwood method for mixed hardwoods, and by three-cut method for hemlock.

Rotation ages for existing and regenerated mixed hardwood and hemlock are:

Stand	Range	Average
	(years)	
Existing mixed hardwood	70-180	124
Existing hemlock	150-210	184
Regenerated mixed hardwood	60-130	96
Regenerated hemlock	150	150

Residual crown cover to be retained after shelterwood seed cut, depending on the primary species being regenerated, is:

<u>Species</u>	<u>Residual Crown Cover</u>
Hemlock	80 percent or more
Yellow birch and other Hardwoods	60-70 percent

Schedule the shelterwood removal cut to remove residual overstories after seedlings attain a minimum height of 3 feet and a minimum of 5,000 well-spaced seedlings per acre.

Intermediate Harvest

Intermediate cuts are generally scheduled to upgrade the stand and increase tree growth:

- Marking guides will be prepared to each stand to be thinned.
- Normally, thin at 10- to 20-year intervals, beginning as soon as the stand is operable.
- Avoid thinning during the sap-flowing season.
- Strip thinning may be acceptable for the first entry.
- Favor retention of acceptable growing stock of species other than sugar maple during thinning.

Initial Harvest for Previously Unmanaged Stands - Even-aged or Uneven-aged

The following applies to previously unmanaged upland hardwood stands with a management objective of either even-aged or uneven-aged management. The stands are predominantly pole sized with an average DBH of main canopy trees 10 inches or less. Included may be stands that had previous partial management such as aspen removed or TSI.

Even-aged

Emphasis is on crown release of up to 75 crop trees per acre (up to 100 of the stand if predominantly yellow birch).

Residual basal area will be at the minimum stocking level found in General Technical Report NC-39 NCFES, Figure 6, page 21.

Reducing stocking to this low level will be done one time. The next cut in about 20 years will maintain a residual stocking of 90 percent crown cover.

Uneven-aged

Emphasis is on crown release of up to 53 crop trees per acre and the creation of 5 to 8 regeneration holes per acre in the canopy. Each hole should be 25 to 40 feet in diameter.

Residual basal area will be at the minimum stocking level found in General Technical Report NC-39 NCFES, Figure 6, page 21.

The next cut in about 20 years will follow the stand structure objectives for uneven-aged management.

Reforestation

Favor natural regeneration of midtolerant species.

Design shelterwood seed cuts:

- Mark from below.
- Maintain regular spacing.
- Retain desirable species.
- Remove undesirable trees and trees of poor quality.

Site preparation methods may be scheduled that reduce sugar maple competition, improve genetic tree quality, and prepare a mineral-soil seedbed. Schedule site preparation:

- Immediately before or after the shelterwood seed cut, after leaf-fall when possible.
- Over 50 to 75 percent of the stand.
- To coincide with good or better seed crops of target species within two growing seasons.
- To incorporate humus and mineral soil.
- To reduce advanced regeneration of sugar maple in the understory.

Use supplemental seeding of hemlock in areas being regenerated to hemlock.

Plantings of hemlock, yellow birch, red oak, and white pine may be scheduled on sites where the species is a member of the successional pattern and is needed to provide for wildlife habitat needs.

Timber Stand Improvement

Schedule cleaning and weeding of mixed upland hardwood/hemlock stands where heavy competition from sugar maple is present or where needed to maintain yellow birch and thin clumps of basswood and red maple.

Schedule cleaning and weeding at 8 to 12 years of age.

Precommercial thinning may be scheduled in stands that will not be merchantable within 10 years. Thin once per rotation. If scheduled, release 50 to 70 acceptable crop trees per acre, providing about 5 feet of crown-growing space on 3 to 4 quarter-faces per tree:

- At 25 to 40 years of age.
- When average diameter-at-breast-height is less than 7 inches.
- At any season of the year.
- On sites with site index greater than 60 for sugar maple.

Girdling or felling with hand tools is preferred.

Lowland Hardwoods

Final Harvest

For lowland hardwood stands without a conifer component (e.g., black ash), regenerate using the two-cut shelterwood method, using any logging method that will not degrade the site or cause excessive damage to residual trees.

For mixed lowland hardwood/conifer stands, regenerate on a case-by-case basis because of variable stand and site conditions. Soil-site investigations will be made for each planned treatment and for monitoring vegetative response to treatment.

Rotation ages for existing and regenerated lowland hardwood stands are:

Stand	Range	Average
	(years)	
Existing lowland hardwoods	70-180	124
Regenerated lowland hardwoods	60-130	96

Mark the shelterwood seed cut to maintain residual stocking of 60 percent to 70 percent crown cover.

Schedule shelterwood removal cut in the winter with snow cover to protect against seedling damage.

Intermediate Harvest

Intermediate cuts may be scheduled to upgrade the stand and increase tree growth. If scheduled,

- Marking guides will be prepared for each stand to be thinned.
- Normally, thin at 20- to 30-year intervals, beginning at about 50 years of age.

Residual stocking levels will be based on species composition, average stand diameter, tree quality, and cutting cycle length (see General Technical Report NC-39, NCFES, for a guide).

Reforestation

Favor natural regeneration of seed-origin stands.

Site preparation is generally limited to removal of unmerchantable trees (culls) and trees of poor genetic quality.

Planting of lowland conifers, hemlock, or yellow birch may be done on a limited basis.

Timber Stand Improvement

Generally, release and precommercial thinning will not be done.

Jack Pine

Harvest

Regenerate existing jack pine stands or convert other types to jack pine by clearcutting using full-tree, tree-length, or shortwood logging methods, based on silvicultural objective and characteristics of the specific site. Frequency of entry is usually once each rotation.

Rotation ages for existing and regenerated jack pine are:

<u>Stand</u>	<u>Range</u>	<u>Average</u>
		(years)
Existing jack pine	50-90	69
Regenerated jack pine	50-80	67

Favor shorter rotation in areas of high risk for jack pine budworm.

In general, jack pine on sites with site index 55 or better may be converted to red pine, except that jack pine will be retained as needed to obtain composition objectives for the management prescription and for spatial arrangement within the management area.

Intermediate Harvest

A single commercial thinning may be done at 25 to 35 years of age in stands with a site index of 60 or better for jack pine and average crown ratios are 40 percent or greater.

Avoid removing more than one-third of the basal area in a single thinning, provided that the residual stocking level is not reduced below a basal area of 70 to 80 sq. ft. per acre.

Thin from above and below because "wolf" and suppressed trees produce flowers which encourage budworm attack.

Reforestation

Match the method of logging and site preparation to the intended method of regeneration.

Regenerate jack pine by natural regeneration in LTA 15. Do not make further investments in order to achieve above 40 percent stocking.

Favor natural regeneration of jack pine where a sufficient quantity and quality seed source is present, on sites more susceptible to spittlebug infestation, and where adequate site preparation can be accomplished in LTA 1, 14, 14a, 14b, 17, and 18.

Direct seeding of jack pine is preferred over planting to supplement natural regeneration when 40 percent stocking is not met at 3 years.

Direct seed in early spring prior to snowmelt.

Obtain seed from approved seed collection areas.

Avoid planting jack pine on sites where release would be anticipated.

Investment in planting jack pine should be made only on sites with site index of 60 or better. Machine planting is preferred whenever site conditions are favorable. Either bare-root or container-grown stock may be planted.

Plant bare root stock as early in the spring as possible.

Timber Stand Improvement

Generally, release of jack pine is not necessary to achieve reforestation.

Release will be scheduled if evaluation of the stocking of planted species and the type and degree of competition indicates the need for release.

If there is need for release, chemical release will be the primary method on suitable sites.

Mechanical release will be used in areas where it is most cost effective or where chemical release is not advisable due to proximity to open water or other resource and environmental considerations.

Schedule mechanical release during the growing season to minimize sprouting.

Schedule one release in the rotation if necessary to release regenerated stand from overtopping undesirable vegetation.

Generally precommercial thinning of jack pine is not needed. Precommercial thinning may be scheduled if the stand contains over 2,000 trees per acre and if there is need to prevent stagnation.

If there is need for precommercial thinning:

- Thin once per rotation.
- Thin stands at 5 to 15 years of age.
- Mechanical thinning is preferred.
- Maintain residual stocking of 600 to 1,000 trees per acre.

Red Pine

Final Harvest

Regenerate existing red pine stands or convert other types to red pine by clearcutting using full-tree, tree-length, or shortwood logging methods.

Rotation ages for existing and regenerated red pine are:

Stand	Range	Average
	(years)	
Existing red pine	90-220	137
Regenerated red pine	50-130	91

Natural regeneration is not recommended.

Shelterwood and seed tree methods are not recommended due to poor stand establishment and the disease siroccoccus shoot blight.

Intermediate Harvest

Schedule commercial thinnings every 10 to 15 years, beginning at 25 to 40 years of age.

Residual stocking levels are:

Average DBH (in inches)	Basal Area After Thinning (in square feet)
5-9	80-100
10-15	100-120
15 or more	120-140

Avoid thinning during the sap-flowing season.

When determining residual stand density for a thinning prescription, the following criteria should be considered: crown ratio, aspect, slope, adjacent stand (windward), soil-site.

Row or strip thinning may be acceptable for the first thinning except where visual resource values, such as foreground areas of travel routes, require other methods.

Reforestation

Maintain red pine plantations with natural inclusions of other species. Natural inclusions should be 1 to 5 acres in size.

Identify sites that have a history of poor red pine establishment and regenerate more suitable species.

All areas being regenerated to red pine require methods of site preparation and planting that are compatible with each other and with site conditions. Also, schedule harvest at times of the year (early growing season) to minimize sprouting of competing vegetation and reduce release cost.

Investment in site preparation and planting should only be made on sites with a site index of 56 or better for red pine.

Schedule site preparation as needed to reduce slash, to control shrubs and other competition, or to expose mineral soil.

Emphasize the site preparation and planting method that is most cost effective on a particular site.

Bare root or container stock may be planted.

Plant bare root stock as early in spring as possible.

Obtain seed for nursery stock from approved seed collection areas.

Direct seeding is not recommended.

Timber Stand Improvement

Generally, one release treatment will be needed to release red pine plantations from competition of broadleaf species.

Release will be scheduled if evaluation of the stocking of planted species and the type and degree of competition indicates the need for release.

Chemical release will be the primary method on suitable sites.

Mechanical release will be used in areas where it is cost effective or where chemical release is not advisable due to proximity to open water or other resource and environmental considerations.

Schedule mechanical release during the growing season (July and August) to minimize sprouting.

One release from Saratoga spittlebug alternate hosts may be needed in plantations around 5 years of age.

Precommercial thinning or pruning will generally not be done.

White Pine

Harvest

Regenerate existing white pine stands or convert other types to white pine, usually by a three-cut shelterwood method, using full-tree, tree-length, or shortwood logging methods.

Rotation ages for existing and regenerated white pine are:

Stand	Range	Average
	(years)	
Existing white pine	90-220	137
Regenerated white pine	50-130	91

For shelterwood seed cut (second cut), retain a residual crown cover of about 40 percent.

Defer shelterwood removal cut (third cut) until regeneration is about 25 feet in height.

Intermediate Harvest

Intermediate cuts are usually scheduled at 10- to 15-year intervals, beginning at about 40 years of age.

Thin to remove up to 40 percent of the basal area, but retain residual stocking level of 100 to 120 sq. ft. of basal area per acre.

Reforestation

Favor natural regeneration to white pine and other conifers when regenerating existing white pine stands.

Underplant rust-resistant white pine under partial shade of low-quality hardwoods or aspen, where potential site index is greater than 60 for white pine and the area is relatively free of ribes species, when converting to white pine.

When conversion to white pine is planned (that is, when natural regeneration of white pine is not expected):

- Spring planting of white pine is preferred.
- Retain a residual crown cover of about 40 percent until regeneration reaches 25 feet in height.
- Periodically remove the overstory by timber stand improvement, rather than by commercial sale, to avoid breakage of the developing stand.

Site preparation will be scheduled as needed to reduce slash, to control shrubs and other competition, and to expose mineral soil.

Use supplemental seeding where natural seed source is expected to be insufficient.

Release will be scheduled if evaluation of the stocking of planted species and the type and degree of competition indicates the need for release.

Chemical site preparation and release will be the primary method for controlling understory competition.

Timber Stand Improvement

Precommercial thinning of white pine generally is not needed.

In areas of high risk of blister rust, periodically prune off lower half of live crown, beginning at age 5, until lower 9 feet of bole is free of live branches.

White Spruce

Final Harvest

Regenerate existing white spruce stands or convert other types to white spruce by clearcut or two-cut shelterwood methods using full-tree, tree-length, or shortwood logging methods.

Rotation ages for existing and regenerated white spruce are:

<u>Stand</u>	<u>Range</u>	<u>Average</u>
	(years)	
Existing white spruce	90-220	137
Regenerated white spruce	50-130	91

Mark the shelterwood seed cut to maintain a residual stocking of 50 percent to 70 percent crown cover.

Schedule the removal cut after regeneration is established, which is usually at 5 to 10 years after the shelterwood seed cut.

In areas of frost danger, the removal cut will be scheduled in two cuts to retain a light overstory until the reproduction is 12 to 20 feet in height.

Intermediate Harvest

Intermediate cuts are usually scheduled at 10- to 20-year intervals, beginning at 30 to 40 years of age.

Thin from below to favor white spruce. Schedule to remove up to 40 percent of the basal area, but retain residual stocking levels of 100 to 120 sq. ft. of basal area per acre.

When determining residual stand density for a thinning prescription the following criteria should be considered: crown ratio, aspect, slope, adjacent stand (windward), soil-site.

Reforestation

Favor natural regeneration using a two-cut shelterwood method.

Mark the shelterwood seed cut to retain at least 40 sq. ft. basal area per acre of acceptable seed trees in the overstory.

Schedule site preparation immediately before or after shelterwood seed cut to prepare seedbed and to control understory competition.

Where natural regeneration of white spruce is not practical, consider site preparation and planting to white spruce or mixtures thereof with tamarack or other suitable species. Spring planting of white spruce is preferred.

Avoid planting white spruce on excessively dry sites and in frost-prone areas.

Use supplemental seeding of white pine or a mix of white spruce, black spruce, and tamarack as needed.

Timber Stand Improvement

Release of white spruce plantations will be scheduled if evaluation of the stocking of planted species and the type and degree of competition indicates the need for release.

Give consideration to protection of spruce from white pine weevil and sawfly before scheduling release. Maintain 30 to 50 percent live crown ratio to reduce mortality from spruce budworm feeding.

If there is need for release, schedule one release treatment using either chemical or mechanical methods.

Chemical release will be the primary method on suitable sites.

Mechanical release will be used in areas where it is cost effective or where chemical release is not advisable due to proximity to open water or other resource and environmental considerations.

Mechanical release should be scheduled during the growing season to minimize sprouting.

In areas where frost damage is anticipated, defer full release until white spruce is 12 to 20 feet tall.

Precommercial thinning of white spruce generally is not done.

Balsam Fir

Final Harvest

Regenerate existing balsam fir stands or convert other types to balsam fir by clearcut or two-cut shelterwood methods using full-tree, tree-length, or shortwood logging methods.

Rotation ages for existing and regenerated balsam fir are:

Stand	Range	Average
	(years)	
Existing balsam fir	50-90	69
Regenerated balsam fir	50-80	67

Favor shorter rotations to reduce risk of spruce budworm outbreaks.

Mark shelterwood seed cut to maintain residual stocking of 50 percent to 70 percent crown closure.

Schedule shelterwood removal cuts after regeneration is established, usually at 5 to 10 years after the shelterwood seed cut.

Reforestation

Favor natural regeneration to balsam fir and other species without site preparation.

A balsam fir-aspen mixture is acceptable and common in the regeneration of balsam fir stands. Favor a balsam fir-aspen mixture for greater budworm resistance. Follow aspen guides to regenerate mixed balsam fir-aspen stands where advanced regeneration of balsam fir is present.

Balsam fir in mixture with white spruce, hemlock, white pine, cedar, and/or tamarack is also acceptable. If an evaluation of the site, seed source, and type and degree of competition expected indicates that these other conifer species could be increased in the stand, site preparation may be scheduled. Full-tree logging during the snow-free season may accomplish adequate site preparation.

When planting is necessary to supplement natural regeneration of balsam fir, plant 175 to 225 white spruce, tamarack, jack pine, red pine, or white pine per acre.

Timber Stand Improvement

Generally, release or precommercial thinning will not be done in balsam fir stands.

Lowland Conifer

Final Harvest

Regenerate lowland conifer stands without a hardwood component, by strip cut, patch cut, or shelterwood methods or combinations thereof. Use full-tree logging methods where damage to residual stand can be avoided.

For mixed lowland conifer-hardwood stands, regenerate on a case-by-case basis because of variable stand and site conditions. Soil-site investigations will be made for each planned treatment and for monitoring vegetative response to treatment.

Rotation ages are highly variable due to site productivity and species composition. Rotation ages for existing and regenerated lowland conifers are:

Stand	Range	Average
		(years)
Existing lowland conifer	60-230	151
Regenerated lowland conifer	60-100	70

Use at least a 10- to 15-year interval between strip cuttings.

Retain residual crown cover of 60 percent to 80 percent after shelterwood-seed cuts depending on the predominant species being regenerated.

Intermediate Harvest

Avoid thinnings on lowland sites.

Reforestation

Schedule preparatory treatment as needed 5 to 10 years prior to the regeneration cut to eliminate undesirable brush and commercial species in the understory.

Favor natural regeneration.

Treat activity fuel (slash) by full-tree logging or burning to prepare seedbed, control competition, and reduce fuel loading.

Avoid planting on lowland sites.

Direct seeding is recommended to supplement natural regeneration.

Schedule shelterwood removal cut after the area is 60 percent stocked with established regeneration.

Schedule logging in winter season to protect advanced regeneration.

VEE

Timber Stand Improvement

Generally release or precommercial thinning will not be done.

Temporary Openings Created by the Application of Even-aged Silviculture

An opening will no longer be considered an opening when the certified reestablished timber stand has reached a height that is greater than 20 percent of the height of the surrounding vegetation.

Separate openings by a manageable stand of at least 10 acres.

Limit the size of temporary openings created by even-aged management to 40 acres or less except as provided below:

- On an individual sale basis after 60 days public notice and review by the Regional Forester.
- As a result of natural catastrophic condition such as fire, insect and disease attack, or windstorm.
- The size and shape of temporary openings will be further limited to meet the ROS setting objectives and the visual quality objectives for the management area.

Silvicultural Examination

Silvicultural examination is the process used to gather the detailed vegetative resource field data needed to develop silvicultural prescriptions that implement the integrated resource management objectives of the Ottawa National Forest Land Management Plan.

Have all silvicultural treatments and prescriptions certified by a certified silviculturist.

Gather vegetative information required to achieve integrated silvicultural, wildlife, visual, and other resource objectives.

Match regenerated timber stand boundaries to natural soil-site boundaries to the extent practicable.

The objectives of silvicultural examination are to provide sufficient data to:

- Determine the habitat/vegetative composition and condition of the forest on 10-year intervals.

- Locate vegetative management opportunities in conjunction with ECS-SRI.
- Complete a firm set of the interdisciplinary silvicultural prescriptions.
- Monitor vegetative changes since the last examination.
- Meet the anticipated data needs for future RPA assessments and Forest Plan revisions.

Use potential site productivity for establishing site index criteria in Forest silvicultural guides and conversion prescriptions.

Determine potential site productivity by a field soil-site evaluation or from Ecological Classification System-Soil Resource Inventory information when available.

Data will be stored in the Timber Management Information System (TMIS). The data base must be properly maintained and updated.

Silvicultural practices will not occur or will be minimal in the following management areas and will therefore minimize the need for silvicultural examination. Although these management areas will remain a part of the forest inventory, data will be collected less frequently and be of only sufficient detail to monitor current vegetative conditions.

- Wilderness area (5.1)
- Sylvania perimeter and McCormick entrance areas (8.2)
- Recommended wilderness, wilderness study, and proposed research natural areas (9.1)
- Wild/scenic inventory study river corridors (9.2)
- Minimum level management areas (9.3)

Old Growth
Management

Provide old growth habitat in selected areas to maintain big trees, snags, culls, den trees, dead and down logs, and other ground material. This can be provided on a combination of suitable and unsuitable lands. See Table 4.9.

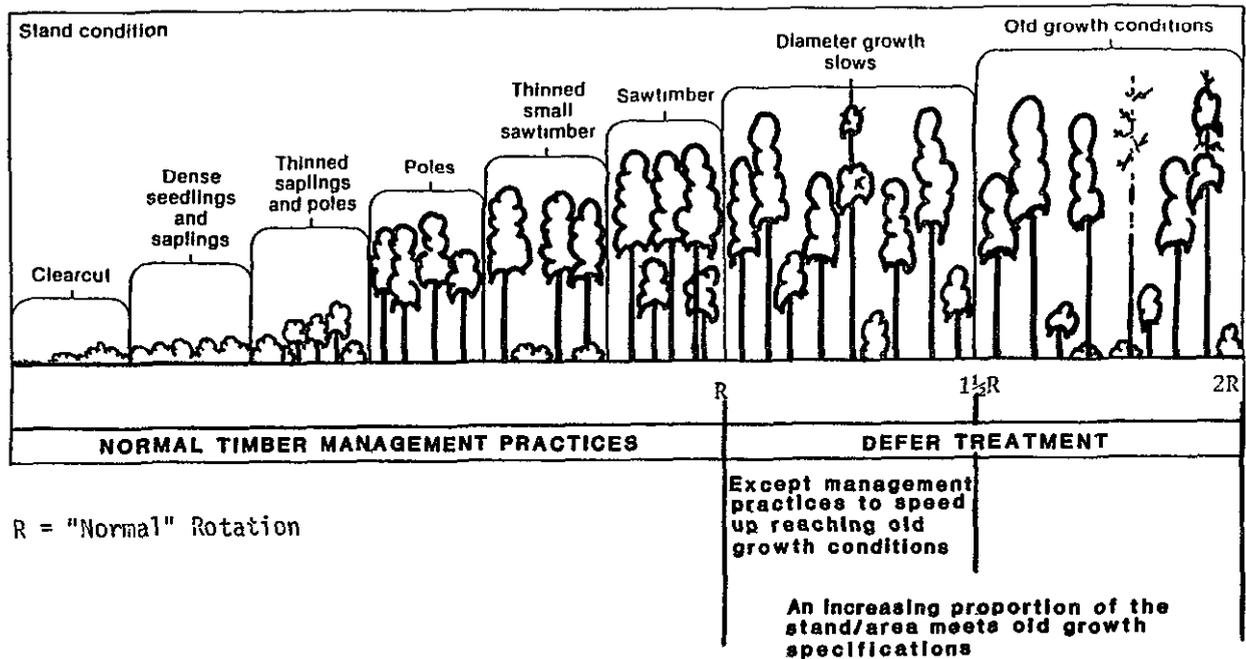
Manage for stands of old growth. Also manage for individual trees or groups of trees that would add to the visual resource.

Designate stands of old growth during the integrated resource management process.

Normally, regenerate stands of old growth at 1-1/2 to 2 times the sawtimber rotation age specified for the vegetation type. See Figure 4.4. Consider regeneration to the same vegetation types as the normal practice.

FIGURE 4.4

Management for Old Growth Characteristics



R = "Normal" Rotation

Consider regenerating stands of old growth on suitable lands by commercial timber sale.

In areas where there presently are few or no stands of old growth, consider deferral of selection cuts, removal cuts, or clearcuts in stands with an overmature overstory.

Table 4.9
Old Growth Stand Characteristics

Specifications for large tree component that qualify stand as old-growth and other desirable stand characteristics.

Canopy Layer and Characteristics	Working Group					
	Aspen/ Paper Birch	Red/ White Pine, White Spruce	Hem- lock	Jack Pine, Bal- sam Fir	Low- land Coni- fers	Upland/ Lowland Hard- woods
Supra Layer						
Desired number per acre	1-2	1-2	1-2	1-2	1-2	1-2
Main Layer						
A. Large tree component only						
Minimum dbh for large tree (inches)	10	20	20	10	10	20
Minimum basal area (sq.ft./acre)	40	50	50	50	50	30
Number per acre (approximate only)	70	20	20	100	100	12
Minimum crown cover (percent)	25	25	25	25	25	25
B. All trees in main layer						
Snags		All are to be retained in stand				
Culls (desired sq.ft./acre)	15	10	10	5	5	10
Midstory Layer						
Desired crown cover (percent)	45	45	45	45	45	45
Shrub and Herb Layers						
Desired ground cover (percent)	20	20	20	20	20	20

Presence of decaying logs on the ground in all working groups.

Definitions:

Supra Layer - Isolated trees that project above the other trees by at least 25 percent of their height.

Main Layer - Principal canopy layer when trees have at least the tops of their crowns exposed to light.

Midstory Layer - Composed of trees and shrubs that reach into and below the main canopy and whole crowns are not exposed to light.

Shrub Layer - Composed of regenerating trees and shrubs and shrubs of low stature whose crowns are generally in lower quarter of crown space.

Herb Layer - Herbaceous plants, mosses, & lichens.

If there are several potential stands of old growth in an area, select the combination of stands for old growth management that provides good spatial distribution within the management area. Favor the following locations in management of old growth stands:

- Where opportunities are greatest to provide habitat for old-growth dependent wildlife.
- Where access is poor for intensive management.
- Where site productivity is relatively poor.
- Where land is considered not suited for timber production.
- Recreation use areas other than intensively developed sites.
- Water-influenced landscapes, including riparian areas.
- Sites in foreground areas of the Ottawa National Forest visual management system sensitivity level 1 and 2 travel routes.

Sale
Preparation

Design sale packages of size and product mix to meet the needs of prospective purchasers, market conditions, and available logging technology and to meet the integrated resource management direction for the management area.

Lay out payment unit boundaries to ensure that the entire unit will be subject to the same operating season.

Limit complete vegetation removal, such as whole tree removal, to soils with sufficient nutrient content and/or storage capacity to support the new stand of vegetation and maintain soil productivity.

Plan and locate system roads prior to sale layout.

Emphasize harvesting methods that leave slash at the stump on Landtype Associations 1, 14, 14a, 15, 17, 18, and 19, even if it means requiring processor operations to haul slash back onto the harvested area.

Plan and document temporary roads and landings during sale layout.

Generally, the following operating seasons will be applied when estimating limitations on timber operations, assuming average weather conditions and the use of rubber-tired skidders:

- Year-round - Landtype Associations 1, 14, 15, and 17, except lowland mineral, organic, and wet alluvial soil-sites.
- Year-round except for spring breakup - Landtype Association 14a, except lowland mineral, organic, and wet alluvial soil-sites.

- Winter and months of July, August, and September - Soil-sites in Landtype Associations 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, and 18, except lowland mineral, organic, and wet alluvial soil-sites.
- Winter and one to two summer months - Lowland mineral soil-sites and Landtype Associations 16 and 19.
- Winter only - organic and wet alluvial soils.

Adjust the above operating periods if tractor or flotation equipment is employed, abnormal weather conditions exist, and/or landtype inclusions are significant.

Require timber estimating to be done by certified estimators.

Use presale measurement procedure for all timber sales.

Conduct volume estimates by area estimates or sample-tree measurement.

Regenerate stands at the rotation ages prescribed for each vegetation type in the management practices.

Strive to meet the long-term timber product composition objectives stated for the management area.

Use soil-site information as a prerequisite for considering species conversion. Use Ecological Classification System-Soil Resource Inventory information where available and/or soil management service information.

In conifer types, consider activity fuel management needs as part of timber sales; consider purchaser completion of fuel treatment wherever feasible or where needed for postsale cultural work.

In timber sales, schedule logging in winter periods as needed to provide winter deer browse, reduce roading costs, lessen impact on costs, lessen impact on recreation users, or reduce visual resource conflicts.

Manage recognized deer yards to provide a sustained supply of winter thermal cover and associated browse.

On suitable sites, generally manage upland types adjacent to heavy thermal cover on an even-aged basis. Modify standard timber management practices to provide increased browse, if needed.

These modifications may include shorter rotations, lower residual stocking levels in intermediate cuts, and three-cut shelterwood regeneration cutting in northern hardwoods.

Construct permanent upland openings, as part of the timber sale, by expanding landings used for timber harvest.

The size, location, and density of permanent openings shall be coordinated to meet the multiple objectives of the management prescription and to consider existing conditions adjacent to the sale area through the Ottawa National Forest integrated resource management process. Locate permanent openings on sites that are economical to create and re-treat. New openings will generally be 1 to 3 acres in size.

Generally stumps will be flush cut and debris removed and scattered or burned. Cut all standing trees except designated overstory trees to be retained for shade or visual resource needs. Follow-up treatment will be done with method deemed most cost effective.

In timber sales within 200 feet of Michigan Department of Natural Resources-designated trout waters less than 18 feet wide, convert aspen to another cover type that is not attractive to beaver.

Delay timber marking until cultural resource survey results are available whenever practical.

Modify timber sale contracts to ensure protection of significant and potentially significant cultural resources.

Sale
Administration

Administer timber sale contracts with qualified timber sale administrators. Administer timber sales to meet the integrated resource management direction for the management area.

Modify and carefully monitor whole tree harvesting on Landtype Association (LTA) 1, 14, 14a, 15, 17, 18, and 19 to ensure maintenance of soil productivity.

Keep logging debris out of creeks, streams, rivers, and other water courses.

Do not block or prevent fish passage in streams unless done in conjunction with prescribed fish management.

Minimize the location of log landings in the foreground areas along collector roads.

Permit decking areas adjacent to collector and local roads providing the following conditions are met:

- Collector roads are not blocked.
- Operation is safe for public passage and properly signed.
- No damage is done to the roadbed, ditches are not blocked, and road investment is protected.
- Visual quality objectives are met or enhanced.
- Use of riparian areas is limited to the winter season.

Log landings are located in riparian areas only if:

- They are winter use only.

- Debris is removed before spring breakup.
- No storage of petroleum products.

District Rangers are responsible for the location, construction, and obliteration of temporary roads.

Refer to temporary road design standards for the management area under 7700 Transportation System for each management area.

Avoid road construction and skidding (track or rubber-tired) on slopes greater than 60 percent and/or unstable soils, especially in portions of Landtype Associations 5, 13, 16, 18, and 20.

In obliteration of temporary roads:

- Remove drainage structures and all fills associated with drainages to original elevations to permit normal maximum flow of water.
- Eliminate road ditches and shape disturbed areas.
- Return the area to vegetative production.
- Provide cross drainage and stabilize exposed surfaces to minimize movement of sediment from road to stream.
- Seed and mulch as needed.
- Effectively block the road to normal passenger vehicle traffic.

Postsale
Management

Treat wood processor slash piles as necessary to meet visual quality objectives and return the area to production.

Consider reducing pine slash to prevent buildup of bark beetle populations.

Consider felling injured trees and potential wolf trees after the harvest cut to prevent pest problems.

Encourage the gathering of firewood, but avoid damage to established regeneration in the postsale harvest.

Apply the utilization standards in Table 4.10 to all timber sold or otherwise disposed of.

Table 4.10
Utilization Standards and Guidelines
Timber Sale and Disposal (36 CFR 223.1)

Minimum Specifications

Product Type	Tree 1/ Diameter Breast Height	Tree 1/ Diameter Breast Height	Piece Length 2/ (Feet)	Piece Diameter Inside Bark at Small End (Inches)	Piece Net Measure In % of Gross Measure
	(Inches)	(Inches)	(Feet)	(Inches)	
Sawlogs 3/ Hardwood	11.0		8	9.6	40%
Aspen	9.0		8	7.6	70%
Softwood	9.0		8	7.6	40%
Pulpwood Hardwood	5.0		8	4.0	70% sound 4/
Softwood	5.0		8	3.0	
Aspen	5.0		8	4.0	

- 1/ Minimum tree specifications include one minimum piece.
- 2/ Plus trim allowance.
- 3/ For species which are graded, only logs that meet grade 3 or better factory logs are considered sawlogs.
- 4/ 70% sound: Applies to absence of rot, voids, and char. Mechanical type defects such as sweep, crook, spider heart, and ring shake shall not be considered.

Apply stocking survey schedules and stocking standards in Table 4.11. (Table 4.11 is a listing of supplemental specifications to regional guides to accommodate local soil and site conditions.)

Table 4.11
Regeneration Stocking Levels

Timber Type	Minimum No. of Acceptable Growing Stock (Trees per acre)	Minimum Acceptable Stocking	Acceptable Growing Stock Species 4/
Normal Planting (Seedlings per acre)			
Balsam fir	280	40% 1/	BF, T, WS, BS, JP, RP, WP, WC, H, A, RM, SM, YB
White spruce 600-725	280	40% 2/	BF, T, WS, BS, RP, WP, RC, H, RM, YB, A
Jack pine 600-725	280	40% 2/	BF, T, WS, BS, JP, RP, PB, A, RO
Red pine 600-725	280	40% 2/	BF, WS, JP, RP, WP, RM, PB, A, RO
White pine 600-800	280	40% 2/	T, WS, JP, RP, WC, H, A
Lowland conifer	420	60% 1/	BF, T, WS, BS, WP, WC, H, YB, WA, BA, RM, SM, PB, A
Aspen	3200	40% 3/	BF, WS, JP, WP, RM, A, PB,
Paper birch	3200	40% 3/	BF, WS, RM, PB, A
Sugar maple	5000	40% 3/	WS, WP, H, SM, YB, PB, WA, BA, GA, RO, B, BC,
Mixed hardwoods	5000	40% 3/	WS, WP, H, SM, YB, PB, WA, BA, GA, RO, BC, B

Table 4.11 (continued)

Timber Type	Minimum No. of Acceptable Growing Stock (Trees per acre)	Minimum Acceptable Stocking	Acceptable Growing Stock Species 4/
Normal Planting (Seedlings per acre)			
Hemlock	300	40% 2/	BF, WS, WP, WC, H, RM, SM, YB, WA, GA
Lowland hardwoods	1000	40% 3/	BF, T, WS, BS, WP, WC, H, RM, SM, YB, WA, BA, GA, BP, A

1/ Minimum percent of 1/700-acre plots stocked with one or more acceptable growing stock trees (see Revised Ottawa Species Guides of December 1979).

2/ Minimum percent of 1/700-acre plots stocked with one or more acceptable growing stock trees (see Reforestation Handbook, FSH 2409.26b).

3/ Minimum percent of 1/1000-acre plots stocked with one or more acceptable growing stock tree (see Reforestation Handbook, FSH 2409.26b).

4/ Species codes:

Species	Species Codes	Species	Species Codes
Balsam fir	BF	Red maple	RM
Tamarack	T	Sugar maple	SM
White spruce	WS	Yellow birch	YB
Black spruce	BS	Paper birch	PB
Jack pine	JP	White ash	WA
Red pine	RP	Black ash	BA
White pine	WP	Green ash	GA
White cedar	WC	Balsam poplar	BP
		Aspen	A
		Black cherry	BC
		Northern red oak	RO
		Basswood	B

Employ regeneration practices such as site preparation, seeding, planting, prescribed fire, and fertilization as needed and as consistent with the objectives of the management prescription.

Incorporate genetic improvement principals and practices in silvicultural standards.

Generally, use 10 acres as the minimum stand size for timber production. Smaller stands are usually managed for considerations such as permanent openings, hemlock, oak, for visual quality, or for other significant vegetative features.

Increase utilization of woods residues and other currently unmerchantable material for fuelwood and other products.

Identify quality hardwood sites and other opportunities for intensive management practices.

Require an approved method of site preparation for all areas being regenerated based on site and stand conditions.

Utilize broadcast burns on upland sites in Landtype Association (LTA) 1, 14, 14a, 15, 17, 18 and 19 only when available soil moisture is present in the upper portion of the mineral soil. Make determination of sufficient soil moisture on a case-by-case basis as part of the burn plan and implementation.

Give priority to the use of mechanical site preparation equipment that tends to mix soils (e.g., disking) as opposed to massive scarification (e.g., root raking), in seedbed preparation and plant competition removal in LTA 1, 5, 6, 12, 13, 14, 14a, 15, 16, 17, 18, 19, and 20.

Establish plantations on areas where risk is minimized and practices are cost effective.

Conduct first- and third-year restocking surveys for all reforestation areas. Require that the reforested area be adequately stocked with acceptable species 5 years after harvest (see Reforestation Handbook, FSH 2409.26b, Chapter 113).

Survival (staked) plots will be established for planted areas. Survival will be measured on an individual tree basis at 4 to 6 weeks, 12 months, and 36 months after plot establishment. At 36 months measurement, evaluate alternate host of spittlebug in red pine plantations. (See FSM 2496.5 and Reforestation Handbook, FSH 2409.26b, Chapter 114).

Evaluate the effectiveness of reforestation techniques.

2600 Wildlife
Habitat
Management

Wildlife

Refer to Plan, Chapter IV, Forestwide Vegetation Management Standards and Guidelines, 1900 Land and Resource Management Planning - Vegetation Management and 2400 Timber Management - Old Growth Management for additional standards and guidelines relating to wildlife habitat management.

Wildlife habitat improvement will be accomplished through the integration of vegetation/wildlife management practices to the maximum extent possible.

Place very low priority on direct habitat improvement that could be obtained with integrated practices unless the project can be accomplished with minimal investment, such as with volunteers or cooperating agencies or groups or as specified in the integrated resource management prescription for the project.

Direct habitat improvements, other than those accomplished through commercial timber sales, may be scheduled where analysis indicates a need that cannot be met through commercial timber sales. Approval will be on a project plan basis.

Inventories for potential direct wildlife habitat improvement projects will emphasize endangered and threatened species, wetlands, and fisheries habitat. Other projects will often qualify for funding under the 1976 amendment to the Knutson-Vandenberg Act and these funds will be used where appropriate.

Habitat improvement projects will emphasize using natural materials and will have a natural appearance when completed.

If vegetative management is planned for the area, manage permanent upland openings in forest areas. Recognize the home range needs of the selected species and the contribution of adjacent private lands when considering the spatial distribution of such openings.

Re-treat selected old fields, old logging camps, old homesteads, orchards, and other clearings greater than 1/2 acre in size to the standard that the dominant vegetation is either understory shrubs, grasses, or forbs. Use chemical treatment, chemical and hand tool treatment, chemical and mechanical treatment, or prescribed fire to maintain permanent upland openings.

Freshly disturbed soil areas, such as landings and unsurfaced road beds, may be left exposed or revegetated.

- Perform erosion control on erosive sites.
- Avoid seeding so as to favor natural regeneration of native herbs and shrubs, except as noted below.
- Seed to warm-season native grasses within Landtype Associations 1, 14, 15, 17, and 18.
- Seed to ladino clover or ladino clover-annual rye mixture within winter deer range and areas where a higher quality protein forage may be worth the added investment of seed and/or site preparation.
- Where seeding is practiced, avoid seeding 20 percent to 50 percent of the disturbed area to provide for dusting habitat and to favor partial revegetation of native herbs and shrubs.

- Where seeding is practiced, avoid seeding after a rain when soil surface is crusted.

Within winter deer range, manage 30 percent to 60 percent of permanent upland openings for browse, favoring quality browse species, such as red maple and elderberry.

Use integrated pest management techniques to prevent undesirable woody plant invasion of permanent forest upland openings.

Manage habitat adjacent to selected warm-water (nontrout) streams and lakes to maintain viable populations of beaver, other furbearers, and associated aquatic species.

3400 Forest Pest Management

Regenerate stands of timber to species well adapted for the site.

Utilize insect- and/or disease-resistant tree planting stock, if available, (e.g., blister-rust-resistant white pine).

Strive for dispersion of timber types and age classes.

Salvage insect- and disease-caused tree mortality promptly, where marketable, and coordinate with other resource considerations.

Emphasize timber harvest programs in areas with extensive acreages of overmature timber where conditions make stands susceptible to insect or disease outbreaks.

Promote increased utilization of wood products and wood residue.

Control forest nursery pathogens at the nursery site.

5100 Fire Management

Suppress all wildfire.

Authorize use of prescribed fire (natural and/or human caused) to establish or maintain vegetation, except in wilderness (M.A. 5.1).

Treat activity fuels to a level commensurate with the allowable fire intensity and rate of spread. Meet applicable state laws when applying treatment along highways and adjacent properties.

Reduce fuels resulting from conifer clearcuts in the following situations:

- Large contiguous fuel areas.
- Areas adjacent to high value improvements such as private homes or developed recreation sites.
- Areas adjacent to roads that are open for public travel and railroads.

Include as acceptable fuel treatment methods prescribed burning, lopping and scattering, whole tree logging, mechanical site preparation, and other mechanical methods.

Consider prescribed fire for wildlife habitat improvement, site preparation, hazard reduction, and other resource management purposes.

