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Environmental Assessment

Clear Lake Project

Harrisville Ranger District
Huron-Manistee National Forests

Alcona County, Michigan

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Document Structure

National Forest management is guided by congressional mandate to provide multiple benefits to American people for present and future generations. The National Environmental Policy Act (NEPA) Procedures (36 CFR Part 220) and the Council on Environmental Policy (CEQ) implementing regulations (40 CFR 1500-1508) establish policy, set goals and provide regulations for analyzing and documenting the environmental consequences of proposed management actions. This analysis follows the process outlined in the NEPA procedures and CEQ implementing regulations.

This Environmental Assessment (EA) discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four parts:

Chapter 1: Purpose and Need for Action. This section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.

Chapter 2: Alternatives Considered, Including the Proposed Action. This section provides a more detailed description of the agency's proposed action and design criteria for the project.

Chapter 3: Environmental Consequences. This section describes the environmental effects of implementing the proposed action and provides sufficient evidence and analysis to determine whether to prepare an EIS or a FONSI (40 CFR 1508.9). This analysis is organized by resource. Within each section, the affected environment is described, followed by the effects of the No Action Alternative that provides a baseline for evaluation and comparison of the other alternatives that follow.

Chapter 4: List of Preparers. This section provides a list of specialists that assisted in the preparation of the Environmental Assessment and lists their area of expertise.

Availability of the Planning Record

A consideration in preparation of this environmental assessment has been the reduction of paperwork as specified in 40 CFR 1500.4. The objective is to furnish enough site-specific information to demonstrate a reasonable consideration of the environmental impacts of the alternatives and how these impacts might be mitigated. The Planning Record contains detailed information used in the analysis and is available upon request at the Huron-Shores Ranger Station, Oscoda, Michigan.

Chapter 1: Purpose and Need for Action

The Huron Shores Ranger Station of the Huron-Manistee National Forests has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This EA identifies the direct, indirect and cumulative effects that would result from the implementation of the Clear Lake Aspen Project, which proposes resource management activities to meet management objectives established in the Huron-Manistee National Forests Land and Resource Management Plan (Forests' Plan). The Clear Lake Aspen Project includes timber management, wildlife habitat management, and non-native invasive plant species management.

1.1 Project Location and Project Area Description

The Clear Lake Aspen Project is located on National Forest System (NFS) lands on the Harrisville Ranger District of the Huron National Forest. The project is located west of Harrisville in Alcona County (Table 1).
The project area is within Forest Service compartments 693, 694, 722, 724, 740 and 743.

Table 1: Legal Descriptions of Project Locations

Township	Range	Sections
26N	6E	16, 17, 20, 29, 30, 32, 33,34
25N	6E	1, 2, 3, 10, 11

The project area is primarily gently rolling sandy hills formed in coarse to medium textured sandy and gravelly soils with loam and clay layering. Vegetation is predominantly aspen, oak, and red pine. A mixed swamp conifer vegetation type comprises the remainder of the project area that is characterized by organic soils along streams and drainages. Several small, unnamed creek tributaries and intermittent streams run through the area. More detailed descriptions of the project area are located in Chapter 3.

There are no municipal watersheds, research natural areas, or special interest areas within the project boundaries.

1.2 Proposed Action

The Clear Lake Aspen Project proposes to:

1. Harvest by clearcutting approximately 800 acres of mature aspen in units up to 40 acres to maintain the aspen forest type, enhance wildlife habitat, and create age-class diversity within the project area.

2. Thin approximately 18 acres of red pine to improve growth and vigor of the remaining trees.

3. Construct approximately one mile of temporary roads and associated landings. These roads and landings would be closed and rehabilitated when harvest activities were completed.

4. Maintain approximately 17 acres of wildlife openings.

5. Place wildlife nest boxes to increase nesting and roosting opportunities throughout the project.

6. Control or eradicate non-native invasive plant species (NNIS) where necessary and appropriate within the Project area using prescribed fire, mechanical and herbicide treatments.

7. Prescribe burn approximately 272 acres of oak to reduce the red maple understory component and improve the potential to regenerate oak.

Detailed information on the proposal is contained in Chapter 2, Alternative II (Proposed Action).

1.3 Management Direction

The Huron-Manistee National Forests' Land and Resource Management Plan (Forests' Plan) provides a programmatic framework regarding allocation of National Forest System lands and the measures necessary to protect the Forests' resources. It describes how the Huron-Manistee National Forests should be managed and what resources should be provided by these lands now and in the future. The Final Environmental Impact Statement (FEIS) displays forest-wide effects of activities, such as timber harvest, wildlife habitat management, recreation and visual resource management, and transportation system management.

This Environmental Assessment (EA) analyzes the site-specific effects of management activities proposed in the Clear Lake Aspen Project, and is tiered to the Huron-Manistee National Forests' Land and Resource Management Plan, the Final Environmental Impact Statement, and the accompanying Record of Decision.

1.4 Purpose of Project (Objectives)

Implementation of site-specific projects is guided by Forests' Plan direction through management prescriptions designed to attain a desired condition in each Management Area (MA). The Clear Lake Aspen Project falls within MA 4.2 (Table 2). The proposed activities address site-specific needs and opportunities to move the project area from the existing condition to the desired condition as set forth in the Forests' Plan.

Table 2: Forest Plan Management Area 4.2 and Direction

Management Area	Direction
4.2 Roaded Natural Sandy Plains and Hills	Management activities enhance and increase the variety of wildlife habitats and produce high volumes of timber products. Emphasis includes reducing life-threatening and property damaging wildfire potential and providing a variety of recreational opportunities.

Objectives for the Clear Lake Aspen Project include:

1. Improve timber stand condition and age class distribution
2. Provide timber products
3. Enhance and increase variety of wildlife habitats within Management Area
4. Reduce or eliminate NNIS
5. Reintroduce fire into fire-adapted ecosystems

The general purpose of the project corresponds with the direction provided for Management Area 4.2. This project would produce high volumes of quality timber products with special consideration for enhancing wildlife habitats. Regenerating the aspen would provide early successional habitats and ecosystems necessary to sustain healthy populations of plants and animals. The Clear Lake Aspen Project is designed to enhance natural habitats and sustain the aspen vegetation class.

1.5 Need for Action

Improve Timber Stand Condition and Age Class Distribution (Objective 1)

The Clear Lake Aspen Project is needed to maintain the aspen vegetation type and age-class diversity described in the Forest Plan. This Project is also needed to provide a variety of habitats, timber products, and recreational experiences.

Currently the Huron National Forest (Forest) meets Forests' Plan objectives of maintaining between a 16-22 % vegetation class of aspen (Forests' Plan, page II-17). Currently, the Forest has approximately 21% aspen, however the age-class distribution is unbalanced (Table 8). Approximately 39% of the aspen on the Forest is over the expected rotation age of 50 years and only 8% is under 20 years old. This project addresses the need to regenerate aspen on the Forest before a considerable share of the Forest's aspen component is lost to disease and forest succession. Most of the Clear Lake Project area aspen stands proposed for harvest are greater than 50 years old and are quickly losing the vigor that is needed to regenerate naturally. This project is needed in order to maintain the

aspen vegetation type and age-class diversity at desired Forests' Plan levels and to provide a variety of wildlife habitats, timber products, and recreational experiences.

Table 3: Age Class Distribution of Aspen on the Huron Zone of the Huron National Forest

		Age Class										
	Acres	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100+
Huron Shores Zone	38,650	492	2,751	5,845	6,208	7,536	3,430	1,458	2,526	5,261	2,751	340
Clear Lake Aspen Project	2,907	0	204	1,030	587	485	49	22	5	485	0	0
Total Acres	41,557	492	2,955	6,875	6,795	8,021	3,479	1,480	2,531	5,746	2,751	340
Percent of acres by age class		1.2%	7.1%	16.5%	16.3%	19.3%	8.4%	3.6%	6.1%	13.8%	6.6%	.8%
Percent of acres by age class		8.3%		32.8%		19.3%	39.3%					

The red pine plantation proposed for management has reached a basal area that requires thinning. Thinning removes the trees that are low quality, unhealthy, or interfere with the growth of high quality trees. Thinning lowers the tree density and allows the remaining trees to receive more sunlight, water, nutrients, and have proper spacing for optimal growth. Gilmore and Palik (2006) states that periodic thinning of young red pine stands is recommended to put the growth on the best trees available, maintain uniform growth rates, remove diseased and injured trees, shorten rotations, and increase the yield for future timber products.

Provide timber products (Objective 2)

An objective of the Forest Plan MA 4.2 is to provide timber products. The proposed actions include vegetative treatments of aspen and red pine (approximately 818 acres). These treatments would produce high volumes of pulpwood and sawtimber products for the local economy. Thinned red pine plantations would produce high valued utility poles, pulpwood and veneer. The Forest Plan recommends that stands with commercial value should be thinned at intervals of ten years or more, and may occur several times throughout the rotation of a timber stand.

Enhance and increase variety of wildlife habitats within Management Area 4.2 (Objective 3)

The Clear Lake Project proposes to maintain approximately 17 acres of wildlife openings. Opening improvement is needed to help maintain viable populations of open land-associated species such as white-tailed deer, snowshoe hare, and wild turkey. Without the periodic removal of encroaching woody vegetation through mechanical means and/or prescribed burning, natural succession gradually reduces open land habitat suitability and availability for open land species. Over the long term, the loss of this habitat type would negatively affect the population viability of open land-associated species on the Huron-Manistee National Forests.

Wildlife nest boxes would be placed throughout the project area to increase nesting and roosting opportunities.

Reduce or eliminate Non Native Invasive Species (Objective 4)

The management of non-native invasive species (NNIS) is important because they have the capacity to alter or dominate native communities and easily become established in areas that are frequently or severely disturbed, such as roadsides, landing sites, and skid trails. They can then spread from these disturbed sites into the surrounding habitats and disrupt the ecology of natural communities. Non-native invasive plants can degrade wildlife habitat, change soil chemistry, alter the ecology of native plant communities, cause declines in the growth rates of canopy trees, prevent natural tree regeneration, change fire regimes, directly impact wildlife species, and displace native plants species. Some NNIS species, such as garlic mustard, exude chemicals into the soil which disrupt mycorrhizal relationships, the interaction of plants and soil fungi. Trees as well as a majority of other plant species depend on mycorrhizal relationships for increased water and nutrient absorption and some species will not germinate without the presence of mycorrhizal fungi. Other species, such as spotted knapweed and non-native bush honeysuckles are allelopathic, producing chemicals which prevent the growth of other plants (Czarapata, 2005). Non-native species

tend to green up earlier in spring and stay leafed out later in fall because they are adapted to a different climate, which increases their competitiveness against native species and shades them out.

Reintroduce fire into fire-adapted ecosystems (Objective 5)

Prescribed fires would be reintroduced to approximately 272 acres to allow oak to dominate advance regeneration through the preparation of a favorable seedbed, encouragement of acorn caching, opening-up of the understory, and reduction of fire-intolerant competitors (primarily red maple). Prescribed fires would primarily top-kill unmerchantable stems, depleting red maple root reserves and stimulating the resprouting of oaks.

1.6 Decision to be Made

This Environmental Analysis (EA) evaluates site-specific concerns and opportunities and analyzes the effects of the proposed action for the Clear Lake Aspen Project. The District Ranger, as the decision maker for this EA, must decide whether or not to implement the proposed activities based on the actions and methods, location of actions, and project requirements and mitigations presented in the analysis.

1.7 Public Involvement

Planning direction and guidance for the Clear Lake Aspen Project was obtained from the Forests' Plan, other existing Forest and district planning documents, other applicable federal and state planning documents, and a project initiation letter from the District Ranger.

An Interdisciplinary Team (ID team) of resource specialists gathered information from the project area to determine how to best implement Forests' Plan direction. Needs and opportunities were identified that would move the area from the existing condition to the desired future condition outlined in Forests' Plan, and project proposals were developed by the ID team. Comments on the proposed actions were solicited in March 2009 from Forest Service employees, members of the public, adjacent property owners, and public and private agencies and organizations through a listing in the Huron-Manistee National Forests NEPA Quarterly Schedule of Proposed Actions. Posting of the proposal on the Huron-Manistee National Forests website, and a direct mailing occurred in March 2009 as well.

Eleven comments were received in response to scoping activities. Public and internal comments are used to refine issues, alternatives, and potential environmental effects of the site-specific proposed activities. A copy of the scoping letter, mailing list of individuals, government agencies, tribes, and organizations contacted, and comments received are included in the Planning Record.

1.8 Key Issues

Issues result from debate and disagreement regarding the resource impacts directly related to the proposed activities. In order to provide concise analysis, the agency distinguishes between key scientific issues used in the analysis for formulating alternatives, and other comments and concerns used to track effects and develop mitigation.

As determined from review of comments by the Responsible Official, five issues were identified by the public and two issues were identified internally. Issues were used for the formulation of alternatives for the Clear Lake Aspen Project.

Issues Studied in Detail

External Issues

The following public issues were the result of comments solicited during scoping, and will be brought forward and evaluated in Chapter 3; Environmental Consequences, of this Environmental Assessment.

Issue 1: Aspen Regeneration; A concern was raised regarding the amount of aspen proposed for regeneration in the Clear Lake Project. The commenter recommended that the amount of aspen regeneration be increased.

Response: All of the aspen within the project area boundary was evaluated for potential harvest. There were several factors that limited the amount of aspen harvested within the project area. Some of the aspen stands were excluded because of access issues such as drainages, wetlands and slopes. Other stands that were initially classified as aspen were actually mixed hardwood stands when field-truthed. Several of the aspen stands were also too young

to harvest. These stands did not meet the rotation age guidelines of 40-60 years old as documented in the Forest Plan.

Issue 2: Clearcutting Hardwoods; Several people expressed opposition to clearcutting the proposed stands and regenerating them to aspen. They felt these stands should be managed for hardwoods such as oak, maple and beech with scattered conifers. One of the suggestions included removing the aspen and mature trees and replacing these trees with planted hardwoods. Others suggested harvesting only the aspen and leaving a major portion of the hardwoods.

Response: One of the objectives of the Forest Plan is to maintain an aspen forest type. The Huron Forest has approximately 21% aspen, but the age-class distribution of the aspen vegetation type is unbalanced (Table 3). The Clear Lake Project would add approximately 800 acres to the 0-9 age class. Alternative III was created, in part, to address this issue and would exclude a number of stands from being harvested and regenerated to aspen. Some of the aspen stands that have a component of oak in the midstory would be retained.

Issue 3: Dust; A land owner was concerned about the amount of dust created from logging truck traffic on N. Lake Road.

Response: Dust would not be an issue since the harvesting of the Clear Lake Project would take place in the fall and winter months. Harvesting is restricted to September 30 through May 1 in all aspen stands in order to minimize soil compaction and increase aspen sprouting. Two aspen stands and one red pine stand would require frozen ground during harvest in order to alleviate deep rutting due to the clay soil composition in portions of the skidding trail. Clay soils are poorly drained and logging equipment could cause deep ruts if allowed during periods of heavy precipitation and warm temperatures.

Issue 4: Slash; Commenter would like the slash from the project to be removed or chipped.

Response: Slash is usually left in aspen clearcuts to leave some of the nutrients on site. The Design Criteria in section 2.6 addresses logging slash measures. Within a strip 25 feet in width, as measured from the edge of private property, all slash from the purchasers operations would be completely removed. Within an adjacent strip of 25 feet, for a total of 50 feet, all slash from purchaser's operations shall be lopped and scattered to lie 18 inches off the ground. Within 200 feet of a travel way (road), slash from timber purchasers operations would be treated by the contractor to lie within 18 inches of the ground. In harvested stands prescribed for underburning the contractor would be required to have the slash lie within 24 inches of the ground and kept away from the boles of residual trees.

Issue 5: Safety of prescribed burn activities; Individuals were concerned with the potential escape of prescribed burn**.** Some of the commenter's own land adjacent to the proposed prescribed burn and wanted to know what precautions would be taken to prevent the fire from spreading to surrounding areas.

Response: Prescribed burning may be used to reduce understory vegetation and promote regeneration of oak and aspen. Prescribed burns would only be conducted when the chance of escape is minimal. Prescribed burns would be patrolled to insure the fire stays within designated boundaries. The prescribed burns would reduce slash loading and associated fire risks. They would also reduce the chance of damage to the residual stand if a fire were to escape from private property.

All prescribed burning would follow an approved written plan using the current Region 9 *Prescribed Fire Plan* format. An example of a Prescribed Burning Go/No-Go Checklist and Agency Administrator Pre-Ignition Approval Checklist can be found in Appendix B.

Both the Burn Boss and the Agency Administrator would review the forecasted weather conditions for the day(s) a prescribed burn is planned. If forecasted weather conditions were outside of the prescribed weather conditions in the Prescribed Burn Plan the prescribed burn would not take place. If weather conditions measured on site were outside of the prescribed weather conditions listed in the Burn Plan the prescribed burn would not take place.

Internal issues

The following internal issues were the result of interdisciplinary team discussion. These issues will be brought forward and evaluated.

Issue 6: Northern Goshawk/Red–Shouldered Hawk; A nest- protection area exists within the project area.

Response: Protection measures are discussed in the Wildlife Protection Measures under section 2.6 Design Criteria.

Issue 7: Cerulean Warbler; A nest protection area exists within the project area.

Response: Protection measures are discussed in the Wildlife Protection Measures under section 2.6 Design Criteria.

Issues considered outside the scope of the Project

The following issue was considered outside the scope of the project, and therefore will not be evaluated in the Chapter 3; Environmental Consequences section of this Environmental Assessment.

Issue 1: Road Maintenance; A concern was raised regarding the existing condition of Ross Road in Section 21. The commenter would like this road repaired and maintained.

Response: The issue concerning repairing and maintaining Ross Road is outside the scope of the Clear Lake Project. Repairing Ross Road does not meet the purpose and need of the project. Additionally, the maintenance of this road is the counties responsibility.

Chapter 2: Comparison of Alternatives, Including the Proposed Action

This chapter describes the proposed action and alternatives to the proposed action. It includes a description of each alternative considered in this analysis. This section also presents the alternatives in comparative form, defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. This comparison is based on the objectives identified in Chapter 1.

Project design criteria used to reduce adverse impacts to resources are a part of each alternative.

2.1 Alternatives Considered in Detail

Three alternatives are considered in detail, the No Action Alternative, the Proposed Action Alternative, and the Reduced Aspen Regeneration Alternative. Alternative I, The No Action Alternative, analyzes the effects of deferred treatment (no management activities taking place at this time). Alternative II, the Proposed Action, follows management direction established in the Forests' Plan as described in Section 1.5 of this document. Alternative III, The Reduced Aspen Regeneration Alternative, was developed in response to key issues identified during the scoping process as described in Section 1.9 of this document. Other factors such as access to stands, wetlands and slope also contributed to the development of Alternative III.

2.2 Alternative I (No Action)

This alternative was developed in response to National Environmental Policy Act requirements [40 CFR 1502.14(d)] for a No Action Alternative. Selection of this alternative means no management activities would be implemented in the project area at this time. No vegetation, wildlife, prescribed fire, NNIS or recreation management would take place, and no timber commodities would be produced. Current uses of the area would continue until such uses were prohibited by changed environmental conditions. Routine use and maintenance of roads, trails, and other facilities in the project areas would continue. Prescribed natural fires are not allowed on the Huron National Forest and all wildfires would be suppressed. Wildfire (as a natural process) is not considered in the analysis of this alternative.

Selection of the No Action Alternative does not preclude future analysis or implementation of on-going management proposals within the project areas. This alternative provides a baseline used to compare the environmental effects of the action alternatives. While this is a viable alternative, it does not help meet the desired condition as described in the Forests' Plan, or achieve the Purpose and Need for Action as described in Chapter 1 of this document.

2.3 Alternative II (Proposed Action)

Direction provided in the Forests' Plan is the basis for this alternative. Alternative II (Proposed Action) is designed to move the project area from the current condition toward the desired condition as described in the Forests' Plan. This action responds to the need to regenerate aspen, improve timber stand condition and age-class distribution, produce timber products, improve wildlife habitat, reintroduce fire in fire-adapted ecosystems, improve recreation and reduce or eliminate NNIS. A Map displaying the activities of Alternative II is on page 21.

A summary of Alternative II (Proposed Action) is as follows:

1. Harvest by clearcutting approximately 800 acres of mature aspen in units up to 40 acres to maintain the aspen forest type, enhance wildlife habitat, and create age-class diversity within the project area.

2. Thin approximately 18 acres of red pine to improve growth and vigor of the remaining trees.

3. Construct approximately one mile of temporary roads and associated landings. These roads and landings would be closed and rehabilitated when harvest activities were completed.

4. Maintain approximately 17 acres of wildlife openings.

5. Place wildlife nest boxes to increase nesting and roosting opportunities throughout the project area.

6. Control or eradicate non-native invasive plant species (NNIS) where necessary and appropriate within the Project area using prescribed fire, mechanical and herbicide treatments.

7. Prescribe burn approximately 272 acres of oak to reduce the red maple understory component and improve the potential to regenerate oak.

Details of Alternative II (Proposed Action)

Regenerate approximately 800 acres of aspen through clearcutting units up to 40 acres in size (Table 4). In the aspen clearcuts, a minimum of nine (9) trees (≥ 9 inches dbh) per acre, includes live and dead trees, would be retained for snags, and three (3) live trees (≥ 10 inches dbh) per acre for down wood, to improve wildlife habitat. Four (4) trees per acre of the largest diameter practical would be retained in clumps to provide mast/den trees. Dead trees that pose a hazard to loggers would be felled and left on site.

Aspen stands that have advanced regeneration of oak in the midstory would also be retained as reserve trees. Retaining some of the midstory oak along with the four mast trees per acre would create a vertically stratified stand that would improve species diversity and create a multi age class structure. The plurality of the stands would still be aspen, but would have a component of oak. This could also improve wildlife habitat and visual aesthetics (Cleland, Leefers and Dickmann 2010).

Table 4: Proposed Action -Aspen Regeneration Area and Approximate Acres

Compartment	Stand	Acres	Forest Type	Proposed Treatment
693	4	19.0	Aspen	Clearcut-coppice w/reserves
693	17	19.0	Aspen	Clearcut-coppice w/reserves
693	22	12.0	Aspen	Clearcut-coppice w/reserves
693	26	11.0	Aspen	Clearcut-coppice w/reserves
694	15	40.0	Aspen	Clearcut-coppice w/reserves
694	19	13.0	Aspen	Clearcut-coppice w/reserves
694	21	16.0	Aspen	Clearcut-coppice w/reserves
694	37	16.0	Aspen	Clearcut-coppice w/reserves
694	42	13.0	Aspen	Clearcut-coppice w/reserves
694	46	11.0	Aspen	Clearcut-coppice w/reserves
694	47	17.0	Aspen	Clearcut-coppice w/reserves
722	6	17.0	Aspen	Clearcut-coppice w/reserves
722	33	24.0	Aspen	Clearcut-coppice w/reserves
722	36	40.0	Aspen	Clearcut-coppice w/reserves
722	39	40.0	Aspen	Clearcut-coppice w/reserves
722	42	40.0	Aspen	Clearcut-coppice w/reserves
722	45	40.0	Aspen	Clearcut-coppice w/reserves
743	3	37.0	Aspen	Clearcut-coppice w/reserves
743	4	40.0	Aspen	Clearcut-coppice w/reserves
743	9	40.0	Aspen	Clearcut-coppice w/reserves
743	27	28.0	Aspen	Clearcut-coppice w/reserves
743	28	13.0	Aspen	Clearcut-coppice w/reserves
743	29	23.0	Aspen	Clearcut-coppice w/reserves
743	30	27.0	Aspen	Clearcut-coppice w/reserves
743	31	31.0	Aspen	Clearcut-coppice w/reserves
720	4	22.0	Aspen	Clearcut-coppice w/reserves
720	6	27.0	Aspen	Clearcut-coppice w/reserves
720	20	22.0	Aspen	Clearcut-coppice w/reserves
720	27	18.0	Aspen	Clearcut-coppice w/reserves
720	29	16.0	Aspen	Clearcut-coppice w/reserves
720	30	22.0	Aspen	Clearcut-coppice w/reserves

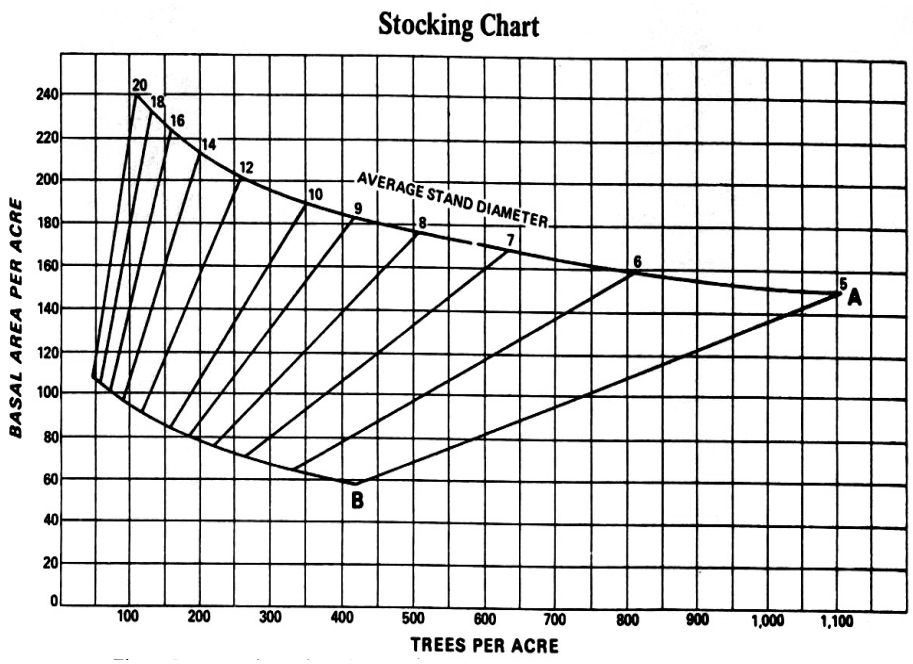
Thin approximately 18 acres of red pine in compartment 693 stand 8 (Table 5). This stand is proposed to be thinned because the basal area is above recommended B-stocking levels (Table 6). Gilmore and Palik (2006) states that periodic thinning of young red pine stands is recommended to put the growth on the best trees available, maintain uniform growth rates, remove diseased and injured trees, shorten rotations, and increase the yield.

Red Pine managed near the minimum recommended stocking would have the most rapid diameter growth because the crowns would have optimum growing space. Ideal growth conditions, for the stands chosen for thinning (irrespective of average stand diameter) would occur at about the 90-110 ft^2 per acre range.

Table 5: Proposed Action - Red pine Thinning Area and Approximate Acres

Compartment	Stand	Acres	Forest Type	Proposed Treatment
693	8	17.0	Red Pine Plantation	Thinning

Table 6: Stocking Chart for Red pine . Gilmore and Palik (2006)



Mature oak, and white pine would be retained to improve tree species diversity and provide future dens and snags. Red pine beneath or adjacent to oaks however would be removed to improve oak tree growth and mast production. Improving the growth of scattered oak trees within the red pine plantation can improve species diversity and provide future den trees for wildlife.

A minimum of nine trees per acre (≥ 9" DBH) would be treated to create snags; three trees per acre (≥ 10" DBH) would be treated to create down wood; while four trees per acre of the largest diameter practical would be retained to provide mast/den trees.

Construct approximately one mile of temporary roads to remove forest products in the project areas proposed for timber harvest. Landings would be constructed for timber product preparation and storage and would be approximately one acre in size. Temporary roads, skid trails, and landings would be closed after the timber sale, and reforested through mechanical means or by hand if natural regeneration does not occur.

Maintain approximately 17 acres of existing forest openings (Table 7) for wildlife. Treatments would include cutting encroaching vegetation by mechanical means, hand cutting, or prescribed burning.

Table 7: Proposed Action - Opening Maintenance Area and Acres

Compartment	Stand	Acres	Proposed Treatment
722	11	2.8	Opening Maintenance
722	25	7.6	Opening Maintenance
722	40	3.7	Opening Maintenance

Place Wildlife nest boxes to increase roosting and foraging opportunities for owls, tree squirrels, bats, waterfowl, and eastern bluebird. Multi-use boxes for owls and tree squirrels would be placed in a red pine stand that currently lacks cavity trees. Bat boxes would be placed in a wildlife opening immediately adjacent to a wetland impoundment. Waterfowl nest boxes would be placed on beaver ponds and wetland impoundments within the project area. These boxes would benefit ducks, including wood duck and hooded merganser. Eastern bluebird boxes would be placed in an existing wildlife opening. All nest boxes would be monitored and maintained.

Table 8: Proposed Action – Wildlife nest box locations

Compartment	Stand
693	8
693	14
693	7
694	4
694	58
694	61
722	25

Control or eradicate non-native invasive plant species (NNIS), where necessary and appropriate within the Clear Lake Aspen Project area using manual pulling, chainsaw, tilling, planting native vegetation or herbicides (Table 9). Up to 200 acres of infested land area would be treated with herbicides and/or mechanical/manual means. See Appendix C.1 for a detailed description of manual and mechanical treatment methods, herbicide use, and herbicides used.

The sites may be treated annually for up to five years to eliminate residual NNIS. Areas targeted include (but are not limited to) 40 acres of knapweed, sweet clover, and St. John'swort along roadsides adjacent to aggressive vegetation management units (aspen clearcuts and/or wildlife opening maintenance; treatment of 156 acres of autumn olive in compartment 743. The types of herbicides used would be 2, 4 D, Clopyralid, Fluazifop-p-Butyl, Fosamine, Glyphosate, Sethoxydim, Triclopyr, and/or Dicamba, depending on relative effectiveness on target species and appropriateness for the site conditions. These herbicides would be used in accordance with the label directions (Appendix C.1).

Table 9: Proposed Action - NNIS Estimated Infested Areas and Acres

Compartment	Stand	Acres
743	15	99.5
743	16	90.2
743	18	114.6

The proposed NNIS actions include:

- Control infestations along federally owned roadsides in the Clear Lake Aspen Project area to the degree that they no longer serve as significant seed sources for National Forest lands. Eradicate roadside infestations adjacent to clearcut areas so that they do not spread into the interiors of the stands while they are open.

- Re-establish native vegetation as needed by planting locally acquired native sod clumps and by inter-seeding native grasses (e.g. Canada wild rye).

- Selectively eradicate from the project area non-native invasive species that are not already widespread (e.g. the leafy spurge), so that the species does not become widespread.

- Eradicate or control interior infestations depending on infestation size and the naturalness of the surrounding vegetation.

- Control with the appropriate herbicides, burn, and then seed with native grasses (as native genotypes become available) any large infestation that occurs in a matrix of artificially managed vegetation (e.g. Stand 51-7).

- Eradicate chemically or otherwise and then cover with weed-free mulch or wood chips to inhibit weed seedlings any small infestation under forest cover or in small openings

Prescribe burn approximately 272 acres using medium to high intensity fire (Table 10). The purpose of the burn would allow oak to dominate advance regeneration through the preparation of a favorable seedbed, encouragement of acorn caching, opening-up of the understory, and reduction of fire-intolerant competitors (primarily red maple).

Implementation would occur in the spring, during which time red maple translocates its carbohydrate reserves from the root system to the stem earlier than oak. Fire would need to be prescribed repeatedly to deplete root reserves of resprouting red maple thus minimizing its numbers and competitive status. Initial implementation would be prescribed approximately two growing seasons between fires to set back the red maple that now currently dominates the midstory and understory.

Fires would be prescribed at a minimum interval of two growing seasons between treatments to allow the effects of treatments to be adequately determined, allow oak species to germinate, sprout, and allow the re-establishment of a continuous fine-fuel bed.

Future fires would be prescribed in an approximately seven to fifteen year cycle to continue to maintain oak as the dominant species on the site. Intervals should be adjusted accordingly depending on the level of competition to oak and the stage of development of oak regeneration over the largest percentage of the area.

Table 10: Proposed Action – Prescribed Burn estimated Acres

Compartment	Stand	Acres
693	10	272

NOTE: *The intent to prescribe burn 272 acres using a medium to high intensity burn was proposed in this alternative to create a disturbance to the understory and to promote a favorable seedbed for native oak species and serotinous tree species. However, further field investigation revealed that the overstory component contained mostly red maple and aspen with very few oak trees. Without oak trees in the overstory there would be an inadequate acorn supply for future oak regeneration. Repeated understory fire may help reduce existing red maple and prepare a seedbed for oak, but it would also prepare a seed bed for red maple and aspen. Maple and aspen produce an abundant amount of seed every year whereas oak seed production can be intermittent with exceptional seed years several years apart. The oak seed production is further limited to the deficiency of oak.*

This stand has also been previously thinned and most of the oak has been harvested. The thinning operation likely created large canopy gaps releasing shade tolerant red maple that can overtop and inhibit oak regeneration. Initial red oak regeneration requires diffuse light or small canopy openings to reduce competition from other species (Stringer). The opportunity for red oak regeneration may have past due to the lack of advanced oak regeneration and seed source in the overstory, natural succession of red maple could be inevitable.

2.4 Alternative III (Modified Proposed Action)

Alternative III is a modification of the Proposed Action. Alternative III was developed in response to key issues identified during the scoping process as described in Section 1.9 of this document. Other factors such as access to

stands, wetlands and slope also contributed to the development of Alternative III. A summary comparison of the alternative can be found in Table 13 and a map displaying the activities proposed in Alternative III can be found on page 22.

A summary of Alternative III is as follows:

1. Harvest by clearcutting approximately 620 acres of mature aspen in units up to 40 acres to maintain the aspen forest type, enhance wildlife habitat, and create age-class diversity within the project area.

2. Thin approximately 18 acres of red pine to improve growth and vigor of the remaining trees.

3. Construct approximately one mile of temporary roads and associated landings. These roads and landings would be closed and rehabilitated when harvest activities were completed.

4. Maintain approximately 17 acres of wildlife openings.

5. Place wildlife nest boxes to increase nesting and roosting opportunities throughout the project area.

6. Control or eradicate non-native invasive plant species (NNIS) where necessary and appropriate within the Project area using prescribed fire, mechanical and herbicide treatments.

7. Prescribe burn approximately 29 acres of aspen to reduce the dense shrub understory and promote aspen regeneration.

Details of Alternative III

Regenerate approximately 620 acres of aspen through clearcutting units up to 40 acres in size. Alternative III reduces the amount of aspen harvested by 180 acres (Table 11). The remaining aspen clearcuts would still have a minimum of 9 trees (≥ 9 inches dbh) per acre, includes live and dead trees, would be retained for snags, and three (3) live trees (≥ 10 inches dbh) per acre for down wood, to improve wildlife habitat. Four (4) trees per acre of the largest diameter practical would be retained in clumps to provide mast/den trees. Dead trees that pose a hazard to loggers would be felled and left on site.

The remaining aspen stands that have advanced regeneration of oak in the midstory would also be retained as reserve trees. Retaining some of the midstory oak along with the four mast trees per acre would create a vertically stratified stand that would improve species diversity and create a multi age class structure. The plurality of the stands would still be aspen, but would have a component of oak. This could also improve wildlife habitat and visual aesthetics (Cleland *et al.* 2001).

The reduction in aspen regeneration is based on additional field visits, review of stand inventories, public comments that wanted hardwoods rather than aspen management and Forest Plan guidelines. The Forest Plan limits the size of regeneration harvests to 40 acres and all clearcuts must be separated by a stand of at least ten acres. The stands excluded from the proposed action are listed in Table 11.

Table 11: Stands excluded from aspen regeneration - Alternative II (Proposed Action)

Compartment	Stand	Acres	Reasons for exclusion
694	15	40.0	Mostly hardwoods
694	42	13.0	Access issues
694	47	17.0	Access issues
722	45	40.0	Immature aspen
720	4	22.0	Contains wetlands
720	30	22.0	Occupied by Regional Forester Sensitive Species

Compartment 694 stand 15 is comprised mostly of oak and other hardwoods with a small component of aspen and conifers. This stand was determined to be managed as hardwoods since the aspen was sparse and attempts to regenerate aspen may not be successful. This stand is also surrounded by designated old growth and has wetlands

adjacent to it. Currently the road to access this stand is closed to motorized vehicles and would need culverts placed in the areas that cross the wetland areas.

Compartment 694 stand 42 and 47 are aspen stands that could be regenerated but does not have road access. Currently an old skid trail does exist, but it is flooded due to beavers inhabiting the area. The Forests road engineer determined that it would not be cost effective to build a temporary road to these stands. The beavers would continue to flood the road and the terrain of steep slopes and wetlands would be a challenge. These stands would not be harvested and would eventually succeed to a hardwood forest type.

Compartment 722 stand 45 has hardwoods in the north portion of the stand. The rest of the stand is a mixed aspen maple stand that was harvested in 1988. The majority of the aspen is not merchantable at this time because it is too young. Rotation age for aspen according to the Forest Plan is 50 years. The hardwood portion of the stand would most likely be excluded from future aspen regeneration projects.

Compartment 720 stand 4 is an aspen stand that would not be harvested at this time due to most of the stand being in wetlands.

Compartment 740 stand 30 is occupied by a cerulean warbler which is a Regional Forester Sensitive Species. The standards and guidelines recommendations for the cerulean warbler require at least ten acres of closed forest canopy. This stand also has a rolling topography with occasional slopes greater than 30%. Logging equipment may cause deep ruts and erosion on slopes that are greater than 30%.

Thin approximately 18 acres of red pine in compartment 693 stand 8 (Table 5). This stand is proposed to be thinned because the basal area is above recommended B-stocking levels. Gilmore and Palik (2006) states that periodic thinning of young red pine stands is recommended to put the growth on the best trees available, maintain uniform growth rates, remove diseased and injured trees, shorten rotations, and increase the yield.

Red Pine managed near the minimum recommended stocking would have the most rapid diameter growth because the crowns would have optimum growing space. Ideal growth conditions, for the stands chosen for thinning (irrespective of average stand diameter) would occur at about the 90-110 ft^2 per acre range.

Construct approximately one mile of temporary roads to remove forest products in the project areas proposed for timber harvest. Landings would be constructed for timber product preparation and storage and would be approximately one acre in size. Temporary roads, skid trails, and landings would be closed after the timber sale, and reforested through mechanical means or by hand if natural regeneration does not occur.

Maintain approximately 17**-**acres of existing forest openings (Table 7) for wildlife. This action would be the same as the Proposed Action. Treatments would include cutting encroaching vegetation by mechanical means, hand cutting, or prescribed burning.

Place Wildlife nest boxes to increase roosting and foraging opportunities for owls, tree squirrels, bats, waterfowl, and eastern bluebird. Multi-use boxes for owls and tree squirrels would be placed in a red pine stand that currently lacks cavity trees. Bat boxes would be placed in a wildlife opening immediately adjacent to a wetland impoundment. Waterfowl nest boxes would be placed on beaver ponds and wetland impoundments within the project area. These boxes would benefit ducks, including wood duck and hooded merganser. Eastern bluebird boxes would be placed in an existing wildlife opening. All nest boxes would be monitored and maintained.

Control or eradicate non-native invasive plant species (NNIS), where necessary and appropriate within the Clear Lake Aspen Project area using manual pulling, chainsaw, tilling, planting native vegetation or herbicides (Table 9). This management action is the same as what is proposed in the Proposed Action. Up to 200 acres of infested land area would be treated with herbicides and/or mechanical/manual means. See Appendix C.1 for a detailed description of manual and mechanical treatment methods, herbicide use, and herbicides used.

The sites may be treated annually for up to five years to eliminate residual NNIS. Areas targeted include (but are not limited to) 40 acres of knapweed, sweet clover, and St. John'swort along roadsides adjacent to aggressive vegetation management units (aspen clearcuts and/or wildlife opening maintenance; treatment of 156 acres of autumn olive in compartment 743. The types of herbicides used would be 2, 4 D, Clopyralid, Fluazifop-p-Butyl, Fosamine, Glyphosate, Sethoxydim, Triclopyr, and/or Dicamba, depending on relative effectiveness on target species and appropriateness for the site conditions. These herbicides would be used in accordance with the label directions (Appendix C.1).

The sites may be treated annually for up to five years to eliminate residual NNIS.

Prescribe burn approximately 29 acres using medium to high intensity fire (Table 12). Compartment 694 stand 19 and 21 are aspen stands with a component of pine. Most of the aspen in these stands is decedent and falling apart. These stands have a low basal area with several down and dead trees with an open forest canopy. The understory has a thick layer of shrubs such as downy arrowwood and dogwood. This shrub layer may inhibit aspen suckering after the proposed clear-cut. The prescribed fire would be implemented in early spring after harvest to help reduce the shrub layer and stimulate aspen suckering.

Table 12: Alternative III (Modified proposed action) - Prescribed Burn estimated Acres

Compartment	Stand	Acres
694	19	13
694	21	16

2.5 Summary Comparison of Alternatives

The following tables provide a summary of how the alternatives compare in terms of objectives, activities and issues:

Table 13: Summary Comparison of Alternatives - Objectives and Activities

	Description	Alternative I (No Action)	Alternative II (Proposed Action)	Alternative III (Modified Proposed Action)
Objectives	Improve timber stand condition and age class distribution.	N	Y	Y
	Provide timber products.	N	Y	Y
	Enhance and increase variety of wildlife habitats within Management Area.	N	Y	Y
	Reduce or eliminate NNIS	N	Y	Y
	Reintroduce fire into fire-adapted ecosystems.	N	Y	Y
Activities	Clearcut aspen – regenerate aspen (acres)	0	800	620
	Thin red pine plantation (acres)	0	18	18
	Maintain existing opening (acres)	0	14	14
	Place nesting boxes for wildlife (structures)	0	24	24
	Control or eradicate NNIS (acres)	0	304	304
	Prescribe burn to regenerate oak (acres)	0	272	0
	Prescribe burn to regenerate aspen (acres)	0	0	29

2.6 Design Criteria

Specific actions may be incorporated into the project design during the development of alternatives based on resource concerns and issues raised during scoping and analysis. Design criteria are intended to lessen or eliminate potential impacts from proposed activities. These criteria are measures that may or may not be included in Forests' Plan's Standards and Guidelines, or may impose a stricter application of a Standard or Guideline.

Wildlife Protection Measures

Regional Forester's Sensitive Species would be protected within all project areas to the greatest extent possible. New sensitive species locations discovered within a project area may result in all actions being delayed or interrupted within the area. The appropriate district wildlife/fisheries biologist or botanist would be consulted to determine effects of the action on the species. A Supplemental Information Report (SIR) to the Biological Evaluation may be prepared and would include recommendations regarding protection of the species. The SIR may include modification of the action(s).

Care should be taken while conducting wildlife opening maintenance to leave desirable native and non-native fruting trees and shrubs such as cherry, service berry and apple. If mowing wildlife openings, implementation would occur between July 15 and April 1 to protect ground nesting bird species.

Herbicides would not be applied within 400 feet of an active RFSS woodland raptor and/or songbird nest between May 15 and July 1. At known RFSS invertebrate occurrences, use only herbicides would not kill caterpillar host plant species.

Northern Goshawk / Red-shouldered Hawk**:** The following design criteria for northern goshawks and red-shouldered hawks apply to all actions (see USDA Forest Service 1993):

- Management actions, such as timber harvest, thinning, or herbicide application, would not be allowed within the radius of the nest area of an active northern goshawk or red-shouldered hawk nest (Nest Protection Area) at all times.
- Minimal human presence would occur in any active Nest Protection Area during the nesting season, from March 1st to August 31st.
- Prescribed burns that would include all or portions of the Nest Protection Area are prohibited during the critical nesting season, from March 1st to August 31st. Burns outside of this period would be of low intensity to protect nesting habitat integrity.
- Management actions would not reduce crown closure below 60% within 300 feet of the Nest Protection Area.
- Timber harvest would not be allowed within approximately ½ mile of the nest (a.k.a. Post-fledging Area) from March 1st through August 31st. Activities that involve minimal human presence, such as timber marking, are permitted however within the Post-fledging Area during this period [See Nest Protection Area measures above].
- Red pine thinning and underburning would not be allowed at any time within the nest protection area for a active nest. Red pine thinning would also not be allowed at any time in the nest protection area for the alternate nest; however, the nest protection area for the alternative nest could be underburned outside of the nesting period, i.e. between September 1st and February 28th/29th. The goshawk design criteria and restrictions for the active nest would apply to any active nest site that was found prior to, during project implementation.

Non-Native Invasive Species (NNIS) Plants Measures

- Off-road equipment would be cleaned of seeds, soil, vegetative matter and other debris that could hold NNIS seeds and/or propagules. Off-road equipment would be inspected by a Forest Service representative to prevent NNIS introduction or spread in the project areas.
- Skid trails and plow lines would be placed and rehabilitated in a way that limits the spread of existing non-native invasive species from roads, trails, or powerline corridors, into stand interiors. Skid trails and plow lines would be rehabilitated (re-contoured, seeded, etc) after they are no longer needed.
- Where needed, infestations adjacent to clearcuts/planting sites would be treated with the most appropriate herbicide immediately prior to the production of NNIS seed in during the growing season preceding the cut and/or replanting activities.
- The proliferation of *Centaurea stoebe* (spotted knapweed) and *Hypericum perforatum* (St. John's wort) would be limited in infested (fuel break) areas by scheduling, whenever feasible, mowing/brushing within the period between snowmelt and July 1. This is the period after which many of the weed species winter fruiting structures have collapsed and before the advent of new seed.

Regional Forester Sensitive Species (RFSS) Plant Protection Measures

- To minimize disturbance, heavy equipment would be excluded from an area within ten feet of marked Hill's thistle (*Cirsium hillii*) and other RFSS plant locations, unless specified otherwise by district botanist. The plants would also be protected from ground-disturbing activities (temporary roads, landings, skid trails, furrowing, etc.).

NNIS Treatment Protection Measures

The following measures would be implemented to ensure safe treatment of non-native invasive plant species:

- Notices would be posted near all areas to be treated, and recently treated, with herbicides.
- Herbicide application would only occur when wind speeds are less than 10 mph, or according to label direction, to minimize herbicide drift.
- Herbicide label directions would be carefully followed. This could include temporary closure of treatment areas for public health and safety.
- Appropriate protective gear would be worn by herbicide applicators per label direction.
- Herbicide containers would be disposed of following label and Forest Service guidelines.
- Herbicides would be labeled and stored appropriately in accordance with label specifications, state and federal laws, and Forest Service regulations.
- Herbicides stored on-site would have Material Safety Data Sheets per Forest Service guidelines.
- All those working with herbicides would review corresponding Material Safety Data Sheets.
- Rinse water for cleaning or rinsing actions in conjunction with herbicide treatment would be disposed of according to Environmental Protection Agency regulations.
- Weather forecasts would be obtained prior to herbicide treatment, and treatment activities would be halted, if needed, to prevent runoff during heavy rain events.
- Areas to receive herbicide treatment would be evaluated to ensure protection of threatened, endangered, and sensitive (TES) species. If any TES species are located, then appropriate protective measures would be implemented.
- Only formulations approved for aquatic-use would be applied in or adjacent to wetlands, lakes, and streams, following label direction.
- Avoid herbicide use in wetlands with suitable amphibian breeding habitat, as determined by Forest wildlife staff during pre-treatment review.
- Aquatic herbicide applications require a permit from the Michigan Department of Environmental Quality (DEQ).
- All private landowners, residents, and lake associations of affected lakes would be notified of plans for aquatic herbicide application.
- Areas to receive ground disturbance would be surveyed to ensure protection of cultural resources. If any cultural resource sites are located, then appropriate protection measures would be implemented.
- Following NNIS treatments, revegetate exposed soils promptly to avoid re-colonization by NNIS. For manual treatments that disturb the soil, tamp the soil down. Use only approved seed mixtures and weed seed-free mulch.
- Retain native vegetation and limit soil disturbance as much as possible.
- Fueling or oiling of mechanical equipment would occur away from aquatic habitats.
- Equipment, boots, and clothing would be cleaned thoroughly before moving from treatment site to ensure that seeds or other propagules are not transported to other sites.
- NNIS parts capable of starting new plants (seeds, rhizomes, etc.) would be disposed of in a way that would not facilitate spread.
- All control treatments should be timed to be most effective, based on the species phenology and life history.

Cultural Resources Protection Measures

- All cultural resources sites would be protected by avoiding the site, either through sale design alteration, or through designation of a reserve area around the site. Such a Reserve Area will be at least 30 meters (98.4 feet) radius or the area determined by a Forest Service Archaeologist that will be adequate to protect the site.
- Any cultural resource sites found during implementation of the project would be reported immediately to a Forest Service Archaeologist and work would stop in the area.

Reforestation Protection Measures

- Harvesting in the aspen stand would be restricted to the dormant season, i.e. from September 30 to May 1, in order to increase the density of aspen sprouting.
- Perform site preparation prior to the first growing season after harvest to maximize sprouting.

Logging Slash Measures

- Slash in harvested red pine stands prescribed for underburning would be treated by the contractor to lie within 24 inches off the ground and kept two feet from the boles of residual trees to facilitate burning.
- Within a strip 25 feet in width, as measured from the edge of private property, all slash from the purchasers operations would be removed by the contractor.
- Within 200 feet of a travel way (road), slash from timber purchasers operations would be treated by the contractor to lie within 18 inches of the ground.

Healthy Forest Protection Measures

- To reduce the likelihood of overland spread of oak wilt disease, mechanical operations within or adjacent to stands with a residual oak component would not be permitted during the period of April 15 to July 1. This restriction is addressed in individual stand prescriptions where it applies.
- Underburning in red pine stands would be prohibited from May 1 to July 15 to reduce the stress on the red pine during the period of active bud growth and leader development.
- In red pine stands maintain B-level stocking or higher in live trees of desirable or acceptable commercial species (excludes rough, culls, and dead trees). If stocking falls below B-level, burning and harvesting would be postponed until stand recovers to B-level.
- Harvesting activities in aspen regeneration units would be restricted to the period between September 30 and May 1 in order to increase the density of aspen sprouting.

Visual Protection Measures

Summary of VQO/Scenic Design/Mitigation Features

- Schedule treatments to appropriately disperse visual impacts spatially in the landscape and over time. Where possible, implement treatments during the low visitor use seasons.
- Where feasible, locate landings or staging areas beyond foreground views near residential and recreation sites (i.e. campgrounds), and beyond views of major travel routes
- Where possible, temporary roads would be located on existing roadbeds to minimize new ground disturbances.
- Post-treatment establishment of user-created routes within treatment areas would be prevented by closing and rehabilitating temporary access routes.
- Provide cover on landings, temporary roads, or other cleared areas to blend these areas visually into the surrounding landscape and rehabilitate at completion of project. For example, edge line of clearings would be curved instead of straight.
- Where possible, retain a few large non-hazardous snags per acre. This enhances natural scenery characteristics valued for viewing wildlife.
- Trees and shrubs would be retained between the roadway and the parking area.

2.7 Monitoring

The National Forest Management Act requires National Forests to monitor and evaluate their Forest Plans. Forest' Plan monitoring is done across the Forests on a periodic basis to ensure that activities reasonably conform to management area direction.

Project monitoring occurs before, during, and after project implementation. Administrators, inspectors, and resource specialists ensure project elements are implemented as designed and that standards and guidelines are followed for protection of resources. Evaluation of completed projects addresses how well management actions achieved desired outcomes or objectives, and the effectiveness of resource protection measures.

Figure 1: Alternative II (Proposed Action)

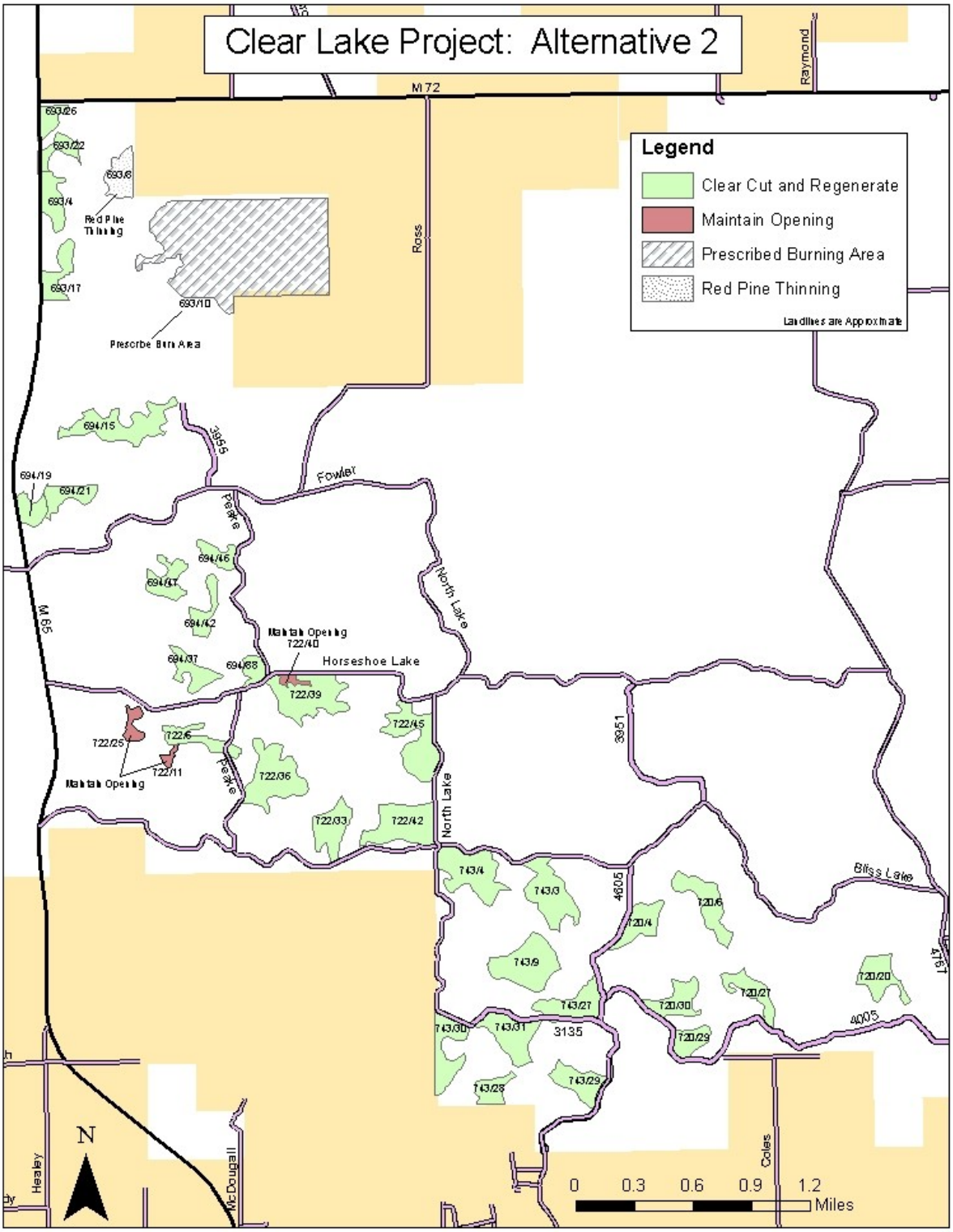
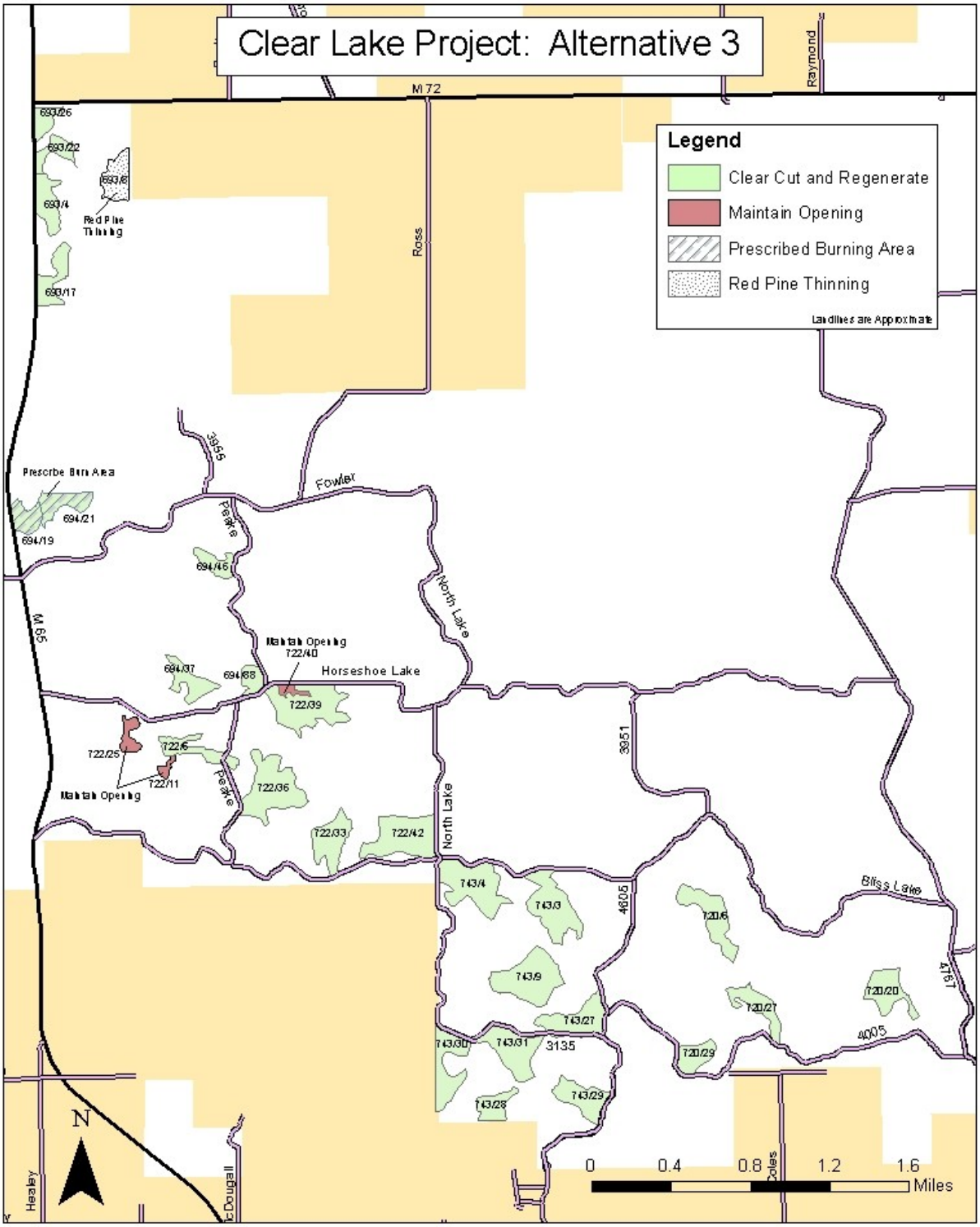


Figure 2: Alternative III (The Reduced Aspen Regeneration Alternative)



Chapter 3: Environmental Consequences

This section summarizes the physical, biological, social, and economic environments of the affected project area and the potential changes to those environments due to implementation of the proposed action. It also presents the scientific and analytical basis for comparison of the alternatives.

Chapter IV of the Forests' Plan EIS (pages 5-9) discusses the practices of even-aged silviculture and its impacts to vegetation when utilized in forest management. The remaining pages of the chapter discuss cumulative effects of individual environmental elements such as soils, vegetation, wildlife, etc. Proposed project conditions are typical of those discussed in the Forests' Plan EIS. This analysis tiers to the EIS discussions. The actions proposed in Alternative II are consistent with the direction of the Final Environmental Impact Statement for the Forests' Plan. The actions proposed in Alternative III are also consistent with the Forests' Plan.

Chapter 3 is organized by resource. This section will cover the *Present Condition and Effects of the Alternatives* for each affected resource. Following is an outline of how each resource section is organized:

- *Analysis Bounds* This describes the cumulative effects analysis boundary considered for the individual resource and an explanation of the reason that particular area was considered. (This could be the project area, or a larger area that incorporates the project area.)

- *Affected Environment* This section briefly describes the current condition (affected environment) of the resource in the project areas, and how past activities have affected that condition.

- *Direct and Indirect Effects* These will be described for each alternative. This section describes the direct and indirect effects of each alternative on the present condition of the resource. Generally, direct effects are caused by the action and occur at the same time and place as the action. Indirect effects are caused by the action but occur later in time or are spatially removed from the action. Direct and indirect effects can be beneficial or detrimental.

- *Cumulative Effects* These will be described for each alternative. Cumulative effects include not only the effects of the proposed actions, but may also include the effects of past actions and reasonably foreseeable future actions on the resource. This section includes effects within a cumulative effects analysis area, which may extend outside project area boundaries. Cumulative effects of the No Action Alternative will consider the effects of not implementing this specific project, rather than not implementing all projects within the analysis area over the long term.

Acreages used for analyses in this environmental assessment are GIS acres. All acreages are approximate.

3.1 Present Condition and Effects of the Alternatives

Biological Factors

Vegetation

Analysis Bounds

The geographical bounds for the cumulative effects analysis area for the vegetation analysis of the Clear Lake Project will be defined as the Harrisville and Tawas Ranger Districts of the Huron National Forest (from here forward referred to as the Huron Zone). The Huron Zone consists of approximately 213,534 acres. These Huron Zone was chosen as geographic bounds to better analyze the aspen age class diversity and vegetation distribution as stated within the Forest Plan goals and objectives for Management Area 4.2 (Forest Plan Chapter III 4.2-3).

For the purpose of this analysis, cumulative effects will be bounded in time by a fifteen year period. This period includes the past ten years of management activities and the reasonably foreseeable future five years. This temporal boundary was chosen to reflect one "age class" period of past management and the planned five-year sale program for the Huron Zone. Age class distribution objectives are based on integrated resource objectives and rotation age objectives for forest vegetation types. Vegetation management is reasonably planned for the next five year period.

Affected Environment
Project Area

The project area is within Forest Service Compartments 693, 694, 722, 724, 740, and 743 and is approximately 6,401 acres. Private lands within the project area are generally larger tracts of land used principally for hunting and recreation. There is limited evidence of timber harvesting, wildlife planting, and opening maintenance on the adjacent private lands (ArcGIS).

According to Figure 3 below, approximately 80% of the project area is hardwood forest, 14% conifers, and 6% openings. There is a mixing of the hardwoods and conifers within stands. The hardwood forest stands are 45% aspen/birch (2,880 acres); high site oak (1,600 acres) low site oak (512 acres) and 2% northern hardwoods (128 acres). See figure 3. Approximately 8% of the project area is long lived conifers such as white and red pine (512 acres), 5% is short lived conifers such as jack pine (320 acres) and 1% is lowland conifer (64 acres).

Present Vegetative Composition and Age-Class Distribution of the Project Area

The Harrisville and Tawas Ranger District distribution of the forest types as shown in Figure 3 is approximately 45% of the project area consisting of short-rotation aspen/birch forest types and approximately 8% of long-lived conifers such as red and white pine. Within the distribution of the vegetation approximately 12% of the project areas species is within the expected rotation ages of 50 to 60 years (Figure 4).

Age class distribution of the project area is skewed towards aspen within the 20-49 year old as well as the 70-89 years old aspen timber. The 0-9 year old age class is essentially nonexistent. Aspen age class distribution in the project area is similar, with zero timber within the 0-9 age class range and most of the timber within the 20-49 age class as well as the 80-89 age class range (Figures 4 & 5).

Figure 3; Vegetation Distribution of the Clear Lake Project Area

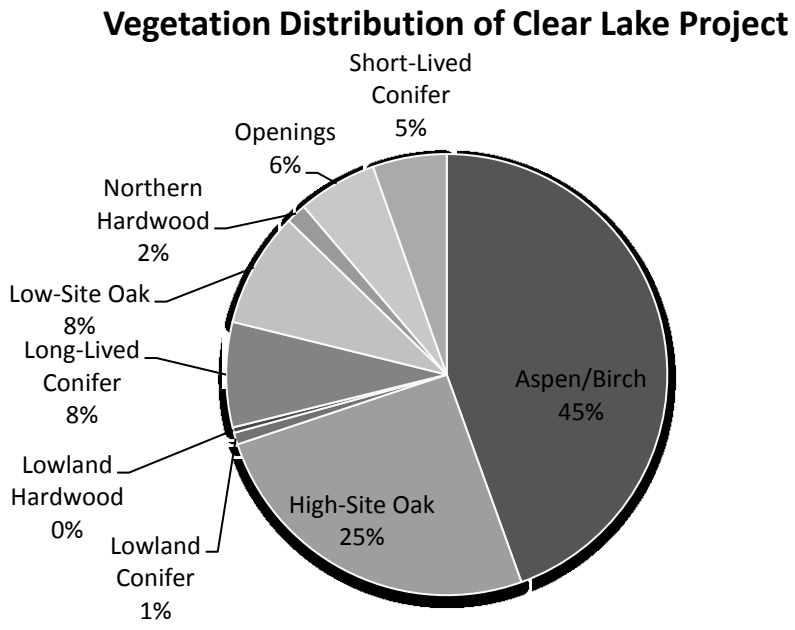
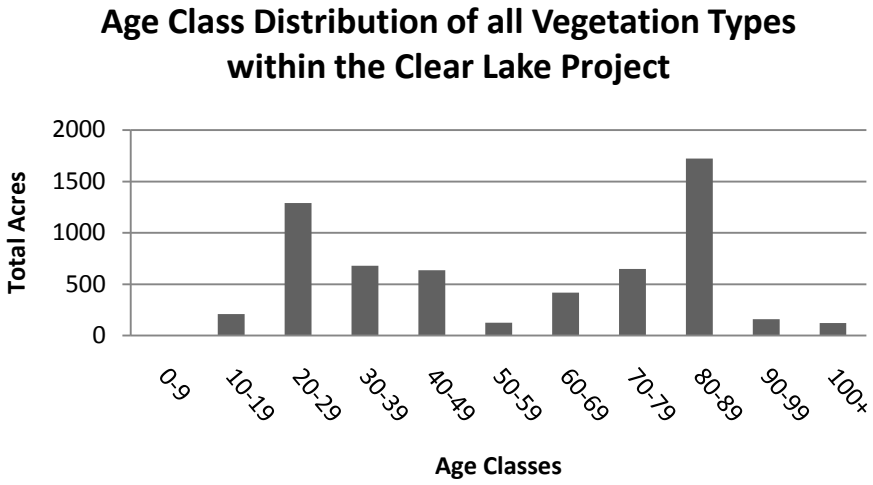


Figure 4; Age Class Distribution of all Vegetation Types within the Clear Lake Project Area

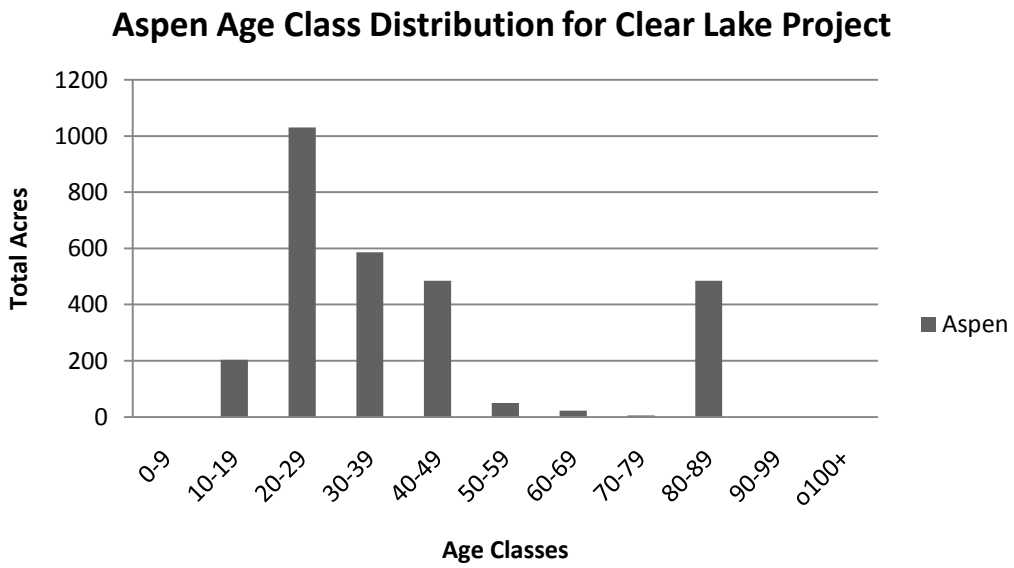


This analysis will address two vegetation types included in the Forests' Plan vegetation composition objectives; Aspen/Birch and Long-Lived Conifer Group.

- **Aspen/Birch** [*present condition*]

Approximately 45% of the project area is represented by the aspen/birch forest type. Two percent of the project areas aspen/birch vegetation type is over the desired rotation age of 50 years. Nearly 56% of the project area aspen is between the ages of 20 and 39, and none of the aspen is within the zero to nine year age class (see Figure 5). All of the aspen stands proposed for harvesting have an oak component. The oak component ranges between 10 to 50 percent of the stands. Removal of the present timber would encourage new regeneration growth of the aspen that is presently stagnate due to high level of old growth aspen that is in the project area and enhance some of the groundcover vegetation.

Figure 5; Age Class Distribution of the Aspen within project area



- **Long-lived Conifer** [*present condition*]

Currently, red pine represents approximately 8% of the project area vegetation. Red pine in the Clear Lake project area grows primarily in plantations that were established in the mid-1950's to control the sand dunes and reduce the "sand blows" in Michigan. Red pine is a slow growing species that thin themselves naturally after the age of 40 however not to the quality rate that active management usually produces. Red pine commonly shows dominance in an area within 10 to 12 years. More dense stands increase the likelihood that the red pine would become stagnate. Red pine responds very well to manipulated thinning operations and it would naturally thin itself once the trees have reached approximately seven to eight feet in height.

Forests' Plan rotation age guidelines set a final harvest range of red pine between 70 to 100 years (Forests' Plan, page II-17). Ideally, thinning operations should occur every 20 to 30 years. Thinning promotes higher quality and quantity of the desired merchantable wood material in the remaining trees left on site. Most of the plantations are not uniform in size or shape and appear to have been planted in patches where other vegetation was lacking or sparse. Red pine stands proposed for thinning in this project are a mix of second to final harvest. The current stocking level is approximately 200 square feet per acre of basal area (BA).

Direct and Indirect Effects of Alternative I (No Action)

- **Aspen/Birch**

Over the next decade, stands that are presently identified as mature aspen would become over-mature, eventually breaking apart, and transitioning to other tree species.

The deferral of aspen regeneration in the project area would result in a high risk of rapid aspen deterioration (Forests' Plan, p. B-11). The aspen component would not be managed and no regeneration would occur. No timber products would be produced. The existing 17 acres of openings would not be treated and over time, trees would encroach and eventually fill in the openings.

- **Long-Lived Conifer**

A result of the No Action Alternative would be no active thinning of long-lived conifers. In the next 10 years the number of acres of red pine would remain unchanged in the Clear Lake Project area. Long-lived conifers that possess a closed canopy would continue to grow within the limited space availability. After time, the growth of these stands would become stagnate and begin to deteriorate.

- **Prescribed Burning**

Stands that become over-mature and break apart would increase the number of snags and downed woody material. Natural fuel-loading would increase the chances of a large wildfire, which if not controlled, would facilitate a change in the existing stand composition and over time would result in a new stand mix composition consisting of oak, aspen, jack pine, red pine, and pine barrens.

Direct and Indirect Effects of Alternative II and Alternative III

- **Aspen/Birch**

Aspen stands in the Lake States begin to deteriorate rapidly when they reach approximately 60 years old due to rapid declines in tree health. *Phellinus tremulae*, a common heart rot disease, causes significant volume losses in aspen at advanced ages. All of the stands proposed for harvest are 50+ years' old and showing considerable signs of decline. By harvesting 50+ year old aspen, heart rot would be reduced. Management of the aspen would not only regenerate aspen, but some oak regeneration would also occur. This is because similarities in growth are exhibited by aspen and oak. Both oak and aspen are hardy species and sprout within the first few years after a disturbance (Sander 1990). The difference is that oak tends to grow at a slower rate than aspen. This would give aspen the advantage and over time, aspen would re-populate itself within the project area.

The action alternatives would increase the early successional aspen in the 0-9 year age class by approximately 21% and reduce the 50+ age class by 67% in the project area.

- **Long-Lived Conifer**

Thinning red pine plantations would reduce the total number of stems per acre and reduce the stands to their optimal stand density of about the 90-110 ft^2 per acre range. Thinning would open the dense canopy of the stand, encourage diameter growth of individual tree growth due to the new space availability and enhance the nutrient availability. Thinning would also reduce the remaining time it would take the stands to produce large diameter trees desirable for timber production. Thinning of red pine over-story would produce a more diverse groundcover of blueberries, ferns, and various season grasses and open the stand for further growth enhancement of the adjacent oaks species and additional development of existing species and mammals.

- **Prescribed Burning**

The original intent of Alternative II (The Proposed Action) was to prescribe burn 272 acres using a medium to high intensity burn. The prescribed burn was proposed to create a disturbance to the understory and to promote a favorable seedbed for native oak species and serotinous tree species. However, further field investigation revealed that there is not an adequate overstory of either oak or serotinous tree species to produce acorn or seed sources to promote this regeneration. It is thought that the use of prescribed fire would promote less desirable species such as red maple. The inventory results and field visits concluded that there would be little oak or serotinous tree species regeneration if prescribed fire was used and successful promotion of these desirable species would be limited, at best. Therefore, Compartment 693 stand 10 was excluded for prescribed burning treatment.

Alternative III proposes to underburn 29 acres of aspen stands to mimic a natural disturbance to the understory. Prescribed burning would assist in the stimulation of the aspen suckering, enhance the growth of the natural regeneration by giving the timber type the advantage of competing with other conifers that are present within the stands (http://cpluhna.nau.edu/Biota/aspen_forest.htm). It would also enhance the groundcover for fruit bearing plants such as blueberries and raspberries as well as ferns and grasses. In addition, the initial effects to the lands would reduce and remove the dead and down woody material within the stands, reduce the larger shrubs, and reintroduce nutrients into the soils.

Cumulative Effects

Past, Present, and Future Activities in the Analysis Area

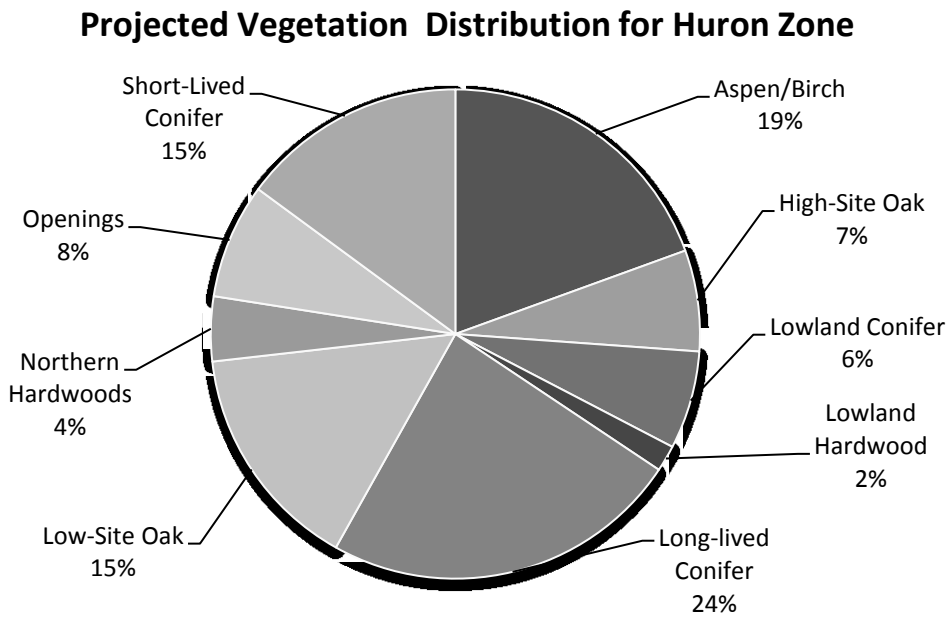
Future actions, together with the past and present actions in the cumulative effects analysis area would continue to follow guidelines set forth in the strategy for the Forest Plan. Vegetative management activities that have been completed within the analysis area in the past ten years include Woodcock Waiting, Wicker Hills, Match, and Green Eagle. These timber sales that are similar to The Clear Lake Project vegetation types consisted of approximately 16,188 acres timber management. Of these activities approximately 591acres were managed for the aspen/birch forest type. The Forest Plan states that a minimum of 325 acres of aspen will be managed forest wide annually in order to maintain the appropriate age class distribution (Forest Plan Chapter 3 Section XIV page 92).

Three timber sales were sold in fiscal year 2010 with approximately 1,157 acres of timber is slated to be managed. None of the timber sold consists of the aspen/ birch timber type.

Vegetative Composition and Age-Class Distribution of the Analysis Area

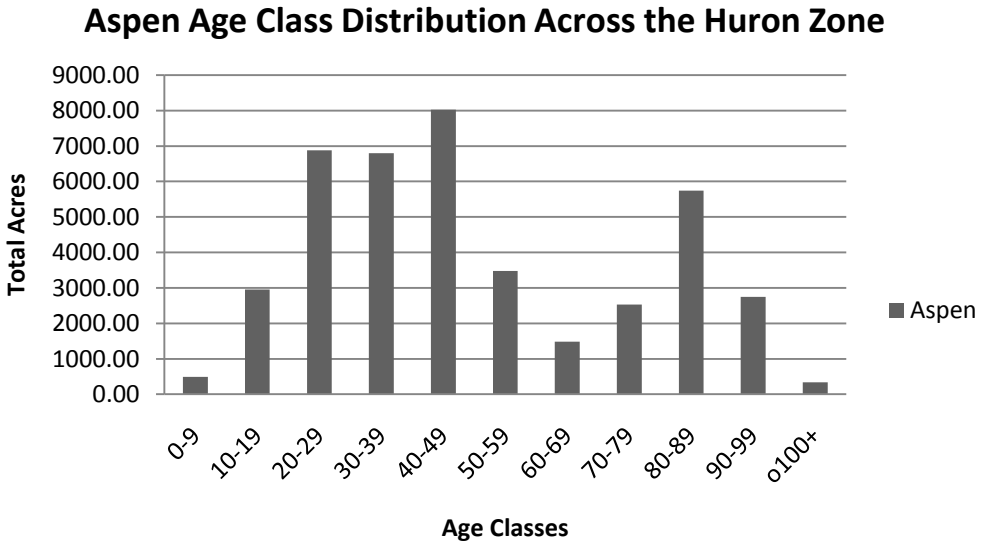
Nineteen percent of the Huron Zone is aspen/birch, 15% short-lived conifer, 24% red and white pine (long-lived conifer), and 15% low-site oak. Other vegetation types representing the remaining percentages of the analysis area include northern hardwood, high-site oak, lowland conifer, lowland hardwood, and openings (Figure 6).

Figure 6; Projected Vegetative Distribution of Huron Zone



The aspen age-class distribution within the analysis area is currently unbalanced (Figure 7). Forty nine percent of the aspen is greater than desired rotation age of 40 years, and just over 19% is within the 40 to 49 years age class. Approximately 25% of the analysis area aspen is less than 30 years old, and 16% of the aspen is within the 30-39 years old. Ideally, the desired future age-class distribution for the analysis area would be evenly distributed with a maximum of 1,046 acres in each of five age classes between zero and 50 years old, and no aspen would be over the desired rotation age of 50.

Figure 7; Aspen Age Class Distribution Across the Huron Zone



Cumulative Effects of Alternative I

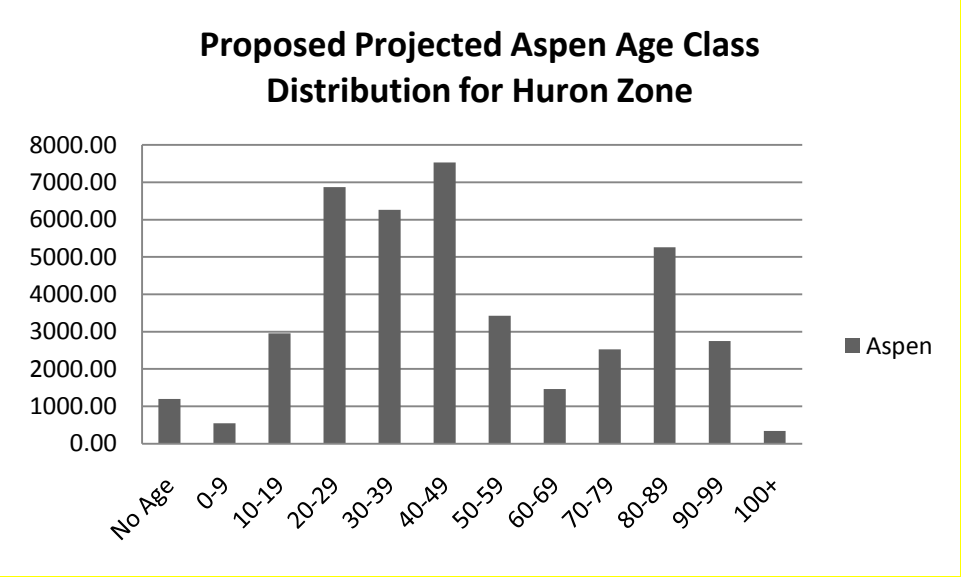
More than 16,326 acres of the analysis area aspen timber type is 50+ years old. As these stands continue to age, they lose the ability to sprout, resulting in a lower percentage of tolerant species and an eventual vegetation type conversion. A result of the No Action Alternative would be the conversion of the over-mature aspen to other forest types in the next 15 to 20 years. It is estimated between 2,500 to 3,000 acres of aspen within the analysis area would likely convert to other forest types in the next ten years without further harvest activities being planned in that time period.

Cumulative Effects of Alternative II and Alternative III

Implementation of either of the action alternatives would help to maintain the aspen/birch vegetation type across the analysis area. The ten year projection for the aspen/birch vegetation type is predicted to decrease by more than 11,000 acres due to natural succession in areas such as old growth, lands physically unsuitable for timber harvest, and land considered unnecessary to meet species viability needs (FEIS, III-233).

Implementation of either of the Clear Lake action alternatives would move between 620 and 800 acres of aspen from the mature age classes into the zero to nine years age-class (Figure 8). This harvest would help to shift the rotation age component of aspen/birch vegetation type to a more balanced age-class distribution within the analysis area.

Figure 8; Proposed Projected Aspen Age Class Distribution for Huron Shores Ranger Station



Management of the aspen stands proposed in Alternative II and the oak and maple stand in Alternative III would affect the vegetation community composition and influence the vigorous re-growth rates induced by logging operations. The young growth may attract burrowing animals that would loosen the soils and form holes capable of channeling waters within the timber operations sites. The downed woody materials are important components of a natural forest and aquatic habitats communities. These materials would be utilized as a cover type and transition into organic matter for present and future vegetation within the forest.

Cumulatively, implementation of the action alternatives in this project as well as future projects may cause a slight change in the Huron Zone soil erosion and productivity. However, erosion in combination with other site factors work to degrade productivity on the scale of decades and centuries (http://forest.moscowfsl.wsu.edu/smp/docs/docs/Elliot_1-57444-100-0.html).

Management guidelines on timber removal would prohibit high levels of compaction and reduce the extent of any topographic disruption during subsequent logging operations. Design criteria would limit logging operations within

the forest to assist in the aid recovery of soils structure, during the winter season when soils are frozen. This would mitigate soil compaction and reverse the effects of compaction of the soil. Removal of timber would open the forest canopy and encourage early successional stage vegetation.

Tree species native to the site would have a greater opportunity to develop and utilize the lands with little competition of non-native tree species.

Non-Native Invasive Species

Analysis Bounds

The cumulative effects analysis areas (CEAA) are delineated based upon the time span and spatial extent that treatment effects would potentially interact with other unrelated activities of similar nature. For NNIS infestations to be affected by, or to affect other activities, it must either occur on the same sites or be within a reasonable dispersal distance during the timeframe that suitable habitat is available. The timeframe considered is about five years past and future. The time frame was selected to approximate the time required for disturbed bare areas to recover to the degree that they are less vulnerable to invasion by weeds. The CEAA is all areas within 0.3 miles (0.5 km) of the treatment areas. The CEAA for NNIS treatments was derived by assuming a 100 meter per year plant dispersal rate during the five year NNIS vulnerability window.

Past, Present, and Future Actions

Past Actions
Federal: No soil disturbing federal activities have taken place in the past five years.
Non-Federal: Alcona County government has mowed roadsides, graded gravel roads, and distributed salts along the roads. Local residents have mowed their lawns. Visitors and local residents have walked or driven across federal lands for various recreational or consumptive purposes.

Present Actions
Federal: No soil disturbing federal activities presently occurring within the CEAA.
Non-Federal: Alcona County government mows, grades, and distributes salts along the roads. Local residents will continue to mow their lawns. Visitors and local residents walk or drive across federal lands for various recreational or consumptive purposes.

Future Actions
Federal: The Forest Service will suppress any wildfires should they develop in the next five years within the CEAA. Other projects are not planned within the CEAA in the near future.
Non-Federal: Alcona County government will continue to mow roadsides, grade gravel roads, and distribute salts along the roads. Local residents will continue to mow their lawns. Visitors and local residents will continue to walk or drive across federal lands for various recreational or consumptive purposes. Non-federal entities, natural or human, have a low, but non-zero, likelihood of starting a wildfire within the CEAA within the next few years.

Affected Environment
Project Area

Occurrences of non-native invasive species were mapped June through September of 2008. Among the 75 species that are ranked by the Huron-Manistee National Forests as non-native invasive species requiring management action, six were found: *Bromus inermis* (smooth brome); *Centaurea stoebe* (spotted knapweed); *Dactylis glomerata* (orchardgrass); *Elaeagnus umbellata* (autumn olive), *Hypericum perforatum* (common St. Johnswort); and *Melilotus officinalis* (sweet clover).

Most of the named roads that were surveyed had low to high amounts of spotted knapweed, common St Johnswort, and/or smooth brome. Autumn olive was frequent in the southern half of compartment 722 which is bounded by Bliss Lake Road (FR 4604) on the south, Horseshoe Lake (FR 4503) on the north, S. North Lake Road (FR 3135) on the east, and S. Peake Road (FR 4434) on the west.

All of the NNIS known within the project area are widely established species on the Huron-Manistee National Forests and have a low priority for treatments, except where restoration of natural communities is taking place. For these species, the Clear Lake Aspen Project proposes to reduce infestations along roads and non-natural openings (e.g. log landings), and to eradicate NNIS in areas adjacent and within clearcuts.

Table 14; Gross area of NNIS treatment units with respective key target species and likely herbicides used (actual infestation area is lower than displayed gross area -- up to 90% for roadsides; less than 5% for Compartment 722)

Activity/ Area	Target Species	Likely Herbicides	Gross Area (acres)
Roadsides	knapweed/St. Johnswort	Triclopyr/Clopyralid/Glyphosate	39
Compartment 722	Autumn Olive	Triclopyr/Glyphosate	155
Total			194

Direct and Indirect Effects of Alternative I (No Action)

Alternative I would not reduce NNIS infestations, because NNIS treatment activities would be deferred. Indirect effects from Alternative I would be continued persistence of NNIS and continued spread of NNIS from road maintenance activities over the short term. Alternative I would cause a net increase in non-native species infestation over the long term which would make a goal of reduced NNIS infestations slightly more difficult for future projects. This alternative would not help meet the desired future condition as described in the Forests' Plan, or to achieve the Purpose and Need for Action as described in Chapter 1 of this document.

Direct and Indirect Effects of Alternatives II and III

The proposed treatment of NNIS with herbicides and mechanical methods is designed to achieve a reduction of NNIS. By killing individual NNIS plants, the production of new seed would be halted. Re-treating the areas for up to five years would temporarily prevent successful NNIS recruitment from the seed bank. After five years seed bank would likely be reduced, although not exhausted.

All activities such as clearcutting, thinning, road construction, tree planting, and fuel break and opening maintenance, increase the likelihood that NNIS propagules would be introduced or spread from existing centers of infestation. The previously listed activities all expose mineral soil to a varying degree, and, therefore, provide temporary new habitat for NNIS to more easily colonize. However, the proposed NNIS treatments of within and adjacent to these plus conservation measures requiring equipment cleaning combine to minimize the likelihood of introductions caused by this project.

Alternatives II and III would help to meet a desired future condition as described in the Forests' Plan, or to achieve the Purpose and Need for Action as described in Chapter 1 of this document.

For NNIS, the types of activities that are relevant in nature include anything that disturbs the ground (e.g. timber activities) or otherwise exposes mineral soil (e.g. fire) making the land temporarily suitable for NNIS colonization. Human related vectors of seed dispersal (e.g. mowing, general traffic through vegetation) will also be considered as a part of cumulative effects.

Cumulative Effects of Alternative II and Alternative III

Past road maintenance, and to a lesser degree, past vegetation management activities, have all contributed to increases in NNIS over the past five years. However, the proposed action would prevent or negate any increases cause by this and other similar future projects. When combined with past, present, and reasonably foreseeable future activities, Alternatives II and III would likely achieve an objective of reduced NNIS coverage.

Wildlife

The Forests' Plan establishes direction for the types, amounts, distribution, spatial pattern, and function of wildlife habitats. This includes direction for the protection, enhancement and restoration of habitats for rare species.

This section addresses how implementation of the Action Alternatives would affect wildlife species associated with the current vegetative community types of the project area. Specifically, it describes current wildlife habitat conditions (suitability) and the expected changes in suitability based upon implementation of the action alternatives. Wildlife habitat suitability is influenced by many factors. In the context of this document, the most important factor affecting wildlife species is the resulting change of vegetative composition (including changes that occur spatially and temporally), and the associated affects of the processes that facilitate that vegetative change. Simply stated, wildlife species are directly affected by the act of removing trees through timber harvest activities and by reforestation activities (site preparation and tree replacement both natural and artificial). Wildlife species are indirectly affected by the resulting forested conditions after tree removal. Wildlife species are also cumulatively affected by the combination of these conditions, past actions, and those created by other adjacent expected actions over time.

Although wildlife species each have their own individual habitat requirements, similar needs allow a general grouping of species associated with common community types. Therefore, the Huron-Manistee National Forests have six Management Indicator Species (four wildlife species). Principal habitat characteristics and species or habitat abundance for Management Indicator Species (MIS) can be found in the Forests' Plan (p. II-31-34). An analysis of potential effects for the proposed management activities on MIS Species would result in an analysis for wildlife species with similar essential habitat requirements. A portion of wildlife species on the Huron-Manistee National Forests receive representative consideration by analyzing the effects to MIS. Effects to wildlife Federally endangered, threatened, (ETS) and Regional Forester's Sensitive species (RFSS) are addressed in the Biological Evaluation located in the Biological Evaluation for Clear Lake Project, located in the project file.

The general purpose of the Clear Lake project is to regenerate aspen and early successional habitat while enhancing wildlife habitats. To move the project area from its current condition toward the desired future condition, the Forests' Plan says that emphasis should be given to managing grouse, deer, wildlife emphasis areas, and fish habitat. The analysis of the effects of the project alternatives on wildlife will therefore, focus on how the Action Alternatives moves the project area toward the desired future condition compared with the existing vegetative condition. It will also address how changes in habitats would affect other wildlife species by analyzing effects to MIS species.

Analysis Bounds

The cumulative effects analysis area for the vegetation resource is all lands within compartments 693, 694, 722, 740 and 743, and totals approximately 7,554 acres. These areas are scheduled to receive similar treatments over the planning period, in order to accomplish the objectives described in the Forests' Plan. The cumulative effects analysis area lies entirely within the Forests' Proclamation boundary and is a mix of National Forest and private lands. These geographic bounds for cumulative effects analysis were chosen for similar soil and vegetation types where the mix of National Forest and private lands has an influence on land use and vegetation management across the landscape.

For the purpose of this analysis, cumulative effects will be bounded in time by a fifteen year period. This period includes the past ten years of management activities and the reasonably foreseeable future five years. This temporal boundary was chosen to reflect one "age class" period of past management, and the planned five-year sale program for the Huron Shores Ranger Station. Age class distribution objectives are based on integrated resource objectives and rotation age objectives for forest vegetation types. Vegetation management is reasonably planned for the next five year period.

The cumulative effects analysis area is approximately 7,554 acres of combined national forest and private lands. Huron-Manistee National Forests lands make up 85% of the cumulative effects analysis area (analysis area). The remaining 15% of the analysis area is private lands interspersed with the National Forest and having similar soil properties and vegetative composition to the federal lands. The analysis area as a whole is comprised primarily of aspen/birch, oak, long rotation conifer, and lowland forest types, with approximately 6% of the area in and open condition. Aerial photography shows minimal development on the private lands within the analysis area in the past ten years, and less than 1% of the area vegetation being actively managed at any one time. Less than one percent of the area is agricultural, and much of the private land is used primarily for hunting purposes.

Past, Present, and Future Activities in the Analysis Area

Vegetative management activities completed within the analysis area in the past ten years includes approximately 48 acres of wildlife opening rehabilitation, wildlife habitat nest structures being placed on 44 acres, a wetland impoundment creation project on 20 acres, and native shrub plantings on two acres. Present and future activities

taking place in the analysis area include continued maintenance of the Poplar Lake and Foote Openings through prescribed burning and/or mechanical treatments, the placement of additional wildlife nest structures, and the continued maintenance of the Foote, Dams, Nowhere, and Redlin wetland impoundments. A review of recent aerial photography shows no notable harvesting activity on private lands within the analysis area. There appears to more of a trend toward planting abandoned farm fields than harvesting within the watershed, although plantings are generally on less than 20 acre parcels and very little activity is discernible within the past ten years. No vegetation management projects are planned on National Forest lands within the cumulative effects analysis area in the next five year period.

Vegetative Composition and Age-Class Distribution of the Analysis Area

A description of the vegetative composition and vegetative age-class distribution within the analysis area can be found in the Vegetation analysis section of this document, beginning on page 23.

Affected Environment
Project Area

The present vegetative condition for the project area is described in detail in Chapter 3; Vegetation section of this document. To understand the forests today it is important to understand the Forests' history, which serves to provide insights into current conditions, as well as ecological potential. The magnificent forests that were once here were cut down by loggers and used to provide raw materials for the growing country, in the east. In fact over half the houses in Buffalo, New York were constructed of lumber from the Huron National Forest. After being cut-over, much of what is now the Huron National Forest was burned by wildfires which consumed the forest debris left from early logging. These fires killed the remaining trees and shrubs that provided food and shelter for many wildlife species. By the end of the 19th century most of the original forests had disappeared. In 1911, Congress authorized the Federal Government to purchase "forested, cut-over, or denuded" land for soil and water protection. This enabled the creation of the Huron-Manistee National Forests. These lands contained little more than scrubby oak, an occasional pine tree, silted rivers, and blackened stumps. Wildlife and fish habitat and populations had declined or were lost. Reforestation on the HMNF started in 1909 and was greatly accelerated by The Civilian Conservation Corp (CCC) era. This effort was instrumental in the reforestation of Michigan, as thousands of acres of openlands were planted to red pine and jack pine, to increase timber for the growing country.

Biodiversity in the Clear Lake Project Area

According to Hunter, (1990), biodiversity is often measured by species richness (number of species present) and species evenness (distribution of abundance among different species). Species richness and evenness are influenced by within stand characteristics such as structural and vertical diversity, and the availability of coarse woody debris (CWD) such as snags and downed logs. For this document, structural diversity includes both vertical diversity and horizontal diversity. Vertical diversity is greatest in forests that are well stratified and are uneven aged. Stands that are even aged, such as those found in the project area, have reduced foraging and nesting opportunities for songbirds. This, along with the lack of plant diversity, further diminishes species richness and evenness. Consequently, the habitat needs (cover and structure) of prey species such as rodents are not met, or the suitability of habitat is reduced. Amphibian and reptile species that are associated with conifer forest types are often closely associated with the amount of large CWD present.

There are several private inholdings within the project area. Private lands border or are adjacent to a large portion of the project area and are primarily larger tracts of land used for hunting. Recent evidence of limited timber harvesting, wildlife plantings, and opening maintenance is evident.

No vegetative management activities have been implemented in the project area on National Forest System lands in the past ten years. Excluding this project, there is no additional vegetative management analysis planned for the project area in the next five years.

Wildlife species which require early successional habitats include species such as white-tailed deer, ruffed grouse, and chestnut-sided warbler. These species meet many of their biological needs (food, cover, nesting, etc.) on the private lands as well as the National Forest System lands that fall within the project area boundary. However, there is limited evidence of timber harvesting, wildlife plantings and opening maintenance on the adjacent private lands so while aspen occurs as a forest type it is typically older aged, in decline, and in need of regeneration. About 45% of

the project area is aspen/birch vegetation type and approximately 25% is high site oak vegetation class. The remainder of the area is occupied by approximately 8% low site oak, 8% red pine (long-lived conifer), 6% opening, 5% short-lived conifer, 2 % northern hardwoods, and 1% lowland species (Figure 3).

About 59 % of the project area vegetation is short-lived forest types with desired rotation ages of 50 years. The age class distribution of the project area vegetation is shown in (Figure 4). Approximately 49% of the project area vegetation is over 50 years old.

Approximately 49% of National Forest System lands within the project area are represented by the aspen/birch forest type. Generally, the aspen within the project area can be characterized as immature (50 years or less). Approximately 19 % or 561 acres of the project area aspen is over the 50 years desired rotation age. Nearly 56% of the project area aspen is between the ages of 20 and 39, and no project area aspen is below the age of 10 years (Figure 5). All of the aspen stands proposed for harvest have an oak component that makes up between 10 and 50% of the stands.

Across the project area, long rotation aged conifer stands occur primarily as red pine plantations. When grown to maximize production and return, which is the case with red pine plantations established during the 1930's and 1940's, the trees are maintained in a closed or nearly closed canopy condition in order to suppress competition from other woody species. The effect of this management is a reduction in the diversity of tree species within the plantation. The low light conditions created under a closed canopy also cause the branches of red pine trees to die and/or slough off. The effect of this is a loss of understory and mid-story cover as these stands age. Thus after approximately 20-30 years, red pine plantations lack the diversity and multi-layer structure of natural pine stands and provide comparatively fewer opportunities for wildlife species. One notable exception is the seed source from cones, which is utilized by red squirrels and some birds such as white-winged crossbills. Currently, the majority of red pine stands in the project area are more than 60 years old.

Species richness and evenness are also influenced by such within stand characteristics as structural and vertical diversity, and the availability of coarse woody debris (CWD) such as snags and downed logs. For this document, structural diversity includes both vertical diversity and horizontal diversity. Vertical diversity is greatest in forests that are well stratified and are uneven aged. Stands that are even aged, such as those found in the project area, have reduced foraging and nesting opportunities for songbirds. This, along with the lack of vegetative diversity, further diminishes species richness and evenness. Consequently, the habitat needs (cover and structure) of prey species such as rodents are not met, or the suitability of habitat is reduced. Amphibian and reptile species that are associated with conifer forest types are often closely associated with the amount of large CWD present.

Populations of disturbance sensitive species such as the pileated woodpecker, gray squirrel, and flying squirrel are fairly common on the National Forest lands within the project area due to the portion of the project area that is over 50 years old. These species require larger blocks of mature forest, concentrations of dead standing and down wood, mast, and/or closed canopy conditions to meet their biological needs.

Fragmentation

The primary concern for wildlife associated with the mature deciduous forest/closed canopy community, in particular forest interior neo-tropical migratory bird species, is the effect of forest fragmentation. Fragmentation, which is the breaking up of continuous habitats, produces many changes in the landscape such as a reduction in mature forest, increased edge, reduced interior areas, and increased isolation in the remaining interior area. Fragmented areas tend to result in greater predation on songbird nests by blue jays, grackles, raccoons, and skunks and parasitism by brown-headed cowbirds (*Molothrus ater*).

Brown-headed cowbirds evolved following herds of American bison across the prairies ecosystems of the Great Plains. Constantly moving with the buffalo, brown-headed cowbirds did not have time to stop and spend the time required for nesting and brood-rearing, so they adapted a strategy of laying their eggs in the nests of other host birds that would then raise the young cowbirds as their own. The cowbird chicks hatch first and out-compete the host chicks for resources. Over time these host birds developed strategies to cope with parasitism from brown-headed cowbirds. Since then, agriculture expansion and forest clearing in the Midwest and eventually into the lower peninsula of Michigan in the late 1800's, resulted in the cowbird expanding its range into northern Michigan warbler nesting areas. Many eastern birds have not adapted to parasitism from cowbirds and have no natural defenses.

The U.S.D.I. Fish and Wildlife Service (FWS) annually conduct a brown-headed cowbird control program, to reduce the threat of cowbird parasitism on Kirtland's warblers in Kirtland's Warblers Management Areas (KWMA). While this control program removes local cowbirds from KW nesting areas and is very successful at the local level, over its 35 year history, it has had virtually no effect on the populations of cowbirds throughout Michigan. Brown-headed cowbirds from agricultural areas outside of KWMAs produce a continuing supply of birds which disperse into KWMAs and across the Forests. It is equally likely that this trapping effort has no effect on the numbers of brown-headed cowbirds in the Clear Lake project area and that cowbirds threaten resident neo-tropical migrants in adjacent interior forest habitats.

Forest interior species are habitat specialists that have evolved a competitive advantage within a closed canopy condition. Opening the canopy through timber harvest or natural disturbances may create conditions that enable habitat generalists to actively compete with interior species for limited resources; or may expose interior species to increased risks from nest site predators, such as the corvids (American crows and blue jays) or raccoons; and nest site parasites, such as the brown-headed cowbird. Recent concern for declining populations of interior species and species loss, stem from research reports of human dominated landscapes. In a doctoral thesis, Hamady, (2000) discusses how trends of declines and increases are not consistent but vary spatially by geographical region and temporally. Because of that variability, trends from specific localities cannot be extrapolated in a general way. Reports of declines of some bird species have nevertheless triggered a concern for the overall welfare of interior species.

Limiting factors outlined for neo-tropical migrant birds include tropical deforestation, deterioration of habitat along migratory routes due to rapid urban encroachment, and habitat fragmentation (Hamady, 2000). For the eastern deciduous forest biome, forest fragmentation is suspected to cause declines in some bird species. Hamady explains that in early studies where forest fragmentation was identified as having a detrimental effect on forest interior species, forest fragmentation is typically represented as a pattern of forest patches in a non-forested matrix. These reports site forest fragmentation as a limiting factor on breeding grounds due to high predation rates along forest edges and high cowbird parasitism rates in agricultural landscapes.

While the effects of forest fragmentation have been demonstrated, it is important to remember that forest fragmentation research has largely been conducted in human-dominated landscapes and agricultural landscapes. The concepts of forest fragmentation have evolved from landscapes in which the forest is reduced to fragments in a matrix that is non-forested. Hamady points out that models addressing the behavior of bird populations in such fragmented landscapes were largely influenced by the theory of island biogeography equilibrium proposed by Mac Arthur and Wilson (1967). It is misleading to apply these results to large forested tracts in large forested regions. Today the percentage of forest cover in the Northern Lower Peninsula of Michigan and, in general, the Upper Great Lakes Region is not very different than it was prior to settlement by nonnative Americans (McCann, 1991). This is in contrast to the Lower Great Lakes area where agriculture and urbanization have resulted in forest loss and forest fragmentation. The highly forested northern Great Lakes region stands out from a regional perspective as an area that shows the most potential for the conservation of forest interior and area-sensitive bird species.

While forest interior species are certainly affected by forest fragmentation at the Forest level, the effects are considerably reduced when discussed at the stand level within an intact ecosystem rather than the highly disintegrated landscapes described earlier. Any effects resulting from stand level fragmentation would influence individuals at the local level not populations, due to the small scale of the prescribed treatments and the availability of similar habitats across the Forest.

Analysis of Effects of the Action Alternatives on Biodiversity for Wildlife

Implementation of the Action Alternatives would promote Forests' Plan goals and objectives for vegetative management and associated wildlife species within the project area. It would provide softwood and hardwood timber products, improve the aspen age-class distribution, and promote the health and vigor of the forest ecosystem. Project proposals would have the following direct and indirect effects on biodiversity for wildlife species within the project area.

Direct and Indirect Effects of Alternative II and Alternative III

Timber harvest requires using equipment and the felling of trees. Use of this equipment and the removal of trees may directly affect wildlife present at the time of harvest. If tree harvesting occurs during the winter, migratory species such as neo-tropical birds or squirrels are not as vulnerable during this time because they are not raising

young, and have either started or completed their move to winter habitat. However, year round resident wildlife or migrants that use this area as winter habitat could be directly affected by the timber harvest activities.

These effects are generally temporary in nature and include harassment, displacement and limited mortality. Due to the temporary nature of these disturbances and the resilience of populations to this type of disturbance, direct effects would be minimal and would not affect the viability of any of the species present.

The prescribed burning would not directly affect RFSS as the units proposed for burning do not have RFSS present. If prescribed burning activities were to occur during the breeding/nesting period for known RFSS (Cerulean warbler and Red-shouldered hawk), smoke could temporarily impact nest areas, an indirect effect, but impacts would be of short duration and are considered negligible.

Not implementing the proposed Action Alternatives would result in no direct impacts since no action would occur.

Vegetative Composition

Implementation of the Action Alternatives would not greatly alter the existing vegetative community and composition at the project level, but would balance the age structure of aspen over time. Red pine, aspen, and oak would continue to occur on the project area but thinning the red pine should allow residuals to grow in diameter in the foreseeable future. The beneficial indirect effect of this action is a continuation of the mix of vegetative composition but an improved age class distribution of aspen at the project level. Maintenance (14 acres) of the existing openland habitat would provide some small beneficial habitat to wildlife species as well as helping to maintain the species richness and evenness of the project area. These openings would be complimented temporarily by the clear cutting of the aspen areas for the first couple years, as they would provide openland habitat conditions until the regenerating aspen becomes too thick or tall.

Indirect effects to wildlife would occur as a result of changes to habitat. As habitat was changed from mature forested to open or regenerating forest, the suitability of that habitat would go up or down, depending on the species in question. For example, fox and gray squirrels would find the existing condition, with its existing mature oak trees and declining aspen with cavities for nesting suitable and occupiable but after harvest when these areas were in a temporary open condition the area would be unsuitable and squirrels would be displaced to adjacent habitats. Retention and creation of snags and creation of dead and down as proposed would ensure that these important components would continue to be available for cavity nesting species.

This alternative would set back succession on approximately 800 acres, but would perpetuate the early successional component by regenerating aspen, thereby benefiting species associated with this habitat type, such as ruffed grouse and chestnut-sided warblers. Species such as squirrels, blue jays, and hairy woodpeckers that are currently using this habitat would be forced to immigrate to other suitable habitat. These areas are available immediately adjacent to the project area and are considered abundant and not limiting. These displaced animals would be vulnerable to numerous situations that could result in injury or death, until they establish a new territory.

Not implementing the Action Alternatives would allow natural successional processes to continue, but would not noticeably alter the existing vegetative community and composition in the foreseeable future. Age structure would be affected over time. Younger stands would mature and with no dependable mechanism for mimicking large scale natural disturbance there would be no natural regeneration. Over the long term not implementing the Action Alternatives would result in static or decreasing wildlife and vegetative diversity. As younger aged stands mature and the canopy closes, grassy species and forbs which provide forage for a variety of wildlife species would decline. Species of wildlife requiring openings, early successional habitat, and mid–successional habitat would be displaced from the project area. Mature forest species such as woodpeckers and squirrels would benefit from not implementing this alternative. Long rotation conifer (red pine) would remain the same as current conditions. There would be a continual loss of horizontal structural diversity over time as limbs die, lose their needles and eventually slough off. Vertical structural diversity would gradually increase as trees die. Eventually, small openings in the canopy caused by tree mortality would result in a developing understory and midstory at the micro-site level through creation of canopy gaps. Within the aspen types this process would occur more quickly, due to the shorter life span of this species and would eventually lead to stand conversion. It would be quite slow in red pine types and likely would not occur into the very long term. With the slow improvements in structural diversity created within these stands, plant and animal diversity would eventually increase. Species that require coarse woody debris would slowly benefit without implementation of the Action Alternatives, including rodents, insects, amphibians, and reptiles, but the benefits would occur over a much longer time span.

Overall, species richness and species evenness is likely moderate in the project area, however the proposed action would maintain or increase the biodiversity of the project area by enhancing or increasing the varied habitats and providing improved age structure among the vegetative types which occur there.

Structural Diversity

The existing vegetative types would remain in the project area after implementation of the Action Alternatives, however, the age classes and proportions would change. Short rotation species such as aspen would continue as the dominant species in the project area, with oak and red pine being the next most common species. This proposal would regenerate the aspen vegetative type and would set back natural successional processes within the project area. There would be a total loss of horizontal and vertical structural diversity as stands are clear cut and the woody vegetation is removed in 800 acres of aspen. There would be no opportunities for birds to nest in treated aspen areas after harvest, for the first two years until herbaceous cover begins to fill in and then aspen begins to regenerate. Once seedling sapling stages of aspen develop, foraging and nesting opportunities for a wide variety of species would dramatically increase. Aspen-birch forests support a wide variety and diverse range of plants over the stand's life span of 50-70 years. Different growth stages in aspen forests result in different ground covers, fruiting shrubs, and competing tree species and it is this diversity of plant life that attracts so many different species of wildlife.

Young aspen stands, seedling/sapling aged, are attractive to chestnut-sided warbler, mourning warbler, indigo bunting, and golden-winged warbler a species which is listed as Regional Foresters Sensitive Species by the Forest Service. Aspen is a highly desirable as forage to a wide range of wildlife species including white-tailed deer, cottontail rabbits, and snowshoe hares. When the stand is aged 10-40 years (pole sized timber), species such as least flycatcher, yellow-bellied sapsucker, ruby-throated hummingbird, red-eyed vireo, ovenbird, pileated woodpecker, woodland jumping mouse, porcupine, white-tailed deer and ruffed grouse would use the stands.

Aspen reaches maturity between 40-50 years old. Species attracted to this stage of aspen forests include the black bear, porcupine, flying squirrel, white-footed mouse, pileated woodpecker, and veery. Mature stands also contain many trees that are dead or dying as mature aspen is susceptible to hydroxylon cancer disease. These trees host an accumulation of insects, which in turn provide food for many kinds of wildlife including black bear and a variety of woodpeckers.

By not implementing the Action Alternatives, vegetative types would remain similar to current conditions, with long rotation conifer (red pine) continuing with little change from current conditions. There would be a slow continual loss of horizontal structural diversity over time as limbs die, lose their needles and eventually slough off. Vertical structural diversity would gradually increase as trees die. Eventually, small openings in the canopy caused by tree mortality would result in a developing understory and midstory. Within the aspen types this process would occur more quickly, due to the shorter life span of this species and would eventually lead to stand conversion. It would be quite slow in red pine types and likely would not occur into the very long term. As there would eventually be some improved structural diversity created within these stands, plant and animal diversity would eventually increase, which would be a slight indirect beneficial effect. Species that require coarse woody debris would slowly benefit by this alternative including rodents, insects, amphibians, and reptiles.

The indirect effects of regenerating stands of aspen would provide more benefits to wildlife through increased structural diversity than not managing these stands and allowing natural successional processes to continue.

Fragmentation

Regeneration of aspen through clear cutting is considered the most dependable way to achieve the desired results of maintaining this vegetative type on the project area. However, clear cutting results in the temporary fragmentation of the project area, rendering songbirds vulnerable to parasitism by cowbirds. The likelihood of parasitism is reduced because this area is forested with a closed canopy condition and therefore not optimal habitat for cowbirds. There is a possibility that cowbirds would find the project area and parasitize nests during the two to three years that it takes for aspen seedling/saplings to grow to approximately 20% height of adjacent vegetation. The potential to increase parasitism within the project area would be an adverse indirect effect on songbird productivity for approximately two to three years. After that time the stands would be restocked and parasitism would be unlikely. This adverse indirect effect would be on small in scale, would affect local birds only, and would not affect the viability of populations on the Forest.

If the Action Alternatives were not implemented, fragmentation would not increase. Fragmentation would remain the same or slightly decrease from current conditions, over the next decade, as younger stands of aspen mature and small openings fill in from woody encroachment. Red pine plantations would continue to grow, however, due to high stocking, overall tree growth would be slow. Unless catastrophic natural events such as wildfire take place, landscape conditions would remain in the same proportions as they are currently. Fire suppression is likely to limit the extent of the role that wildfire would play in the fragmentation of the project area.

Cumulative Effects of Alternative II and Alternative III

Cumulatively, selection of the Action Alternatives would help to maintain the long-term desired vegetative composition of early successional habitat types for associated wildlife species and Forests' Plan projected goals for vegetation accomplishments described in Chapter 1.

As stated previously, a wide variety of wildlife species thrive in aspen habitats and depend on early successional species for all or a part of their yearly nutritional requirements. Implementation of the proposed action would help to maintain the aspen/birch vegetation type across the Forests and in the analysis area and provide a cumulatively beneficial effect for these species. The importance of implementing the Action Alternatives in order to provide this vital habitat component is further emphasized by analyzing the 10 year projections from the FEIS which predicts aspen would decrease by more than 11,000 acres due to natural succession in areas such as old growth, lands physically unsuitable for timber harvest, and land considered unnecessary to meet species viability needs or timber demands (FEIS, III-233). The prescribed burning would have small scale beneficial effects for the analysis area as is would stimulate and promote the growth of native vegetation.

Wildlife species such as ruffed grouse and white-tailed deer have a high recreational appeal both for wildlife viewing and as game species. In the absence of active management within the project area and the analysis bounds area opportunities to view and hunt these species would decrease slowly over time as early successional vegetation types decrease through the process of natural succession. This reduction in habitat would directly reduce the available numbers of white-tailed deer and ruffed grouse over the long term, therefore, making it harder to encounter them. Reduced densities and availability of game species may make the project area less desirable to the public who could enjoy better encounter rates in areas with more suitable habitat and higher numbers of game. Areas such as the Designated Grouse Management Areas are managed more intensively for early successional forest and provide increased diversity and heterogeneity of plant and wildlife species, and provide increase encounters of game species and wildlife species which are desirable to the public. Implementation of the Action Alternatives would provide beneficial cumulative effects by moving approximately 800 acres of aspen from over-mature age classes into the zero to nine years age-class. This harvest would help to move the over-rotation age component and the aspen/birch vegetation type as a whole to a more balanced age-class distribution within the analysis area.

Management proposals would maintain the long-rotation conifer forest type and the upland opening component of the analysis area which would provide beneficial cumulative effects by maintaining the diversity of vegetative composition within the analysis area.

Endangered, Threatened, and Regional Forester's Sensitive Species

A list of Federally endangered and threatened wildlife species and Region 9 Forester's sensitive wildlife species (RFSS) considered and possible effects to those species as a result of implementation of the Action Alternatives is discussed in the Wildlife Biological Evaluation for Clear Lake Project (Biological Evaluation for Clear Lake Project, project file). **The Wildlife Biological Evaluation determined that no federally listed species are found within or near the project area.**

The Wildlife Biological Evaluation also describes the impacts of the alternatives on RFSS. The Wildlife Biological Evaluation found that there are 15 known occurrences of RFSS wildlife species within the project area (one red-shouldered hawk, one northern goshawk, and six cerulean nest areas were confirmed). The Forests' Plan (2006, pp. 11-30) and Soule (1992a) provide recommendations for protection of the northern goshawk. The following project design criteria from the Forests' Plan (pp. 11-30) will be incorporated to provide a measure of protection and to minimize disturbance during the nesting and brood-rearing period for both northern goshawk and red-shouldered hawk.

Standards and Guidelines for northern goshawk and red-shouldered hawk

A) Nest area
1. *A 30 acre area around each active nest site will be identified and designated.*
2. *No habitat alteration will occur within this area.*

B) Post-fledgling area (PFA)
1. *A 400-500 acre area approximately ½ mile radius around and including the nest area will be identified and designated.*
2. *This area would have seasonal restrictions on mechanical operations. All sale activity within the PFA would be permitted outside the nesting and brood-rearing period. (Sale activity permitted from September 1 to February 27).*
3. *Forest service local roads within 960 feet of the nest will be seasonally restricted or closed (March 1 to August 31) to minimize human presence during the brood-rearing period.*
4. *No more than 20% of the area would be in upland openings and/or in the 0-9 year age class. Retain 60% of the PFA in 30 year old plus age classes within long rotation forest types.*

These standards and guidelines are necessary for the protection of northern goshawk and red-shouldered hawk because both birds are sensitive to human related disturbances and if disturbed are known to abandon their nests. Nest areas (30 acres) are protected because both northern goshawk and red-shouldered hawk are known to use the same nests or nest tree from year to year, and they have very specific habitat requirements for nesting. Any alterations to these conditions could cause the nest area to be abandoned. They have additional specific habitat requirements for the larger post-fledgling area (400-500 acres). Implementation of Standards and guidelines as described are proven to provide for the conservation of these species.

Standards and Guidelines for cerulean warbler

The Huron-Manistee National Forest Land and Resource Management Plan 2006 (Forests' plan) page III-2.1-6 states that:

"Timber management and road construction activities should not occur in occupied habitat within 400 ft of a cerulean warbler nest tree, approximately a ten acre area during the breeding season."

In order to mitigate the potential for direct and indirect mortality to cerulean warbler due to nest tree loss or indirect impacts from habitat alteration or noise disturbance in the area, harvest activities should occur outside of the breeding season (April 15–August 15). The harvest period (September 30 to February 27) for this project is likely to occur outside of the breeding and nesting season. Known cerulean warbler nest areas will be excluded from harvest activities.

The Wildlife Biological Evaluation determined that the Action Alternatives may impact northern goshawk, red-shouldered hawk, and cerulean warbler, but is not likely to cause a trend to Federal listing or loss of viability, and would have no impact to any other Regional Forester Sensitive Species.

In the event that new ETS species are found within the project area, conservation measures would be implemented to protect them, as necessary.

Management Indicator Species

Introduction

Since the Forest Service's evolution from single-species management to ecosystem management, wildlife biologists have utilized a more holistic approach when addressing the needs of wildlife species. Although each wildlife species has individual habitat requirements, the sheer number (409 vertebrate species alone) renders single-species management unfeasible. Similar needs among wildlife species allows a general grouping of animals associated with common habitat types. Management Indicator Species (MIS) represent animals with more specific habitat requirements, animals that require rare or unique habitats, and animals that are popular game/viewing species. The Huron-Manistee National Forests has six wildlife Management Indicator Species (Table 15). Principal habitat characteristics and species or habitat abundance for the MIS can be found in the Forests' Plan (p. II-31-34). The analysis of potential effects of the proposed management activities on MIS Species would result in an analysis for

wildlife species with similar essential habitat requirements. The majority of wildlife species on the Huron-Manistee National Forests receive representative consideration by analyzing the effects to MIS. Further discussion on the status of MIS is documented in the Huron-Manistee National Forests Monitoring and Evaluation Reports, which are incorporated here by reference.

Table 15; Management Indicator Species and Associated Habitat Descriptions

Indicator Species	**Principal Habitat Characteristics**	**Existing Condition Within the Project Area**
Bald Eagle *Haliaeetus leucocephalus*	Nest in super canopy trees, generally white pine and aspen, near lakes and large rivers.	Habitat not present
Karner Blue Butterfly *Lycaeides melissa samuelis*	Openings and edges in oak barrens and oak savannahs with lupine.	Specie not found on Huron Nat'l Forest
Kirtland's Warbler *Dendroica kirtlandii*	Dense stands of jack pine 5 to 23 years old and 1.7 to 5.0 meters tall on poor sandy soils.	Habitat not present
Ruffed Grouse *Bonasa umbellus*	Aspen and aspen-alder mixes, 5-25 years old, with large crowned male aspen clones.	Habitat available in project area
Brook Trout *Salvelinus fontinalis*	Cold water streams	Habitat not present
Mottled sculpin *Cottus bairdi*	Cool, clear, moderate and high-gradient creeks, streams, and small rivers	Habitat not present

Population trends for MIS are found in the annual HMNF Monitoring and Evaluation Report. This information is utilized to implement and adjust the Forest program.

Management Indicator Species

Ruffed Grouse
Affected Environment

Mature pines and hardwoods dominated the presettlement forests of Michigan. Since much of the state was covered by virgin forest, which is not suitable habitat for grouse, the total population was certainly much lower than it is now. Grouse probably increased as more areas were settled, then decreased drastically during the logging era and the subsequent period of wildfires. The numbers of grouse declined to the extent that by 1892, the market shooting of ruffed grouse was made illegal.

Ruffed grouse numbers after 1935 are reported as high, due to approximately five million acres of aspen-birch habitat dominating the state. Since that time aspen has decreased to approximately 3.5 million acres due to human development and natural succession converting stands to other forest types. Across the state ruffed grouse are common, but are especially numerous in the Northern Lower Peninsula and the Upper Peninsula. They have small game status and occur in huntable numbers throughout the State. Ruffed grouse are common across the Huron-Manistee National Forests.

Ruffed grouse can be found feeding in a variety of habitats but spend a large amount of their time in early successional forest. Aspen is the single most important tree species for grouse. They feed on aspen catkins, leaves, and buds throughout the year. Flower buds on older aged aspen provide an important winter food. Young aspen stands are used as mating and brood rearing areas in the spring. Aspen and aspen-alder mix, 5-25 years old, with large crowned male aspen clones provide cover and forage in the spring, summer, and fall.

Grouse populations roughly follow a 10-year cycle. The latest peak of that cycle occurred in 1999, and the population started to decline in 2000. The MDNR monitors grouse populations with fall hunter's surveys and through spring drumming counts with the assistance of Huron-Manistee National Forests biologists and technicians. The

major source of mortality on grouse appears to be from avian predation. Hunting appears to have little or no effect on grouse survival.

Aspen occurs naturally across the entire range of soils on the Huron-Manistee National Forests, except the poorest outwash sands and deep organic wetlands. Approximately 45% of National Forest lands within the project area are represented by the aspen/birch forest type. Generally, the aspen within the project area can be characterized as immature (50 years or less). Approximately 19% or 561 acres of the project area aspen is over the 50 years desired rotation age. Nearly 56% of the project area aspen is between the ages of 20 and 39, and no project area aspen is below the age of ten years (Figure 5). All of the aspen stands proposed for harvest have an oak component that makes up between 10 and 50% of the stands.

Ruffed grouse require multi-age/size classes of aspen in close proximity to each other in order to meet their nutrient and cover requirements throughout the year. So, while aspen/birch habitat is abundant and available throughout the project area, habitat suitability is low because the early age classes (seedling/sapling) so critical to courtship, nesting, and brood-rearing, are absent. No surveys for grouse were conducted in the project area.

Forest types and habitat conditions on the project areas do not meet all the nutrient and cover requirements of ruffed grouse and associated species throughout the year, because the most critical age classes (seedling/sapling) do not occur. Therefore, deferring action would maintain existing conditions and habitat suitability would remain low. Existing habitat would likely only receive seasonal use by a few grouse through the year as grouse forage on catkins, leaves and buds. Grouse habitat is plentiful across the analysis area. Aspen/birch stands vary in age and are scattered throughout the analysis area. Due to habitat management for white-tailed deer and wild turkey on private lands within the analysis area, there is additional early successional habitat available for ruffed grouse.

Under the Action Alternatives, up to 800 acres of aspen would be moved from over-mature age classes into the 0 to nine years age-class by clear cutting and regeneration. This harvest would encourage new stands of aspen to regenerate through sprouting, thus increasing the project area's young, early-successional aspen component, the age class critical to nesting and brood-rearing. This proposal would provide future habitat for ruffed grouse and would improve age class distribution and therefore suitability across the project area.

Opening maintenance is also proposed under the Action Alternatives. Fruiting trees and shrubs such as cherry and serviceberry would be retained during maintenance and would provide a beneficial food source for ruffed grouse. Trees would be felled as needed to provide drumming logs for ruffed grouse. Male grouse perch on drumming logs and rapidly fan their wings in front of their breast to make a 'drumming' sound to attract females during the breeding season.

Direct and Indirect Effects of the Action Alternatives on Ruffed Grouse

If the Action Alternatives were not implemented, there would be no direct effects to ruffed grouse across the project area. No new habitat would be created, therefore there would be no indirect effects to ruffed grouse across the project area.

Harvesting in aspen regeneration units would be restricted within the project area to the period between September 30 and May 1, in order to increase the density of aspen sprouting. As ruffed grouse might be temporarily displaced during this time period, direct effects would likely be discountable as they would be able to flee. There should be no direct mortality from harvesting equipment as the nesting/incubation period begins in early to mid May when harvesting would be restricted. The zero to nine age class of aspen is critical to grouse for courtship, nesting, and brood-rearing, so implementation of the Action Alternatives would have beneficial indirect effects on ruffed grouse by improving the suitability of habitat within the project area.

Leaving fruiting trees and shrubs (food source for ruffed grouse) during opening maintenance would provide a beneficial indirect effect; as would the felling of trees for drumming logs. There is potential for negative indirect effects from harvesting as mature aspen trees that provide a food source year round are harvested. The removal of autumn olive, an occasional food source for grouse, is another possible negative indirect effect of the Action Alternatives.

Cumulative Effects of the Action Alternatives on Ruffed Grouse

The Action Alternatives provides more habitat capability to support ruffed grouse as compared to the current vegetative condition.

Due to the popularity of game species (such as grouse and deer) for hunting and wildlife viewing, it is likely that state and federal land managers, as well as private property owners would continue to manage for early successional species into the foreseeable future.

Private lands within the analysis area are mainly occupied dwellings, small farms, and/or managed for recreational purposes such as wildlife viewing and hunting. Some stands are harvested and grasses, trees, shrubs, and forbs are planted to attract early successional game species such as ruffed grouse. These practices were the norm five years ago and are expected to be similar over the next five years.

No management specifically tiered towards ruffed grouse has taken place on National Forest System Lands the previous ten years within the analysis area, and, outside of the Clear Lake Project area no management for ruffed grouse is expected to occur for the next five years. Projects currently being implemented and those to be implemented within the next five years would have no cumulative effect to grouse across the analysis area.

The Action Alternatives would provide a cumulatively beneficial effect by increasing suitability of habitat throughout the analysis area by creating between 620 and 800 acres of early successional habitat, and would provide downed woody debris (drumming logs), and would retain fruiting trees and shrubs for ruffed grouse.

As 45% of the project area and approximately 50% of the analysis area are the aspen/birch vegetative type, and the majority of this habitat is skewed toward 29 year old + age class, harvesting activities associated with the project area would provide beneficial cumulative effects on grouse populations at both levels. Due to the comparable size of the project area and the cumulative effects analysis area, the effects of the project on the analysis area are negligible, but overall are beneficial. Management of early successional aspen/birch communities are likely to continue into the foreseeable future on both National Forest System lands and privately owned lands within the analysis area. Implementation of the Action Alternatives would have beneficial cumulative effects on grouse habitat within the project and analysis areas.

Physical Factors

Soil and Water Resources

Analysis Bounds

The boundary for cumulative effects analysis of soil and water resources is the project area. Watersheds at the 6th level found within the Clear Lake Aspen project include the Au Sable River Watershed (3,290 acres of project area), the Samyn Creek Watershed (1,172 acres), West Branch of the Pine River (1,054 acres), the Kurtz Creek (627 acres), and the McGillis Creek (258 acres) watersheds. This cumulative effects analysis area would be referred to as the "analysis area" for this section.

For the purpose of this analysis, cumulative effects would be bounded in time by a fifteen year period. This period includes the past ten years of management activities and the reasonably foreseeable future five years. This temporal boundary was chosen to address the reference to concerns about changes in watershed function when a percentage of a watershed has been converted to open lands, which includes forest cover less than or equal to fifteen years of age. A five year timeframe for future effects was chosen because vegetation management is reasonably planned for the next five year period.

Past, Present, and Future Activities in the Analysis Area

There have been no vegetative management activities completed within the analysis area in the past twenty years. A review of recent aerial photography shows no notable harvesting activity on private lands within the analysis area (Google Earth 2010). Very little activity is discernible within the past ten years. No vegetation management projects are planned on National Forest lands within the cumulative effects analysis area in the next five year period.

Affected Environment
Project Area

The project area is primarily gently rolling sandy hills formed in coarse to medium textured sandy and gravelly soils with loam and clay layering. The Clear Lake Aspen project area is approximately 95% forested, has good ground cover, is mostly comprised of wet sandy plains, and major precipitation events occur when soils are frost-free. All of these conditions are very favorable for good water infiltration and sub-surface percolation. Overall, the watershed condition within the project area is satisfactory due to the presence of forest canopy and litter cover over most of the area.

Most of the soils in the project area sandy hills formed in course to medium textured sandy and gravelly material. Most areas have loamy or clayey layers at various depths in the soil profile. Topography is gently rolling slopes. All of the proposed treatments are on soils with these characteristics, where soils and vegetation would recover at average rates from disturbance activities. The remaining project area soil is characterized by areas of organic soils along streams or in depressions, where water tables are close to the surface and topography is nearly level.

Approximately 50% of the project area vegetation is immature. Overall, the forested areas within the project area are healthy however some of the older aged aspen is developing conks. Recent harvesting levels have been below overall growth rates and the total biomass in the area has been increasing.

Localized activities such as dispersed recreation use, use of unclassified roads and trails, and poor maintenance of roads can cause local, less than satisfactory conditions.

Direct and Indirect Effects of Alternative II and Alternative III

Increased oxidation (decomposition) of organic matter would occur on clearcut units. The increase in sunlight hitting the ground warms the soils and increases microbial activities resulting in increased decomposition rates. These sites would have lower soil organic matter contents than similarly shaded areas, and would have higher fluxes of soluble nutrients. Accelerated post harvest nutrient losses are confined to a relatively short period of the first few years. Shorter rotations (30-45) tend to remove more nutrients at a faster rate than long rotations (60-90), causing excessive nitrogen drain that impedes growth in the second rotation.

Biomass and nutrient removals would be at levels that would not reduce long-term soil productivity. No timber has been cut in the project area in the past twenty years, and the total biomass in the area has been increasing. Only approximately 12% of the project area vegetation would be reduced to levels indicative of "clearcutting" in Alternative II and approximately 10% in Alternative III. Stands proposed for clearcutting are mature and ready for harvest and no stands are proposed for "short rotation" harvests. Overall biomass levels in the project area would continue to increase. Dead and snag trees and dead and down material left in all harvesting units would contribute to soil nutrients and biomass within the clearcutting units.

The use of equipment on unfrozen soils can cause compaction. Compaction reduces the amount of large air spaces in the soil. In the sandy soils, light to moderate compaction does not affect soil productivity to the extent productivity is impacted on heavier, more fertile soils. Compaction would occur to some degree on all sites harvested in frost-free conditions. Risk of compaction in the medium to sandy soils indicative of the project area is generally low, and soil compaction levels would be maintained below levels that would preclude root penetration or adversely affect long-term site productivity. Harvest operations would follow State of Michigan Best Management Practices and Forests' Plan Standards and Guides and would not be permitted in conditions where excessive damage would result.

Temporary roads and landings would be closed following harvesting activities and returned to a forested condition. These actions would reduce the effects of poor road locations, poorly maintained roads, user-developed roads and trails, and dispersed recreation.

Cumulative Effects of Alternative II and Alternative III

Implementation of the proposed action would pose no major cumulative impacts on the soil and water resources in the analysis area. The distribution of land classification within the watersheds in the project area would be relatively unaffected by the proposal and the watershed condition would remain stable.

Reducing the amount of forested coverage in a given watershed increases the water yield and more water flows out of the watershed. If the vegetation is reestablished as it would be in both action alternatives, this would be a temporary effect. Concerns about changes in timing or quantity of water flow resulting from land uses start when more than 66% of a watershed has been converted to open lands, which includes agricultural lands, development, and/or forest cover less than or equal to fifteen years of age. Thinned stands, left adequately stocked, have a proportionally lesser effect on watershed hydrology.

The proposed levels of vegetation treatment would cause little or no measurable change in the hydrologic characteristics within the affected 6th level watersheds. At the present time, approximately 5% of the project area reflects an open condition. Approximately 800 acres of clearcutting associated with Alternative II of the Clear Lake Aspen project would raise the open condition within the project area to18%. Alternative III would raise the open condition to an even smaller 15%. These totals remains well below the 66% threshold for measurable effects for water yield within the watersheds.

Water yields in the project areas would be slightly higher for about five to fifteen years following harvest, until vegetation is reestablished on cleared sites and leaf area indices reach their maximum levels. Impacts from the harvesting activities on hydrologic characteristics are minimal and would continue to recover as soon as the aspen begins to regenerate. Barring any natural disturbance processes, there would be little or no change in current watershed characteristics in the future.

Visual Quality

Analysis Bounds

The cumulative effects analysis area for the visual resource is the project area (See Figure 1). These areas are scheduled to receive similar treatments over the planning period, in order to accomplish the objectives described in the Forests' Plan. The cumulative effects analysis area lies entirely within the Forests' Proclamation boundary and is a mix of National Forest and private lands. These geographic bounds for cumulative effects analysis were chosen for similar visual objectives.

For the purpose of this analysis, cumulative effects would be bounded in time by a fifteen year period. This period includes the past ten years of management activities and the reasonably foreseeable future five years. This temporal boundary was chosen to reflect one "age class" period of past management, and the planned five-year sale program for the Huron Shores Ranger Station.

Past, Present, and Future Activities in the Analysis Area

In the past ten years, there have been no Forest Service vegetative management activities within the analysis area. A review of recent aerial photography (Google Earth, 2010) shows no recent or notable harvesting activity on private lands within the analysis area. Other activities on-going within the analysis area are approximately 48 acres of wildlife opening maintenance, a wetland impoundment on 20 acres and placement of wildlife habitat nest structures. No vegetation management projects are planned on National Forest lands within the cumulative effects analysis area in the next five year period.

Affected Environment
Project Area

This analysis assesses the effects of the project on the scenic integrity within the analysis area. Scenic integrity is a key concept of the Scenery Management System, which is used to determine the relative value and importance of scenery in the National Forest System. The Scenery Management System is used in the context of ecosystem management to inventory and analyze scenery; assist in developing natural resource goals and objectives; monitor scenic integrity, and ensure that attractive landscapes are sustained for the future.

Scenic Integrity is an indication of the state of naturalness or, conversely, the state of disturbance created by human activities or alteration. It measures how closely the landscape approaches the character desired over the long term. It is stated in degrees of deviation from this desired character. Where the desired character is reflective of the

existing character, then Scenic Integrity measures deviation from the existing condition. Landscape character with a high degree of scenic integrity has a sense of wholeness or being complete. In the Scenery Management System process, Scenic Integrity is managed in degrees ranging over five levels from Very High to Very Low. Scenic Integrity Objectives for the landscape are derived from Scenic Attractiveness and Landscape Visibility values that combine to produce a Scenic Class value. Scenic Class and Forests' Plan Management Areas (MA's) determine the long-term Scenic Integrity Objective.

The project area is characterized by a forested upland environment having a variety of vegetation types with a component of wetland vegetation and habitat types. Visual contrast is evident within the project area as vegetation types are an array of hardwoods and conifers on both upland and lowland sites. Diversity in age classes across the landscape mimics a naturally evolving ecosystem with a mixture of stability and disturbance. Most of the project areas scenic attractiveness is categorized as "indistinctive." A "distinctive" classification is given to wetland areas within the project area. Part of the southeast project area is ranked on the high end of a Scenic Importance scale. This area of high scenic value represents about 10% of the project area.

A naturally appearing landscape for the analysis area would include mixed red, white, and jack pine forests with an oak and aspen component interspersed with lowland conifer wetlands. The area would exhibit varying age-classes and successsional stages due to windthrow, fire, and natural succession.

Direct and Indirect Effects of Alternative II and Alternative III

A short-term decline in scenic integrity would be expected due to harvesting equipment and residual tops and limbs left in clearcut and red pine thinning units. Clearcutting and regenerating aspen and maintaining openings would add to the diversity of age and size classes in the forested environment. Once new seedlings and saplings are established in clearcuts and individual trees within red pine stands have added height and diameter, the appearance of the project area would be more consistent with the desired condition, and the integrity level would be higher than before the activities were implemented. There are five stands proposed for clearcutting adjacent to highway M-65. Total acreage of the five stands is approximately 62.4 acres. This may result in short-term visual impacts to travelers along M-65 until the aspen regenerates in several years. Aesthetics would be lessened along M-65 by design criteria that would require timber purchaser slash operations to be treated to within 18" of the ground within 200 feet of the travel way.

Cumulative Effects of Alternative II and III

Visual variety of the vegetation is already evident across the analysis area landscape due to fairly intensive timber management 40 years ago. Aspen age class diversity within the analysis area is declining. The addition of the proposed activities would add to the overall age-class diversity of the area, but with no other planned harvest in the next five years, the age-class diversity would continue to further decline. Cumulatively, both action alternatives would help to produce the scenic integrity desired for the area as set forth in management direction in the Forests' Plan. Management activities would be apparent on the landscape, but would appear as relatively natural occurrences with openings and wetlands interspersed. This project would move some of the aspen from over-mature age classes into the zero to nine years age class within the analysis area. The variety of age and size classes of vegetation would continue to add to the visual diversity and create the desired landscape character of the analysis area.

Heritage Resources

Affected Environment
Project Area

The area of potential effect for the Clear Lake Aspen Project is identified as approximately 6,401 acres of National Forest system lands (project area boundary). Background research indicates that part of the area had been previously surveyed. The remainder of the project was surveyed in 2006. No archeological or historic sites were located within the project area.

Direct and Indirect Effects of All Alternatives

No direct or indirect effects to cultural resources would result because no ground-disturbing activities would occur within areas where cultural resources are present.

The potential exists for unidentified cultural resources sites to be encountered as the project proceeds. If such sites were encountered, they would be protected under conditions of the timber sale contract (avoidance through creation of additional reserve areas). Additionally, if sites are found during project process, design criteria dictates that any cultural resource sites found during project process would be reported immediately to a Forest Service Archeologist and work would stop in the area (Project Design Criteria, Chapter 2).

The proposed action is consistent with the National Historic Preservation Act and the Archeological Resources Protection Act, Huron-Manistee Land and Resource Management Plan (Forests' Plan, II-13) and the National Forest Management Act.

Cumulative Effects

There would be no cumulative effects to heritage resources because there are no direct or indirect effects.

Transportation

Analysis Bounds

The cumulative effects analysis area for transportation resource will be defined as the project area. This geographic bounds for cumulative effects analysis was chosen for similar road and transportation types where the mix of National Forest and private roads has an influence on transportation management across the landscape.

For the purpose of this analysis, cumulative effects will be bounded in time by a fifteen year period. This period includes the past ten years of transportation management activities and the reasonably foreseeable future five years. This temporal boundary was chosen because transportation management during this timeframe is closely associated with the timber management during this same timeframe.

Affected Environment
Project Area

The Clear Lake Aspen Project Area is located north of Glennie, Michigan in Alcona County. Major roads bordering the project area include M-72 on the north, F-30 on the east and south, and M-65 on the west (Please refer to the Transportation Map, Appendix A.2).

Table 16 displays the breakdown of the existing roads in the analysis area by road type, miles, and road densities. Classified roads are defined as roads wholly or partially within or adjacent to National Forest System lands that are determined to be needed for long-term motor vehicle access, including state roads, county roads, National Forest System roads, and other roads authorized by the Forest Service. Forests' Plan desired road densities for MA 4.2 is zero to three miles of road per square mile. Unclassified roads are roads on National Forest System lands that are not managed as part of the forest transportation system, such as unplanned roads, abandoned travelways, and off-road vehicle tracks that have not been designated and managed as a trail; and those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization.

In 2005 the Forest Service published a final travel management regulation governing the use of OHV's and other motor vehicles on National Forest System lands. The final rule requires national forests to designate those roads, trails, and areas that are open to motor vehicle use. The rule prohibits motor vehicles off the designated system. Beginning March 1, 2008, the Huron National Forest implemented the National Travel Management final rule by publishing a Motor Vehicle Use Map. All roads not on the map (or not on the forest transportation system) are illegal to drive. For this reason, unclassified roads (roads not on the forest transportation system) are not being considered in this analysis as roads open to public access.

Table 16; Current Road Statistics for the Clear Lake Aspen Project Area Roads
** Does not include private roads on private property or trails that are not a road.*

Classified Road Type	Miles within Project Area	Miles/Sq. Mi.
State	5.8	.58
County	2.5	.25
National Forest System		
Open to public use	16.1	1.6
Closed to public use	8.7	.29
Total Project Area Roads*	33.1	2.7

There are three special use permit road easements that are gated within the project area however. These easements are for roads leading to private land within the project area. No management activities are slated in these areas.

Access to harvest units within the project area would primarily utilize existing system and unclassified roads. Because there has been a lack of maintenance on the project area roads, up to three miles of these existing system and unclassified roads would require some light to heavy brushing, minor realignment, and spot gravelling to support heavy truck traffic. Reconstruction of the approach of three existing unclassified roads for temporary access onto M-65 would be required to facilitate hauling. Fill required to loft the approach could be removed from the adjacent area. Approximately one mile of temporary roads would be constructed for removal of forest products. Unclassified roads, temporary roads, and the new access would be closed following harvesting operations (Transportation Map, Appendix A.2).

Direct and Indirect Effects of Alternative II and Alternative III

Implementation of the action alternatives would not result in the addition or decommissioning of any forest system road miles or densities. Existing roads within the project area would be slightly improved by localized brushing, spot gravelling, and the addition of several culverts and gravel aprons at approaches in order to facilitate hauling and heavy truck access. The temporary roads would not occur all in one area rather, they may be small segments of road ranging from several feet to up to several hundred feet in length. The addition of approximately one mile of temporary road would not affect the transportation system because these roads would be closed following harvest activities. Project implementation would not affect access related to public recreation use. Project area total road densities of 2.7 miles/square mile would remain unchanged. This is within Forest Management Area guidelines for road densities of zero to three miles/square mile in MA 4.2.

Cumulative Effects Analysis Area

The cumulative effects analysis area for transportation is MA 4.2 that encompasses the Clear Lake Aspen Project Area. This area is managed to provide a roaded natural recreation experience with moderate amounts of motorized recreational opportunities. The analysis area is a mix of National forest and private lands. Temporally, cumulative effects will include the past five years and the next five year period. Most past uses associated with changes to the transportation system have become established within a five year period and projects are reasonably planned for the next five year period on the district.

The analysis area is 6,401 acres in size and of these, 1,022 acres is private lands. Therefore, 5,379 acres is National Forest lands. The Clear Lake Aspen project area consists of 84% of the National Forest lands within the cumulative effects analysis area. Open analysis area roads on the Forest Transportation System total 16.1 miles, of which 1.2 miles is within the Clear Lake Aspen project area. Forest System road densities on National Forest lands within the cumulative effects analysis area are approximately 2.7 miles/square mile.

No transportation projects have been implemented within the cumulative effects analysis area in the past five years and there are no future transportation projects in the planning stages at this time.

Cumulative Effects of Alternative II and Alternative III

Implementation of the proposed actions would pose no appreciable cumulative effects to the transportation system in the analysis area. These activities, when considered with past, present, and foreseeable future actions would have no effects on recommended Forest Plan road densities within the analysis area. No recreation trails were affected by project proposals and no cumulative effects would result.

Social and Economic Factors

Recreation and Social Values

Analysis Bounds

For the purpose of analyzing cumulative effects, the analysis area will be MA 4.2 that encompasses the Clear Lake Aspen Project Area. This area reflects a Roaded Natural ROS that is 86% National Forest ownership and 14% private. Temporally, cumulative effects will include the past five years and the next five year period. Most recreation projects have become an established feature on the Forest following a five year period. The public has become accustomed to the feature and use has become established.

The analysis area is 6,401 acres in size and of this, 1,022 acres is private lands. The remaining 5,379 acres is National Forest lands.

Other than the building of a small portion of the ATV trail, no recreation projects have been implemented within the cumulative effects analysis area in the past five years. There are no future recreation projects in the planning stages at this time.

Affected Environment

Project Area

Opportunities for developed and dispersed recreational experiences on the Forest are classified and defined by the *Recreation Opportunity Spectrum* [ROS (Forest Plan EIS, Chapter III, pages 271-275)]. The Clear Lake Aspen Project falls within the Roaded Natural ROS Class. Forest Plan direction for management of the analysis area is to provide the opportunity for forest users to affiliate with other users but with some chance of privacy. Access and travel is by conventional motorized including sedans, trailers, and some recreational vehicles.

Recreation use in the general project area is low most of the year. The area provides opportunities for dispersed camping, general hiking, wood cutting, and driving for pleasure. There is evidence of use by deer, grouse, and duck hunters. There are several dispersed camping sites in the project area that are primarily used during these hunting seasons.

Socially, most of the recreation use on the Huron National Forest revolves around motorized activities, or the ability for motorized access. M-65 is a major corridor bordering the west side of the project area and is mostly used for travel through the area or from one town to another. There is little evidence of travelers using the road for viewing scenery. However, Forest Service and County roads within the project area are used more often for viewing scenery. Ross Rd, Bliss Lake Rd, and Fowler Rd are low speed gravel roads traverse the area and provide users the opportunity to view scenery.

The Ann Arbor Snowmobile Trailhead is in the project area directly off from M-65. This trailhead receives moderate to high use in the winter depending on snowfall amounts. Approximately 6.1 miles of snowmobile trail traverse the project area. The North Lake Trailhead parking lot is on the south end of the project area. This trailhead is no longer maintained however it receives some local use from snowmobilers traveling north out of Glennie.

Portions of the new ATV trail cross the project area as well. Approximately 4.3 miles occur within the project area. The ATV trail uses the established Bliss Lake road and eventually hooks into the snowmobile trail near the junction of Bliss Lake Road and North Lake Road. As a general rule, ATV use is low, in the project area.

Direct and Indirect Effects of Alternative II and Alternative III

All alternatives would maintain the present Recreation Opportunity Spectrum. Proposed management activities are compatible with the current recreation uses and character of the area.

Timber harvest and related activities would have the potential to temporarily reduce the feeling of seclusion in the area. Hunters and forest users may be displaced from areas traditionally used while timber harvesting takes place. Treated stands would almost immediately present new ground vegetation and in turn, increase the likelihood for use by early successional wildlife species. For five to ten years in the future, this new vegetation age class would produce better hunting opportunities for those commonly hunted early species such as white-tailed deer and ruffed grouse.

Pleasure drivers in late autumn and early spring may encounter harvest equipment and trucks in active logging areas. This may deter some drivers from the area until harvest is complete, while others may be curious about the activity. During the summer when harvest is not taking place, drivers may find wider roads due to brushing and maintenance. When harvest is complete, vegetation would grow back along the sides of the roads and regular road maintenance would resume.

The snowmobile trail would be crossed by harvesting equipment in Stand 36 approximately ¾ mile to the east of the Ann Arbor trailhead. Since harvest would be from September 30 and May 1, there is the possibility that snowmobilers would encounter equipment crossing the trail. Snowmobilers would see crossing and guide signs at harvest equipment trail crossings until harvest was completed

The ATV trail would traverse through two clearcuts and border two others along the 4.3 mile stretch of the trail within the project area. ATV riders would have increased site distances in the clearings. With increased site distance, riders may increase their speed.

Cumulative Effects of Alternative II and Alternative III

Recreation and tourism pressures are expected to continue to increase with greater numbers of people looking to use public lands for a variety of leisure activities. Cumulatively, the proposed vegetation management activities within the analysis area would have little impact on recreation use and social values of the overall area. No adverse cumulative effects are expected from past, proposed, or reasonably foreseeable future management activities, as the existing array of recreation opportunities would not change within the analysis area. Recreation users would continue to find similar opportunities in the future that have existed in the area in the past.

Civil Rights and Environmental Justice

Analysis Bounds

The cumulative effects analysis area for economics and community well-being is Alcona County, Michigan. Alcona County is dependent on agriculture, forestry, manufacturing, and retail trade for their economic livelihood. The county has more than 50% public ownership in U.S. Forest Service and State of Michigan forest lands. In the year of 2000, Alcona County had a population of 11,719 people. The County experiences a large influx of seasonal residents and weekend tourists. Many local businesses serve tourists and seasonal residents' needs.

Affected Environment
Project Area

The analysis area for determining effects on civil rights and environmental justice is Alcona County, Michigan.
The 2000 U.S. Census shows the median household income for Alcona County is $31,362. The census shows the median household income for the state of Michigan as $44,667. Based on the 2000 results, the minority population in Alcona County is 2.0%. The state of Michigan has a 25% minority population. Demographic information indicates Alcoa County is not qualified as an environmental justice community.

Direct, Indirect, and Cumulative Effects of Alternative II and Alternative III

The two proposed management actions are not expected to disproportionately impact human populations. There are no human health or safety factors associated with, or physical or biological factors influenced by the proposed actions that would affect low-income or minority populations in or around the project area. The laws, rules, and regulations governing nondiscrimination conduct in government employers and by government contractors and subcontractors would be employed in all actions associated with the proposal. No environmental justice issues were raised during scoping of the proposed actions. The proposed and modified proposed actions would not affect environmental justice, directly, indirectly, or cumulatively.

Economic and Community Well-Being

Present net value is a measurement of economic efficiency that results when discounted costs are subtracted from discounted benefits. Present values for forest type and harvest prescriptions, and other values on the Huron-Manistee National Forests were calculated in the Huron-Manistee Final Environmental Impact Statement (FEIS). The following alternatives display various costs of preparing environmental documents, field surveys, and preparation, and administration associated with the management activities in the Clear Lake project. No analysis of discounted future benefits and costs for vegetative management in this project area is documented. It is possible, however, to derive general information regarding dollars costs and benefits of vegetation management alternatives from the FEIS. The following costs for each alternative are displayed in the table below. The costs are best estimates based on past experience. Anticipated stumpage values for Alternative II and III is based on recent 2010 fiscal year projected sales to be sold from the Huron Shores Ranger Station. Estimated volumes are based on past sales, experience and professional judgment.

Table 17; Estimated Dollars Costs and Returns of the Alternatives

Economic Indicators	Alternative I No Action	Alternative II Proposed Action	Alternative III Modification Action
Projects Outputs			
Acres Treated (apx)	0	1,114	671
Anticipated Stumpage Value	$0	$687,271	$420,136
Project Costs			
Environmental Assessment Preparation, Field Preparation, & Administration[1]	$58,975	$58,975	$58,975
Site Preparation for Regeneration Units[2]	$0	$56,560	$43,400
Prescribe Burn of Units [3]	$0	$53,116	$5,684
Stocking Surveys & Planting Certifications[4]	$0	$16,710	$10,065

Direct and Indirect Effects of Alternative I

The economic indicators are based off the known management activities that would be take place according to the proposed alternatives of all actions projected within the area off of the known dollar costs of management within the Clear Lake Project.

1. 225 days@ $215/day, includes survey work, compartment exam, and EA preparation, 6ac/ day field prep @ $225/day; 25 days administration @ $250/day, 15 days contract prep @ $200/day.
2. Proposed acres @ $70/acre, includes contract prep and administration.
3. Prescribed burning of the proposed acres of management @ $196/ac.
4. 1st and 3rd year stocking survey and planting certification of the proposed acres @ $15 ac.

Based off of Alternative I activities, no revenue would be generated if the No Action Alternative was selected. Project planning costs remain the same across all alternatives analyzed. There would be no jobs created and no economic returns to the community. Recreation use would remain fairly constant and would have no evident effect on the local economy. This alternative would represent a change in the trend of providing timber volumes and jobs for the local economy.

Direct and Indirect Effects of Alternative II

The Alternative II project activities would generate approximately 19,137 CCF and of timber products. Although this is not a considerable impact, these alternatives would potential provide important material for local mills. Harvest related activities would provide employment opportunities for local logging contractor's wood products industries and local contractors.

Dollar costs associated with the proposed action are estimated at approximately $185,361. These costs are based on the amount per board foot the Forest receives for timber sale planning, preparation, and administration, and the current costs of site preparation, stocking surveys, and road reconstruction and closure. Using average values estimates from the previous timber sales that conducted on the forest during the fiscal years 2005 -2009 consisting of timber products similar to timber within the project area timber sale projections, this project should yield a dollar value of approximately $687,271.

Direct and Indirect Effects of Alternative III

Project activities for Alternative III would generate approximately 11,699 CCF and of timber products. Although this is not a considerable impact, these alternatives would potential provide important material for local mills. Harvest related activities would provide employment opportunities for local logging contractor's wood products industries and local contractors.

Dollar costs associated with the modified proposed action are estimated at approximately $118,124. These costs are based on the amount per board foot the Forest receives for timber sale planning, preparation, and administration, and the current costs of site preparation, stocking surveys, and road reconstruction and closure. Using average values estimates from the previous timber sales that conducted on the forest during the fiscal years 2005 -2009 consisting of timber products similar to timber within the project area timber sale projections, this project should yield a dollar value of approximately $420,136.

Cumulative Effects

Implementation of Clear Lake Project activities would result in positive effects to local economics by continuing current trends of providing timber products and jobs related to timber harvesting and site preparation on the Huron National Forest.

3.2 Irreversible and Irretrievable Commitment of Resource

Irreversible commitments of resources are decisions to use, modify or otherwise affect nonrenewable resources such as minerals and cultural resources, or resources that have deteriorated to the point that renewal can occur only over a long period of time or at a great expense. None of the alternatives for the proposed Clear Lake project would result in irreversible commitments.

Irretrievable commitments represent opportunities forgone for the period of the proposed actions, during which other resource utilization cannot be realized. These decisions are reversible, but the utilization opportunities are irretrievable. Under multiple-use management, some irretrievable commitments of resources are unavoidable, due to the mutually exclusive relationship between some resources.
The maintenance of wildlife openings, as proposed in the Clear Lake Project, would cause an insignificant irretrievable commitment of resources related to the loss timber products from the forest. This however, is addressed and analyzed in the Forests' Plan, which provides for long-term sustained yield of timber products.

Chapter 4: List of Preparers

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Mara Jones-Branch – Forester
Chris Williams – Wildlife Biologist
Liz McNichols –GIS Specialist
Gordon Haase – Resource Specialist
Kari Vanderheuel –NEPA Planner
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Appendix B—Fire and Fuels

B.1 Prescribed Burning Go/No-Go Checklist
B.2 Agency Pre-Ignition Approval Checklist

Appendix C—Botany

C.1 Detailed Description of manual and mechanical treatment methods, herbicide use, and herbicides used.

Appendix A.1 Clear Lake Project Activities Map

Appendix A.2 Clear Lake Transportation Map

Appendix B.1
PRESCRIBED FIRE GO/NO-GO CHECKLIST

A. Has the burn unit experienced unusual drought conditions or contain above normal fuel loadings which were not considered in the prescription development? If NO proceed with checklist., if YES go to item B.	**YES**	**NO**
B. If YES have appropriate changes been made to the Ignition and Holding plan and the Mop Up and Patrol Plans? If YES proceed with checklist below, if NO STOP.		

YES	NO	QUESTIONS
		Are ALL fire prescription elements met?
		Are ALL smoke management specifications met?
		Has ALL required current and projected fire weather forecast been obtained and are they favorable?
		Are ALL planned operations personnel and equipment on-site, qualified, and operational?
		Has the availability of ALL contingency resources been checked, and are they qualified?
		Have ALL personnel been briefed on the project objectives, their assignment, safety hazards, escape routes, and safety zones?
		Have all the pre-burn considerations identified in the Prescribed Fire Plan been completed or addressed?
		Have ALL the required notifications been made?
		Are ALL permits and clearances obtained?
		In your opinion, can the burn be carried out according to the Prescribed Fire Plan and will it meet the planned objective?

If all the questions were answered "YES" proceed with a test fire. Document the current conditions, location, and results

_____

_____

Burn Boss Date

Appendix B.2
AGENCY ADMINISTRATOR PRE-IGNITION APPROVAL CHECKLIST

Instructions: The Agency Administrator's Pre-Ignition Approval is the intermediate planning review process (i.e. between the Prescribed Fire Complexity Rating System Guide and Go/No-Go Checklist) that should be completed before a prescribed fire can be implemented. The Agency Administrator's Pre-Ignition Approval evaluates whether compliance requirements, Prescribed Fire Plan elements, and internal and external notifications have been or will be completed and expresses the Agency Administrator's intent to implement the Prescribed Fire Plan. If ignition of the prescribed fire is not initiated prior to expiration date determined by the Agency Administrator, a new approval will be required.

YES	NO	KEY ELEMENT QUESTIONS
		Is the Prescribed Fire Plan up to date? *Hints: amendments, seasonality.*
		Will all compliance requirements be completed? *Hints: cultural, threatened and endangered species, smoke management, NEPA.*
		Is risk management in place and the residual risk acceptable? *Hints: Prescribed Fire Complexity Rating Guide completed with rational and mitigation measures identified and documented?*
		Will all elements of the Prescribed Fire Plan be met? *Hints: Preparation work, mitigation, weather, organization, prescription, contingency resources*
		Will all internal and external notifications and media releases be completed? *Hints: Preparedness level restrictions*
		Will key agency staff be fully briefed and understand prescribed fire implementation?
		Are there any other extenuating circumstances that would preclude the successful implementation of the plan?
		Have you determined if and when you are to be notified that contingency actions are being taken? Will this be communicated to the Burn Boss?
		Other:

Recommended by: _____ Date: _____
FMO/Prescribed Fire Burn Boss

Approved by: _____Date: _____
Agency Administrator

Approval expires (date): _____

Appendix C.1 – NNIS Manual and Mechanical Treatment Methods, Herbicide Use, and Herbicides

Manual and Mechanical Treatment Methods

Manual or mechanical methods would be the principle method of control for small spot infestations. Examples of hand tools that might be used include shovels, saws, axes, loppers, hoes, or weed-wrenches. Mechanical methods may include cutting with a string trimmer, chainsaw, brush saw, aquatic harvester, or mower. Plowing or disking may be used in gravel pits or other heavily disturbed sites. Small infestations of herbaceous plants with shallow roots, such as garlic mustard and Eurasian water-milfoil, would typically be hand-pulled. Deeper-rooted herbaceous plants such as autumn olive would be dug up with a shovel. Larger infestations would be mowed or otherwise cut. Individual bushes or small groups of bushes, of exotic honeysuckle, buckthorn, and Japanese barberry would typically be dug up or girdled. Large infestations of exotic bushes would generally not be treated with manual or mechanical methods.

Herbicide Use

The objectives of herbicide use would be to control invasive plant species at sites where manual or mechanical means would be cost-prohibitive or result in excessive soil disturbance or other resource damage. Herbicide application may also be the preferred treatment for certain NNIS species that do not adequately respond to mechanical treatment. Herbicide drift is much reduced with spot treatment. In most cases, herbicides would be directly applied to non-native invasive plants using spot treatments or linear treatment along travel corridors.
Treatments consist of various techniques for applying herbicides to target NNIS without impacting desirable vegetation and other non-target organisms, including humans. Techniques that may be used include:

- Spraying foliage using hand held wands, backpack sprayers, or a sprayer mounted on an ATV or tractor;
- Basal bark and stem treatments using spraying or painting (wiping) methods;
- Cut surface treatments (spraying or wiping); and
- Woody stem injections.

No herbicides would be applied aerially. Only formulations approved for aquatic-use would be applied in or adjacent to wetlands, lakes, and streams, following label direction.

Herbicides

All herbicides would be used in strict accordance with manufacturer's labeling directions concerning concentrations, rates, exposure times, and application methods (Czarapata 2005; Tu, Hurd, and Randall 2001).

2, 4-D ([2, 4-dichlorophenoxy] acetic acid) is a selective herbicide that controls invasive broadleaf herbaceous plants and woody seedlings, but does not harm certain monocots (including grasses). 2,4-D has been found to be effective at controlling leafy spurge, purple loosestrife, buckthorn, spotted knapweed, exotic thistles, and crown vetch. Aquatic formulations of 2,4-D are effective for the control of Eurasian water-milfoil in lakes.

Glyphosate (N-[phosphonomethyl] glycine) is a non-selective, broad spectrum, systemic herbicide that is used to control many grasses, forbs, vines, shrubs, and trees. Glyphosate is effective against garlic mustard, Japanese barberry, leafy spurge, honeysuckle, purple loosestrife, buckthorn, crown vetch, and Japanese knotweed.

Sethoxydim (2-[1-{ethoxyimino} butyl] -5[-2-{ethylthio} propyl]-3-hydroxy-2-cyclohexen-1-one) is a selective herbicide used to control annual and perennial grasses. It has little or no impact on broadleaf herbs or woody plants. Species of concern on the Forests that may be controlled by Sethoxydim would be smooth brome or reed canary grass.

Triclopyr ([{3, 5, 6-trichloro-2-pyridinyl} oxy] acetic acid) is a selective herbicide that controls invasive, broadleaf herbaceous and woody plants, but does not harm certain monocots (grasses). It is particularly effective at controlling woody species with cut-stump or basal bark treatments. Triclopyr is effective against garlic mustard, Japanese barberry, honeysuckle, buckthorn, and crown vetch.

Clopyralid (3, 6-dichloro-2-pyridinecarboxylic acid) controls many annual and perennial broadleaf weeds. It is particularly effective against members of the sunflower, nightshade, and knotweed families. Clopyralid may be used against spotted knapweed, thistles, and crown vetch. Clopyralid is a pre-emergent and post-emergent herbicide, and so can be effective not only on the plants to which it is applied, but can also prevent germination from seeds in the seed bank.

Fosamine ammonium salt (FAS) (ethyl hydrogen [aminocarbonyl] phosphonate) is a selective herbicide that inhibits growth in undesirable woody species. It is commonly used for brush control. FAS works through absorption by leaves, stems, and buds. FAS may be used on honeysuckle, buckthorn, and Japanese barberry.

Dicamba (3, 6-Dichloro-o-anisic acid) is a growth regulator effective against broadleaf species. It is effective against leafy spurge, spotted knapweed, and thistles. It is typically applied in a mix with other herbicides.