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Environmental Assessment

Corsair Project



Tawas Ranger District
Huron-Manistee National Forests

Iosco 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.

New Administrative Process

During the planning for this project, there were changes to the administrative review process in the Code of Federal Regulations (CFR). This Environmental Assessment will acknowledge the new CFR 218 objection process rather than the CFR 215 appeal process. Refer to Appendix A for a more thorough explanation of the new CFR 218 objection process.

Chapter 1: Purpose and Need for Action

The United States Forest Service (USFS) is an agency within the United States Department of Agriculture (USDA). The mission of the USFS is to sustain ecosystem health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations.

The Huron Shores Ranger Station is located on the Huron National Forest in Northeast Lower Michigan. Huron Shores staff has prepared this Environmental Assessment (EA) for your review, reference and consideration to disclose the direct, indirect and cumulative effects of resource landscape management activities on national forest lands within the Corsair Project area.

This EA is tiered to the Forests' Plan. Tiering refers to the coverage of general matters in broader documents, in this case the Forests' Plan, with subsequent narrower focused documents such as this EA (CEQ Regulation 1508.28). Tiering incorporates by reference the topics discussed in the Huron-Manistee National Forests' Final Environmental Impact Statement and the Forests' Plan and therefore allows this EA to concentrate solely on management specific to the Corsair project planning area.

1.1 Project Location and Area Description

The Corsair Project is located on National Forest System (NFS) lands on the Tawas Ranger District of the Huron-Manistee National Forests. More specifically, the project is located east of the Sand Lake community (Table 1 and Figure 1). The project area is approximately 26,730 acres in size. Active management is proposed on approximately 11,000 acres within the 26,730 acre project area. Management activities are proposed for implementation between the years 2013 and 2023.

Table 1: Legal Descriptions of Corsair Project Locations

Township	Range	Sections
23N	6E	1, 11, 12, 13, 14, 23, 24
23N	7E	6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 26, 27, 28, 29, 32, 33, 34, 35
22N	6E	1, 11, 12, 13, 14
22N	7E	2, 3, 4, 5, 6, 7, 8, 9

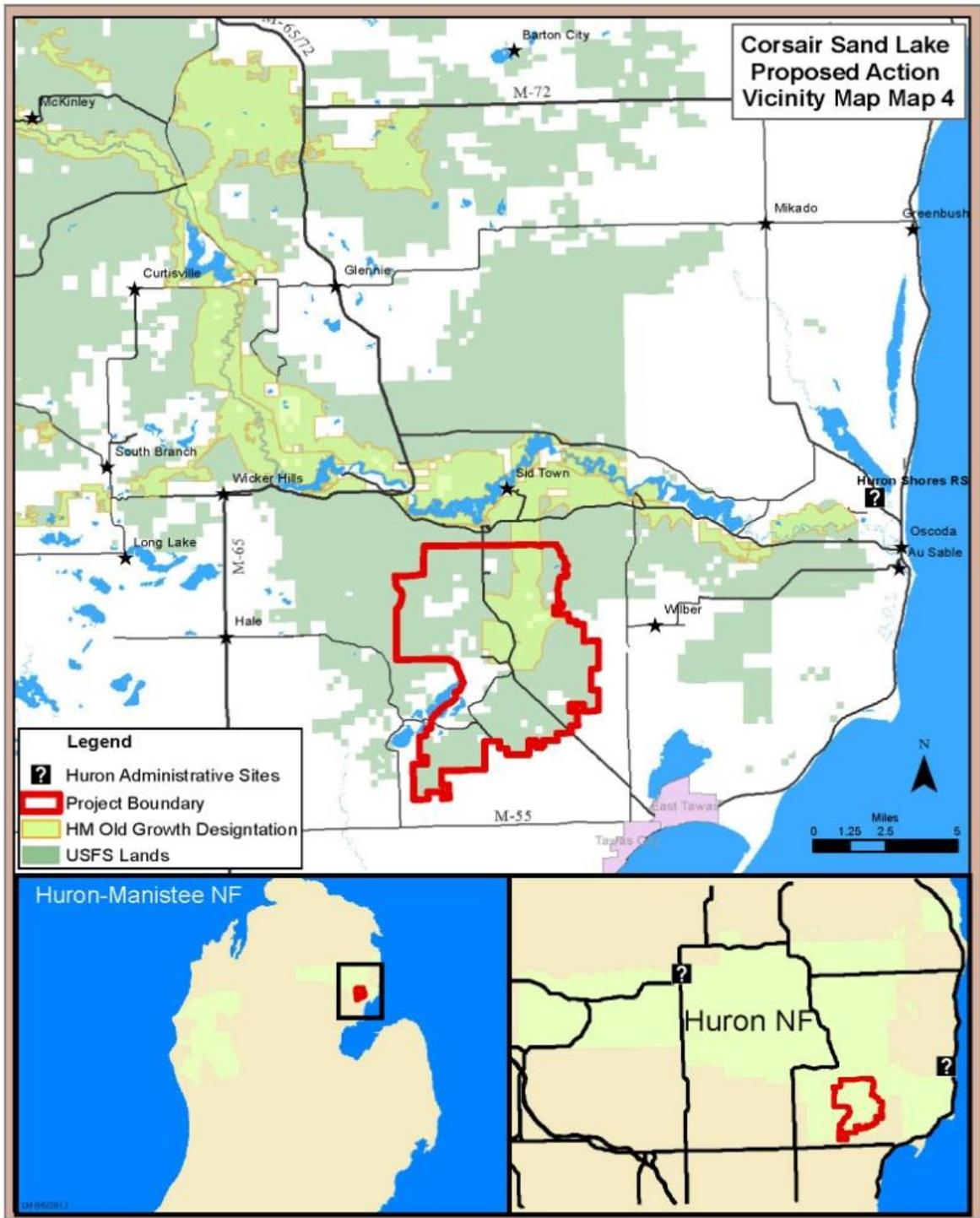


Figure 1: Location of the Corsair Project Area

1.2 Management Direction

The management activities that are carried out to fulfill the Forest Service’s mission are guided by a multitude of applicable federal laws and regulations. It can be difficult to discern how they overlap and are applied in the process of project development. The following is a brief explanation meant to serve as a general framework to describe how the interpretation and execution of several of these laws and Acts relate to the Corsair project.

Forest management activities on the Huron-Manistee National Forests (HMNF) are guided by the Huron-Manistee National Forests’ Land and Resource Management Plan, as amended (Forests’ Plan). The development and use of the Forests’ Plan is mandated through the National Forest Management Act (NFMA) of 1976. The Forests’ Plan is a document that guides all natural resource management activities for the Forests. It describes desired resource conditions, resource management practices, levels of resource production and management, and the availability of suitable land and resource management. The purpose of the Forests’ Plan is to provide management direction to ensure that ecosystems are capable of providing a sustainable flow of beneficial goods and services to the public now and in the future (Forests’ Plan, page I-4-5).

The Forests’ Plan divides the HMNF into different Management Areas (MA); each having a distinct purpose, management goals and objectives and desired conditions. Each MA usually contains 1,000 acres or more and ownership is primarily National Forest. MA’s have standards and guidelines that provide direction for managing resources in moving from an existing condition to the desired condition.

For individual projects such as the Corsair Project, the USFS is required by the National Environmental Policy Act (NEPA) to conduct an environmental analysis (EA). The EA is written to determine and disclose what direct, indirect and cumulative effects the proposed activities may have on the environment.

The proposed activities of the Corsair Project implement the Forest’s Plan by addressing site-specific on the ground needs and opportunities and are the Forest Service’s efforts to move the project area from its existing condition to the desired condition. The Corsair Project area falls within three MA’s; 4.2, 4.4 and 7.1. The following table describes the MA’s within the Corsair Project area and describes the Forests’ Plan Desired Condition for those MA’s (Table 2).

Table 2: Forests’ Plan Management Areas and Desired Condition as it relates to the Corsair Project

Management Area	Desired Condition
4.2 Roaded Natural Sandy Plains and Hills	Human activities such as vegetative management, facilities, structures, utility corridors, mineral exploration and mineral development are evident. Users are aware of ecosystem processes, habitat management techniques, area closures, visitor information and other services provided. The area will provide roads and trails appropriate for motorized and non-motorized uses. Road closures are evident. Timber stands are dominated by red, white and jack pines; red white and black

Management Area	Desired Condition
	oaks; and aspen. The dominant trees in stands are the same age and about the same size. Stands differ in age and are irregular in size and shape, giving the landscape a mosaic appearance. Openings are interspersed throughout the area.
4.4 Rural	<p>The ownership pattern of National Forest System land within this management area is often scattered. It is often a mixture of agricultural land, private lots and wooded National Forest System lands that creates a rural environment. Human activities such as vegetation management, facilities, structures, utility corridors, mineral exploration and development are evident and harmonize with the surrounding environment. Interaction between users is frequent and users are aware of services provided, such as visitor information and law enforcement. There are few opportunities to test primitive outdoor skills. The area will provide roads and trails appropriate for motorized and non-motorized uses.</p> <p>Red, white and jack pine are the dominant tree species, although aspen and other hardwoods are present. The trees within each stand are about the same age and size. The scattered openings on private land are agricultural fields, idle land, borrow pits, and roads. Openings are interspersed throughout the area.</p>
7.1 Concentrated Recreation	<p>Vegetative management activities will enhance old-growth character; protect public health and safety and the soil and water resource. Concentration and interaction between recreation users is high. There is often evidence of other users. The area is to be managed in such a way that on-site controls and restrictions may be present but are subtle.</p> <p>Non-motorized use is emphasized, providing primarily hiking, cross-country skiing, and equestrian travel. Roads and a dense trail system are present. They will be designed to accommodate the high density recreation use and related activities associated with the area.</p> <p>Utility corridors and other special uses may be present, provided they are compatible with the character of the area. Mineral exploration may occur where geologic studies suggest special needs for subsurface information. Some roads are present, but they are gated to provide access only for administrative or other permitted purposes. Other public agency roads may be present. Improvements on these roads may be frequent and are maintained to minimal standards necessary for health and safety.</p>

1.3 Need for the Corsair Project

The need for the Corsair project was arrived at by examining the differences between the existing condition of the landscape and the desired condition described in the Forests' Plan. Field reconnaissance, review of Forest Service databases, review of compartment folders, maps, and discussions between natural resource specialists have revealed substantial gaps in what actually occurs on the landscape and what the desired condition of the landscape should be as described in the Forests' Plan. For example, the Forests' Plan contains information on specific age class and management requirements for forest types. Currently the majority of the red pine and mixed pine-oak stands found within the project area are over-mature and exhibit reduced growth rates and the Forests' Plan and the project area landscape do not match. Another example is that the project area has a greater hazardous fuel risk than areas that have been treated outside of the project area. In addition, there are gaps in what the Forests' Plan states regarding managing old growth and what the landscape exhibits currently. Current condition and desired condition gaps also exist in vegetation age class and diversity, desired condition of recreation facilities, and road system. Simply stated, the Corsair project is needed to close the gap between the management goals of the Forests' Plan (desired condition) and what's actually on the landscape (current condition).

1.4 Objectives of the Project

Objectives are actions intended to attain or accomplish management goals. For each objective of the Corsair project, an indicator of measure has been identified in order to determine how well each alternative would meet each objective. An indicator of measure provides useful in judging differences among actions and to determine to what degree results have or have not been achieved. They enable the decision maker to assess progress toward the desired condition.

Analysis of the Forests' Plan objectives denotes a contrast between the existing condition and the desired condition of the Corsair project area. To implement the Forests' Plan and to address the identified needs, based on the existing condition, site specific needs and management activities need to occur to properly manage resources within the project area. Please refer to Table 3 on the following pages.

Table 3: Existing Condition vs. Desired Condition

Desired Condition (Objective)	Existing Condition	Site Specific Need	Management Activity	Indicator of Measure
<p>1. Implement fuels reduction and fuelbreak projects where conditions warrant for the protection of life, property and safety. High-risk areas adjacent to private lands will receive treatment priority (USDA Forest Service 2006, p II-3).</p>	<p>Past fire suppression has removed the natural role of fire from the landscape. Large accumulations of hazardous fuels in wildland/urban interface.</p>	<p>Increase prescribed fire frequency to a 1 to 7 year interval, (intervals vary by community type) and reduce fire crown potential from 5-7 to 4 (See Revised Forest Plan, Part I); reduce the accumulated fuels to minimize wildfire potential and protect forest resources (biotic and abiotic) and private property.</p>	<p>Prescribed burning acres, mechanical treatment of fuels, commercial timber harvest.</p>	<p>Acres of management, fire crown potential, prescribed fire frequency</p>
<p>2. Maintain or restore community diversity and forest health and to provide for wildlife and plant viability. Produce a diverse mix of timber products in regards to vegetative composition. Contribute to the</p>	<p>Forested stands are overstocked and have limited diversity and limited understory development. Overcrowding causes lack of natural regeneration of pine and oak, poor tree growth declining nutrient cycling and increased vulnerability to infestations by insects and reduced suitability of</p>	<p>Need to restore healthy conditions by removing unhealthy trees and reducing stocking densities to increase growth on remaining trees. Maintain various successional stages across the landscape, suppress and treat NNIS species, increase structure in</p>	<p>Commercial timber harvest, promote white pine, prescribed fire, treatment of NNIS, maintain wildlife openings, supplemental planting of desirable species, maintain fish structures.</p>	

Desired Condition (Objective)	Existing Condition	Site Specific Need	Management Activity	Indicator of Measure
economic base of local community by providing a sustained yield of high quality products.	habitat for wildlife and plants. Habitat suitability is low due to homogenous age class and species composition, infestations of NNIS, aquatic systems lack structure Reduced yield of quality saw timber products.	aquatic systems.		
3. Maintain a network of multiple-use trails in good condition, relying upon partnerships to the greatest extent possible. Supply a spectrum of recreational facilities and opportunities that are responsive to user demands. Provide abundant and diverse opportunities for enjoying scenery, streams, lakes and rivers, heritage sites, and wildlife.	Currently there are snowmobile, equestrian, hiking, and skiing trail opportunities for forest visitors. Overstocked forested stands created reduced view shed along trails. Trees falling onto trail ways cause increased maintenance. Facilities are past usable service dates and have deferred maintenance backlog. Lack of information on regulations and interpretive information on forest treatments on locally significant historical sites.	Create loop routes for trail riders, manage for public health and safety, discourage conflicting uses, manage the equestrian, snowmobile and ATV trail system. New trail bridges and trailhead toilets, designate dispersed campsites, provide additional parking at snowmobile trailhead.	Designate and relocate trails, Design signs for visitor orientation and interpretation and to display regulations. Replace trail bridges and trailhead toilets, designate dispersed campsites, provide additional parking at snowmobile trailhead.	Miles of designated trail Number of facilities repaired/replaced

Desired Condition (Objective)	Existing Condition	Site Specific Need	Management Activity	Indicator of Measure
<p>4. Develop and operate the minimum road system, including all bridges and culverts, maintained to the minimum standard needed to meet requirements of proposed actions, protect the environment, and provide for reasonable and safe access</p>	<p>There are numerous roads causing resource damage. Road densities surpass Forests' Plan maximums for Level 1 and Level 2 roads. Fourteen miles of user created roads and trails are causing resource damage.</p>	<p>Treat resource damage. Maintain the road system for 0-3 miles/square mile (Forests' Plan page II 39-40) to provide safe access for the public, timber extraction, and administrative use. Protect resources along seasonal using gates.</p>	<p>Restoration of natural resources closing/obliterating unclassified and classified roads, stabilize soils and revegetate sites.</p>	<p>Miles of forest system roads closed. Miles of user created roads closed.</p>
<p>5. In old growth...use limited vegetation management to improving visual quality; reduce hazard fuels, mimic natural disturbances, manage pests, create fuelbreaks or maintain diversity of wildlife habitats (USDA Forest Service 2006, III-7.1, 3-4).</p>	<p>Plantation pines with unnatural row appearance, homogenous age class and species composition make up a large portion of the Old Growth area. A larger portion is a complex landscape with heavy fuel accumulations from fire suppression and adjacent wildland/urban interface. Community types are dominated by dry outwash sandy plains that support vegetation that have evolved with and require fire to establish and maintain. The Corsair Trail system lies within designated Old Growth. Public</p>	<p>Within old growth, periodic use of prescribed fire would be used to maintain closed conifer and oak forest while preventing the excessive buildup of fuel loads (FEIS, Chapter 3; page 251). The site specific needs for overstocking of trees, wildlife and fish habitat suitability, NNIS, and developed recreation areas are the same as those discussed earlier (see above specific site management).</p>	<p>Thin old growth and reduce row appearance, implement periodic low intensity prescribed burns. There are specific standards and guidelines within the FEIS relating to management of Old Growth which would apply to implementation (FEIS Chapter 3).</p>	<p>Acres of old growth treatment.</p>

Desired Condition (Objective)	Existing Condition	Site Specific Need	Management Activity	Indicator of Measure
	users of this trail system have requested reduction of older jackpine and dead wood to improve visuals and to “take action to prevent catastrophic wildfire”. NNIS present throughout Old Growth areas. No “let burn” areas on Forest.			

1.5 Proposed Action

A proposed action is a proposal to authorize, recommend, or implement an action to meet the purpose and need of a project. Proposed actions have five parts that comprise their whole: **who** is proposing the action (in this case the Forest Service), **what** are the actions being proposed (listed below), **how** they would be accomplished (explained in the details of Chapter 2), **where** is management being proposed (on National Forest system lands within the Corsair project area) and **when** management activities would be implemented (2013-2023). Below is a list of what is proposed to close the gap between the existing condition in the Corsair planning area and the desired condition as it was initially scoped;

Timber

- Thin approximately 140 acres of oak
- Thin and apply prescribed fire on approximately 313 acre of oak
- Thin approximately 496 acres of red pine
- Thin and prescribe burn approximately 884 acres of red pine
- Promote white pine regeneration on 73 acres

Recreation

- Install three interpretive signs; two at Buck Pond and one at Monument snowmobile trailhead
- Designate two campsites on Buck Pond
- Expand the Monument snowmobile trailhead parking lot by approximately 10 parking spaces
- Relocate approximately 2.5 miles of the Michigan Shore to Shore Horse and Hiking Trail
- Designate approximately 16 miles of ATV trail
- Install and/or move gates to manage motorized use and access
- Replace vault toilets at Corsair/Wrights Lake/Silver Valley trailheads
- Repair and/or replace four bridges within the Corsair/Silver Valley trail system
- Designate dispersed campsites within the project area

Fish and Wildlife

- Restore oak savannah on approximately 1,956 acres
- Maintain the Fisheries Interpretive Trail at Corsair
- Maintain approximately one mile of existing fish structures on Silver Creek
- Enhancement of wildlife openings on approximately six acres
- Mechanical and/or herbicidal treatment of non-native invasive species on approximately 25 acres of high priority leafy spurge infestations

Fire and Fuels

- Reduce hazardous fuels and apply prescribed fire to approximately 30 acres of private land using the Steven's Act
- Non merchantable reduction of hazardous fuels and the application of prescribed burning to approximately 2,484 acres
- Create and maintain approximately 361 acres of shaded fuel breaks
- Apply prescribed fire to approximately 3,537 acres for hazardous fuels reduction and ecosystem restoration

Roads

- Designate roads being used for private property access and issue special use permits

- Obliterate approximately 10 miles of Level 1 and Level 2 forest system roads
- Obliterate approximately 13.5 miles of unauthorized roads and trails

Soils

- Repair soil erosion damage where it occurs across the project area

1.6 Decision to be Made

This EA evaluates site-specific concerns and opportunities and analyzes the effects of the proposed management activities for the Corsair Project. Based on the analysis of the environmental effects disclosed in this EA, the District Ranger, as the decision maker must decide whether or not to implement the proposed activities based on the actions and methods, location of actions, and project requirements and design criteria presented.

As required by 36 CFR 219.35, the best available science is utilized in making this decision. The project record demonstrates a review of relevant scientific information, consideration of responsible opposing views, and, where appropriate, the acknowledgment of incomplete or unavailable information, scientific uncertainty, and risk.

1.7 Scoping and Public Involvement

Scoping is a process that is used to gather comments about a site-specific proposed federal action to determine the scope of issues to be addressed and for identifying unresolved issues related to the proposed action (40 CFR 1501.7). The Forest Service uses public involvement and an Interdisciplinary Team (ID Team) of resource specialists to determine the issues of concern and develop possible solutions. Opportunities for comments enable concerned citizens, resource specialists, other agencies, and local governments to express their ideas and views.

Scoping comments on the proposed actions were solicited in August 2012 from Forest Service employees, members of the public, adjacent property owners, and public and private agencies and organizations. This occurred through a listing in the Huron-Manistee National Forests NEPA Quarterly Schedule of Proposed Actions (SOPA), posting of the proposal on the Huron-Manistee National Forests website, advertising in the newspaper of record and a direct mailing that occurred in August 2012. Approximately 30 scoping comments were received. A copy of the scoping letter, mailing list of individuals, government agencies, tribes, and organizations contacted, and comments received are included in the Project Planning Record.

Public involvement for the project also included ID Team members meeting with concerned citizens and groups of interested public. Several meetings with local landowners occurred in October, 2012. A power point presentation outlining the project was given to the Corsair Trails Council in October, 2012 as well. In November, 2012 several ID Team members met with landowners concerned about prescribed burning. Numerous other informational inquiries were received both by telephone, in person, and by e-mail asking the ID Team to clarify the proposed activities, to share ideas as well as concerns.

1.8 Relevant and Non-Relevant Issues

Issues result from debate and disagreement regarding the resource impacts directly related to the proposed activities and opportunities that weren't previously identified. Relevant issues are identified from the

scoping comments received during the scoping process (FSH 1909.15; 12.4). In project development, relevant issues may also represent compromises between resource areas.

Issues identified from the response to public and internal scoping were separated into two groups: relevant and non-relevant issues as directed by CEQ Regulation 1500.1(b), 1500.2(b), 1500.4(c), and 1500.4(g).

- Non-relevant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, the Forests' Plan, or other higher level decisions; 3) not relevant to the decision being made; or 4) conjectural and not supported by scientific or factual evidence.
- Relevant issues were issues relevant to implementing the proposed action. These included issues that required the development of an alternative to the proposed action, development of design criteria or mitigation, consideration of location in alternative design, or an issue addressed in the effects analysis (Chapter 3).

Relevant Issues Used for Formulating Alternatives;

The following issues were the result of scoping comments solicited during scoping. Issues brought forward here were considered key issues and were used to create alternatives and also sharpen the focus of the Environmental Assessment (FSH 1909.11). As determined from review of comments by the ID Team, six (6) issues were identified;

Issue 1: Reduce hazardous fuels using methods other than prescribed burning; Several comments wanted the Forest Service to consider treatment of hazardous fuels using prescribed burning. Commenters raised concerns that prescribed burning may escape and pose a threat to adjacent land owners property. Commenters suggested using mechanical means to reduce hazardous fuels rather than prescribed fire. This issue is addressed in the following section; Alternatives Considered but not carried forward (see following page).

Issue 2: Management of the roads system; Several comments wanted the Forest Service to consider fewer road closures than what was initially proposed. Having fewer road closures is addressed in the transportation section of this EA (Chapter 3).

Other commenters, public and internal, wanted the Forest Service to consider closing more roads citing examples of resource damage and illegal dumping. This issue was used to drive Alternative III (Modified Proposed Action).

Issue 3: No longer manage the North/South connector horse trail; The ID Team discussed the relevance of maintaining the North/South horse trail connecting the City of Tawas to the official Michigan Shore to Shore Horse and Hiking Trail. This resulted in an issue that was carried forward in Alternative III.

Issue 4: Alternative ATV route; A comment from the public suggested designating an alternative ATV route from what was proposed. This issue is addressed in the following section; Alternatives Considered but not carried forward (see following page).

Issue 5: Additional fish structure maintenance along Silver Creek; A commenter suggested including an additional mile of fish structure maintenance along Silver Creek. This relevant issue was carried forward in Alternative III.

Alternatives Not Considered in Detail;

The range of alternatives considered by the Responsible Official should include all reasonable alternatives to the proposed action. Alternative not considered in detail include those that fail to meet the purpose and need, are technologically infeasible, illegal, unsafe or would result in unreasonable harm (FSH 1909.14.4). The following alternatives were a result of ID Team discussion or based on public issues however were not carried forward in the NEPA analysis.

- Several commenters suggested the Forest Service consider alternative methods to reduce hazardous fuels other than prescribed burning (Issue 1). The ID Team discussed mechanical treatment as a means of addressing this issue. Mechanical fuel removal is an option for fuels removal however it is extremely expensive. Mechanical treatment costs \$300-\$350/acre depending on the size and density of vegetation whereas prescribed burning costs approximately \$75-\$100/acre for treatment. Furthermore, using prescribed fire to enhance ecosystem management is found in the Forests' Plan direction (page II-3, page I-9). Utilizing only mechanical treatment on the landscape is not only expensive but it does not address the project need to reintroduce fire into a fire-adapted ecosystem.
- One commenter suggested an alternative ATV route (Issue 4). Several members of the ID Team spent time in the field checking the suggested route. It was determined that the commenters proposed route would not be included in analysis for several reasons. First, the route had higher safety risks due to it being located on mixed traffic roads (ATV's would be on roads with higher speed vehicles). The Forests' Plan standard and guidelines state that the forest should "manage off highway vehicles by designating trails or routes to minimize user conflicts and to provide for user satisfaction, resource protection and public health and safety (page II-6). Secondly, during field reconnaissance it was observed that the suggested reroute posed a higher probability of disturbance to private landowners since the commenters suggested route passed by more private residence than the route in the scoped Proposed Action.
- There were several comments that raised concerns regarding visuals along the Corsair Trail system and visuals within designated Old Growth areas. The ID team felt that these comments were not issues that would drive an alternative however, these issues are important and should be addressed. Analysis of the effects of the proposed activities on visuals is addressed in Chapter 3 (Visuals, Fire, and Old Growth Effects sections). In addition, design criteria were developed to address visual concerns along the Corsair trail system and in Old Growth.

Chapter 2: Comparison of Alternatives, Including the Proposed Action

This chapter describes specifics of 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.

2.1 Alternatives Considered in Detail

Three alternatives are considered in detail, Alternative I the No Action Alternative, Alternative II the Modified Proposed Action Alternative, and Alternative III.

- Alternative I, The **No Action** Alternative, analyzes the effects of deferred treatment (no management activities taking place at this time).
- Alternative II, the **Modified Proposed Action**, follows management direction established in the Forests' Plan as described in Section 1.5 of this document. It reflects more focus than the Proposed Action that originally went to the public for scoping. Details are described below.
- Alternative III, referred to as **Alternative III** was developed in response to relevant issues identified during the scoping process as described in Section 1.9 of this document. Other factors such as ID Team discussion and field truthing of the project area 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-Manistee 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 (Modified Proposed Action)

Direction provided in the Forests' Plan was the basis for this alternative. Alternative II (also referred to as the Modified Proposed Action) was 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 restore and maintain forest health and diversity, the need to move the area towards a more balanced vegetative age class composition, promote old growth conditions, provide quality recreation opportunities, reduce

hazardous fuels, and reduce or eliminate NNIS. Maps displaying the activities of Alternative II are in Appendix B.2.

Since the Proposed Action was described during the scoping process in August of 2012 ID Team analysis, field review and GIS analysis have resulted in acreage refinements to some of the proposed treatments. As you read the following section, you will notice several acre and location differences from the original proposed action that was scoped. What is described back in Chapter 1 is what was originally scoped. What follows includes the acreage and location adjustments and is reflected below in the details of what is now referred to the Modified Proposed Action. The Chapter 3 effects analysis utilizes the acres and treatments described in the Modified Proposed Action below, not the Proposed Action that was scoped or described in Chapter 1 of this EA.

Details of Alternative II (Modified Proposed Action)

Thin approximately 452 acres of high site oak: High site oak thinning is proposed to improve the existing stand and regulate growth by adjusting stand density through cutting and removal of trees, while striving to retain healthy, well-formed leave trees. The post-thinning stocking levels would allow for a more advantageous distribution of site resources and provide opportunities for increases in mast production and oak regeneration. High site oak stands are proposed to be thinned through a commercial timber sale.

Shelterwood cut and apply prescribed fire on approximately 1,770 acres of low site oak: Low site oak stands are proposed to be shelterwood cut through a commercial timber sale to promote growth of the remaining trees, ensure oak regeneration at the prescribed rotation age, and provide for future timber availability. Jack pine would be removed and red pine would be thinned with an overall goal of reducing the canopy to approximately 70 basal area in order to reduce the potential for wildfire. The post-shelterwood stocking levels would allow for more advantageous tree spacing and provide opportunities for increases in mast production and oak regeneration.

Dead and downed oak has created heavy fuel loading across the low site oak stands. Prescribed burning and or mechanical treatment would occur to reduce fuel loading and the potential of wildfire, and regenerate oak while it is still vital. Burning would also suppress red maple, encourage native warm season grasses, nectaring sources, and associated wildlife species.

Thin approximately 683 acres of red pine: From scoping, field reconnaissance discovered that the red pine thinning slated for the Southwest portion of project area was not ready for treatment. It has been removed from consideration in this alternative. However, approximately 214 acres of red pine in the Northwest portion of the project area not initially proposed for treatment proved ready to be thinned. It has been added for consideration in this alternative.

Thinning red pine through a commercial timber sale would occur to remove low quality, unhealthy, overstocked trees and promote optimal growth on the remaining trees. Red pine not considered old growth would be thinned to the recommended B-stocking levels (Figure 3). Within old growth stands a variable density thinning would occur to remove the row effect, enhance species composition and to create a more naturally appearing stand.

Thin and prescribed burn approximately 484 acres of red pine: Red pine thinning objectives are described

above. A low intensity burn would occur as well to reduce needle cast (fuel loading) and to increase growth of understory forbs, grasses, and shrubs, to enhance wildlife forage, and increase growth and vigor of the overstory.

Promote white pine regeneration on 66 acres (proposal dropped): White pine regeneration was initially proposed to encourage timber diversity in the project area. This proposal was dropped following a field review that determined the stand was already regenerating sufficiently to white pine. This field review also revealed a high site oak component needing regeneration. This stand would be treated for high site oak through thinning while maintaining the white pine component.

Install three (3) interpretive signs: Two of the three interpretive signs would be installed at Buck Pond to explain fishing regulations. The third interpretive sign would be installed at the Monument snowmobile parking lot to explain the historical significance of the Monument Row of red pine trees.

Designate two (2) campsites at Buck Pond: Two campsites would be designated on the west side of Buck Pond. This alternative would provide an opportunity to primitive camp closer to water than the forest closure order of 200 feet.

Expand the Monument Road Snowmobile parking lot: The parking lot would be expanded by approximately ten (10) spaces in order to provide additional parking for vehicles and trailers.

Relocate approximately two and a half (2.5) miles of Michigan Shore to Shore horse and hiking trail: The trail is proposed be relocated from a portion of the Corsair trail system to an old two track after it crosses the Silver Creek Bridge #4. The reroute would head south and then east on a two track road paralleling the snowmobile trail until it crosses Monument Road. The reroute would then head east and hook into the existing trail near Forest Road 4510. This reroute is proposed to minimize user group conflicts and minimize erosion on the Corsair trail system.

Designate approximately ten (10) miles of ATV trail: This is intended to give the public additional loop riding opportunities. It would also provide a link from the Sand Lake communities to the East-West ATV trail traveling north of the project area. No new trail construction is proposed, this proposal is to designate existing snowmobile trail to snowmobile/ATV trail. From the north, the trail would travel from the existing snowmobile/ATV trail #649, then travel east to intersect with snowmobile trail #645. Then it would follow trail #645 to Old State Road to tie to the Sand Lake community.

Install and/or move gates: Gates would be installed or moved to manage seasonal motorized use and access. Segments of trail or road may be gated to minimize resource damage where it occurs. For example in 2010, an unauthorized ATV use was causing soil damage on a hillside adjacent to the snowmobile trail near Plank Road. The soil damage was repaired and two gates were installed to limit non-snowmobile traffic.

Replace outhouse buildings at trailheads: Five older style outhouse buildings are in need of replacement within the Corsair Trail System. The outhouse buildings have reached the end of their usable life and are deteriorating. Two outhouse buildings would be replaced at the Corsair Trailhead. Two additional buildings would be replaced at the Wright's Lake trailhead and one building would be replaced at the Silver Valley trailhead. These new buildings would comply with the Architectural Barriers Act (ABA).

The ABA states that Federally funded buildings and other facilities need to be designed, constructed, or altered in accordance with standards to insure accessibility. The current buildings do not meet the ABA.

Repair/replace four (4) bridges: Bridges within the Corsair trail system would be repaired and/or replaced to ensure safe crossings over Silver Creek.

Designate dispersed campsites within the project area (proposal dropped): The current policy of the Forest Service is that if a road does not appear on the Motorized Vehicle Use Map (MVUM), it is not legally open for vehicle travel. Spurs leading from open roads to dispersed camping spots are not shown on the MVUM map and therefore, are not legally open to vehicle traffic. Designating dispersed campsites would have been a way to create legal access to dispersed camping by changing the status of these spurs from user-created roads to legal roads. After discussion with the ID Team, this proposal has been dropped because designating dispersed campsites is a forest wide issue and outside the scope of this EA. Roads and vehicle access within the project area is addressed in the transportation section (Chapter 3) of this EA.

Restore oak savannah (proposal clarified and renamed): This treatment and acreage are incorporated into the shelterwood cut and apply prescribed burning of low site oak proposal above. It is no longer referred to as oak savannah.

Maintain the fisheries interpretive trail: The interpretive trail is located after the first Silver Creek crossing near the Corsair trailhead. It is an ABA compliant gravel trail approximately 200 feet in length. Eight interpretive panels alongside the trail explain stream ecology. Maintaining the trail would include adding gravel to the trail tread where needed and cleaning/replacing the panels.

Maintain existing fish structures: There are approximately 50 fish structures over the course of a one (1) mile segment of Silver Creek running from Monument Road to the north. The structures were built in the 1980's with native materials to enhance trout habitat. Since then, ice damage and weathering have diminished the effectiveness of many of these structures. Maintenance is needed to replace the brush and logs and restore the suitability of these structures.

Enhancement of a six (6) acre wildlife opening: Natural succession gradually reduces open land habitat suitability and availability for open land species such as wild turkey and dusted skipper and species that utilize openings for a portion of their habitat needs such as white-tailed deer and eastern bluebirds. NNIS species were identified in the opening as well. The intent is to utilize mechanical treatments (for example mowing) to promote warm season grasses, encourage nectaring sources for the Regional Foresters Sensitive Specie dusted skipper, and suppress NNIS with herbicides.

Treatment of NNIS: Infestation by NNIS is displacing native vegetation through competition and degrading habitat. Herbicide, mechanical, hand-pulling treatments and/or prescribed burning would be used on approximately 25 acres to suppress or eradicate NNIS (for example, leafy spurge) and promote native vegetation.

Utilize the Steven's Act to reduce hazardous fuels on private land (proposal dropped): The Steven's Act allows Federal Agencies to treat hazardous fuels on private land and is available to interested parties. Since development of the proposed action the interested private land owner has decided not to treat their

acres and therefore this action will be dropped from the proposed action. The fire and fuels specialists will continue seeking opportunities with landowners to reduce hazardous fuels on private lands.

Non merchantable reduction of hazardous fuels and the application of prescribed fire on approximately 2,273 acres: Non merchantable wood products would be hand cut and treated mechanically and/or with prescribed fire to reduce hazardous fuels. This includes treatments such as brushing, chainsaw work, using a masticator, chipper or other such mechanical tools, and would not utilize commercial timber harvest.

Create and maintain approximately 361 acres of fuel breaks: Fuel breaks are a natural or manmade change in fuel characteristics which affects fire behavior so that fires burning into them can be more readily controlled. The shape of the fuel breaks would be mosaic in nature and contain overstory trees. Fuel breaks would be created using commercial timber harvests and would be maintained by using hand tools and/or mechanized equipment and prescribed fire.

Apply prescribed fire to approximately 8,624 acres: Prescribed fire treatments would reduce hazardous fuel accumulations, aid in nutrient cycling, and enhance habitat for fire adapted species. Low to moderate intensity fire would be used along with multiple prescribed burn entries to accomplish these objectives.

Designate roads being used for private access (proposal dropped): Since scoping this proposal, it has been determined that private access across Forest Service lands need to be addressed in separate decision documents. Designating roads for private use goes through the special use permitting process and should not be considered part of any alternative. The question of identifying which roads are to remain open or closed to whether they are to private land or for general use is a separate issue and addressed in the transportation section of this EA.

Close or obliterate approximately 7.1 miles of Maintenance Level 1 and Level 2 roads: All or portions of several Forest Service roads would be closed to licensed and non-licensed vehicles (refer to Appendix B.2 for specific roads). Current open road densities exceed the Forests' Plan maximums of three (3) miles per square mile. Roads would be closed by mechanical and/or hand placement of gates, guardrails, barrier posts, berms. Obliterated roads would be rehabilitated to blend into the forest landscape. Refer to the transportation section in Chapter 3.

Obliterate approximately 14 miles of unauthorized roads and trails: Unauthorized roads are not official nor managed travel ways. Unauthorized roads discovered during field reconnaissance or during project implementation would be closed and/or obliterated using the methods described above.

Repair soil erosion damage where it occurs: Vehicles operating off- road illegally and ATV traffic have caused soil damage and erosion. A variety of methods such as placement of waterbars, native vegetation plantings, and the placement of gravel would be used to restore eroded soils and repair damage to the forest landscape.

2.4 Alternative III

Alternative III was developed in response to relevant issues identified internally and by the public during the scoping process as described in Section 1.9 of this document. Alternative III was also developed as a result of more rigorous field review by Forest Service staff and the ID Team. Alternative III is similar to

the Alternative II (Modified Proposed Action) with the major difference being additional road closures and prescribed burning. There was one unintentional omission to the Modified Proposed Action relating to prescribed burning that also appears in this alternative. A detailed description of Alternative III is explained below and maps displaying the activities proposed can be found in Appendix B.3. All management proposals for Alternative III are identical to Alternative II (Modified Proposed Action) *except* for the following;

Details of Alternative III

Apply prescribed fire and reduction of non-merchantable fuels: There is approximately a 20 acre difference between the Modified Proposed Action and Alternative III when referring to this treatment type. These acres come from several stands located in the Corsair Trail system area that are in need non-merchantable fuels reduction treatment as well as prescribed burning to establish treatment objectives.

Treat approximately 409 additional acres with low to moderate prescribed burn: Several prescribed burning locations were unintentionally omitted when this project was initially scoped and during the development of the Modified Proposed Action. The additional proposed areas for burning are adjacent to existing prescribed burn units. Prescribed fire treatments of these units would be accomplished using techniques described in Chapter 3.

No longer manage approximately ten (10) miles of the North/South trail link to the Michigan Shore to Shore Horse and Hiking Trail: There have been repeated efforts from the Forest Service to enter into a partnership with local user groups to help maintain the north/south portion of trail that connects Tawas City to the main east/west Michigan Shore to Shore trail. These efforts have not resulted in support or any sponsors. Field reviews also conclude that there is little to no use of the trail. Alternative III proposes to abandon approximately ten miles of the trail and would be accomplished by removing trail marker signs and restoring trail tread to natural vegetation where soil erosion occurs. The proposal to reroute 2.5 miles of horse trail in the Corsair trail system is also no longer considered since it is a part of the proposed 10 mile segment of abandoned trail.

Expand fish structure maintenance on Silver Creek (Issue 5): Alternative III proposes to expand the work proposed in the Modified Proposed Action to include maintaining an additional mile of existing fish structures. This additional maintenance would begin at the Silver Valley trailhead and is proposed along the south side of Silver Creek to what is locally referred to as the Little Mack Bridge in the Corsair Trail System. Alternative III proposes to maintain approximately two (2) miles of fish structures. Fish structures would be maintained using handwork, brush and logs.

Additional road closures (Issue 2): The ID Team performed an extensive field review on the road system and to address proposed changes to the transportation system within the project area. Alternative III proposes closing 5.3 miles of Maintenance Level 1 and Level 2 roads. Alternative III proposes eight (8) miles of unauthorized road to be changed to Level 1, three (3) miles of unauthorized road to be changed to Level 2, and twelve (12) miles of road changed from Level 2 to Level 1. Refer to the project file for a complete list of roads and associated spreadsheets.

No longer consider designating campsites at Buck Pond (Issue 3): Members of the ID Team considered the dispersed use that was occurring at Buck Pond. Most of the recreational use was found to center around the parking lot on the west end of the pond. ID Team discussion concluded that designating campsites at Buck Pond may actually contribute to increased resource damage near the pond. Designating campsites at the pond is not considered in Alternative III.

No longer consider designating dispersed campsites within the project area: The ID Team discussed the need for adding user-created spurs to the MVUM map in order to legalize access to dispersed campsites. The ID Team concluded that this proposal would not be carried forward in Alternative III mainly because the issue should be considered at the Forest level.

No longer consider designating ATV trail on the snowmobile trail: Placing ATV's on a snowmobile trail may degrade the snowmobile trail experience since ATV use tends to bank trails on curves and create wheel ruts. In addition, Iosco County has opened a number of county roads to ATV traffic which diminishes the need for the Forest Service to designate additional trail for ATV's. This proposal will not be carried forward in Alternative III.

Summary of Comparison of Alternatives

The following table is a summary and comparison of the alternatives. It describes the activities proposed while taking into consideration the objectives of the project.

Table 4: Summary Comparison of Alternatives - Objectives and Activities

	Description	Alternative I (No Action)	Alternative II (Modified Proposed Action)	Alternative III
Objectives	Restore and maintain forest health and diversity	No	Yes	Yes
	Produce a diverse mix of timber products	No	Yes	Yes
	Move the project area towards desired condition in regards to vegetative composition	No	Yes	Yes
	Promote old growth conditions within old growth designation	No	Yes	Yes
	Reduce hazardous fuel loading and restore fire adapted ecosystems	No	Yes	Yes
	Maintain and improve wildlife and fisheries habitat	No	Yes	Yes
	Identify, reduce and treat high priority NNIS infestations	No	Yes	Yes
	Provide quality recreation opportunities to the public	No	Yes	Yes
	Manage the transportation system	No	Yes	Yes

	Description	Alternative I (No Action)	Alternative II (Modified Proposed Action)	Alternative III
Activities	Thin high site oak (acres)	0	452	452
	Shelterwood cut and prescribe burn low site oak	0	1,770	1,770
	Thin red pine	0	683	683
	Thin and apply prescribe fire to red pine	0	484	484
	Promote white pine regeneration	0	These acres are incorporated in high site oak treatment	These acres are incorporated in high site oak treatment
	Install interpretive signs	0	3	3
	Designate campsites at Buck Pond	0	2	0
	Expand Monument Snowmobile parking lot	No	Yes	Yes
	Relocate horse and hiking trail segment	No	Yes	No
	Designate miles of ATV trail	No	Yes	No
	Install and/or move gates	No	Yes	Yes
	Replace toilet buildings at trailheads	No	Yes	Yes
	Repair/replace bridges	No	Yes	Yes
	Designate dispersed campsites	No	Yes	No
	Maintain fisheries interpretive trail	No	Yes	Yes
	Maintain existing fish structures	0	1 mile	2 miles
	Enhancement of wildlife openings	0	6 acres	6 acres
	Treatment of NNIS	0	25	25
	Reduce hazardous fuels on private land (Dropped for all action alternatives)	0	0	0
	Non-merchantable fuels reduction and apply prescribed fire	0	2,273	2,293
Create and maintain fuel breaks	0	361	361	

	Description	Alternative I (No Action)	Alternative II (Modified Proposed Action)	Alternative III
	Apply prescribed fire	0	8,624	9,033
	Designate roads for private property access (Dropped for all action alternatives)	0	Dropped from consideration	Dropped from consideration
	Close or obliterate Level 1 and Level 2 roads	0 miles	7.8 miles	5.3 miles
	Obliterate unauthorized roads	0 miles	14 miles	38 miles
	Repair soil damage	No	Yes	Yes

2.5 Design Criteria

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

Healthy Forest Measures

- 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.

Logging Measures

- Where possible, temporary roads would be located on existing roadbeds to minimize new ground disturbances.
- 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 keep fire away from the base of trees.
- 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.

Recreation Measures

- Skidding of forest products would not be permitted along the tread of system trails. Restrict skidding of forest products directly across the tread of system trails at specified locations that are at least 660 feet apart and would occur directly across the trail, when feasible (Forests' Plan II-12).
- Place warning signs at trail crossings and frequently used travel ways to alert recreation users during timber harvest and prescribed burning operations.

Wildlife Measures

Kirtland's Warbler

- Restrict mechanical equipment, within ¼ mile of occupied habitat from May 1 through August 15, to minimize disturbances to Kirtland's warbler during their breeding season.

Northern Goshawk/Red Shouldered Hawk

The following design criteria 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. Implementation of Standards and guidelines as described are proven to provide for the conservation of these species (USDA Forest Service, 1993).

- Timber harvest would be prohibited within the 30 acre nest protection area. From March 1st through August 31st, timber harvest would be restricted approximately 0.5 mile within the post fledging area (400 acres).
- Prescribed burning within the nest protection area would be 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.
- New sensitive species locations discovered within a project area may result in all actions being delayed or interrupted within the area in consultation with the appropriate district wildlife/fisheries biologist or botanist to provide for the conservation of the species.

Plant Measures

- Known locations of Hill's thistle will be marked and protected from heavy equipment and ground-disturbing activities (temporary roads, landings, skid trails, furrowing, etc.).
- Heavy equipment and ground disturbing activities would be excluded from an area within ten feet of marked Hill's thistle (*Cirsium hillii*), Ram's-head Lady's-slipper (*Cypripedium arietinum*) and other RFSS plant locations, unless specified otherwise by district botanist.

- When working within or adjacent to streamside management zones the State of Michigan's Best Management Practices will be followed.

Visual Measures

- When possible, schedule treatments to appropriately disperse visual impacts spatially in the landscape and over time.
- Where possible, implement treatments during the low visitor use seasons.
- 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.

Cultural Resources 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.

2.6 Monitoring

The NFMA requires National Forests to monitor and evaluate their Forest Plans. Forest Plan monitoring is done 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.

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 and Alternative III are consistent with the direction of the Final Environmental Impact Statement for 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.)

Past, Present and Future Actions This section describes both Federal and non-Federal past, present and future actions within the analysis bounds. It sets the stage for the cumulative effects discussion.

Affected Environment This section briefly describes the current condition 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. Timber

Analysis Bounds

The geographical area for analyzing cumulative effects of vegetative treatments will be the Corsair Project boundary (Refer to Maps in Appendix B for project area boundary). This boundary was created by utilizing existing roads and private property boundaries to best encompass all the proposed actions. The analysis area is approximately 26,730 acres and is located in the southernmost part of the Huron Shores District.

The cumulative effects analysis area (CEAA) includes the proposed vegetation treatments as well as the past, present and future actions. The analysis boundary also consists of similar community types, landforms, and management direction. Relevant past, present and future actions are described in more detailed below.

For the purpose of this analysis, cumulative effects will be bound in time by a twenty year period. This period includes the past ten years of management activities and the reasonably foreseeable future of planned vegetation management for the next ten years. Vegetation management activities beyond ten years are not included in the analysis because evidence of these activities is not apparent. The red pine plantations that were thinned, have filled in most of the canopy gaps, and are now considered to be overstocked. The jack pine that was clearcut has regenerated and may still be occupied by the Kirtland's warbler. Very little oak has been managed in the last ten years and the treatments beyond ten years are not recognizable. Most of the logging damage created more than ten years ago has disappeared, logging slash has decomposed and temporary roads have been reclaimed.

Past, Present and Future Actions

Past Actions

Federal-- The Forest Service has managed lands for wildlife, dispersed and developed recreation, wildfire suppression and prevention, constructed, maintained and closed unclassified roads and trails, created and maintained fuel breaks, and forest openings, reduced hazardous fuels with prescribed burning, landlines have been surveyed and maintained. The removal of firewood from National Forest System lands has been permitted.

Timber management and reforestation activities have occurred in the Corsair Project area. Red pine, jack pine and oak have been treated in the past; Table 5 illustrates the timber sales that have occurred within the cumulative effects boundary for the Corsair Project.

Table 5: Timber Sales Completed in the Past Ten Years Within the CEAA

Timber Sale Name	Vegetative Management Treatment	Year Completed	Acres Treated (approx.)	Volume produced - CCF (approx.)
Sale Name Unavailable	Stand Clearcut	2003	292	4,300
Monument-Curtis Fuelbreak	Commercial Thin	2003	58	600
Sale Name Unavailable	Commercial Thin	2004	126	1,100
Sand Lake Fuels II HFI	Commercial Thin	2005	202	1,800
Plank Road KW	Commercial Thin	2005	310	2,700
Memorable Pine South	Commercial Thin	2006	279	1,329
Memorable Pine South	Stand Clearcut	2007	169	3,370
Trout Pond	Commercial Thin	2007	134	879
Trout Pond	Shelterwood Cut	2007	27	164
Trout Pond	Stand Clearcut	2007	67	1,009
Curtis Pine	Commercial Thin	2008	159	1,350
Curtis Pine	Stand Clearcut	2008	116	1,863
Memorable Pine North	Stand Clearcut	2008	136	1,646
Queen WUI Fuelbreak	Commercial Thin	2010	193	2,639
Jolly Rogers	Salvage Cut	2011	28	204
Pine 8a	Commercial Thin	2012	41	388
Tawas 5 KW	Stand Clearcut	2012	492	3,874
Tawas 5 KW	Shelterwood Cut	2012	115	1,050
Bodacious	Stand Clearcut	2012	351	9,702
Jolly Rogers	Stand Clearcut	2012	288	3,679
Totals			3,583	43,646

Non-Federal--The Iosco County government constructed, maintained, and improved roads. Private individuals have used the cumulative effects analysis areas for recreational purposes – hunting, snowmobiling, ATV riding, etc. Energy, telephone and cable companies constructed and maintained service lines and cleared rights-of-way within the cumulative effects analysis area. Residential and commercial development has occurred. Timber has been harvested on private lands. The public has cut firewood off of National Forest System lands.

Present Actions

Federal-- The Forest Service continues to manage lands for wildlife, dispersed and developed recreation, suppress wildfires, reduced hazardous fuels with prescribed burning, construct, maintain and close roads and trails, maintain fuel breaks and forest openings.

Currently, one timber sale is planned within the cumulative effects area. The Wawa Timber Sale is sold and logging operations could start at any time. This sale would produce approximately 8,861 CCF of timber and is displayed in Table 6.

Table 6: Current Timber Sales, Acres Treated and Volume Produced Within the CEAA

Timber Sale Name	Vegetative Management Treatment	Year Planned	Acres Treated (approx.)	Volume produced – CCF (approx.)
Wawa	Stand Clearcut	2013	402	8,861
Totals			402	8,861

Non-Federal - Iosco County continues to maintain and improve roads in the areas. Private individuals continue to use the cumulative effects analysis areas for recreational purposes – hunting, snowmobiling, ATV riding, etc. No oil and gas well development currently exists within the analysis area. Utility companies are maintaining service lines and rights-of-way. Residential and commercial development is most likely occurring.

Future Actions

Federal - The Forest Service would likely continue to manage for wildlife, recreation, fuel reduction, suppress wildfires, construct, maintain and close roads and trails, maintain fuel breaks and forest openings, reduce hazardous fuels with prescribed burning treatments, lease and authorize the development of mineral resources. There are no future treatments planned for the cumulative effects area in the next ten years. Other vegetation treatments may be implemented in the near future, but the planning process has not started. The Forest Service would likely continue to permit the removal of firewood from National Forest System lands.

Non-Federal - The Iosco County government is likely to continue to maintain and improve roads in the analysis area. Private individuals are likely to continue to use the analysis areas for recreational purposes – hunting, snowmobiling, ATV riding, etc. Non-federal entities are likely to start wildfires in the analysis areas. Private companies are likely to maintain utility corridors within the area. Private landowners are

likely to continue to harvest timber off of their lands. The public is likely to continue to cut firewood off of National Forest System lands.

Affected Environment

The Corsair Project is located within Management Areas 4.2, 4.4 and 7.1. 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. As a result of these management practices, desired species compositions are obtained, old growth conditions are improved and high volumes of timber products are produced.

Present Vegetative Composition of the Project Area

The distribution of the forest communities within Corsair is shown in Figure 2. These stands are composed of approximately 47% long lived conifers that include red pine and white pine, 23% short lived conifers that contains mostly jack pine, and 20% of low site oak that includes northern pin oak, black oak, and white oak. Three (3) % is high site oak that includes northern red oak, black oak, and white oak. The remainder of the project area covers aspen/birch, lowland conifers and lowland hardwoods of which 4% is considered open or non-forested.

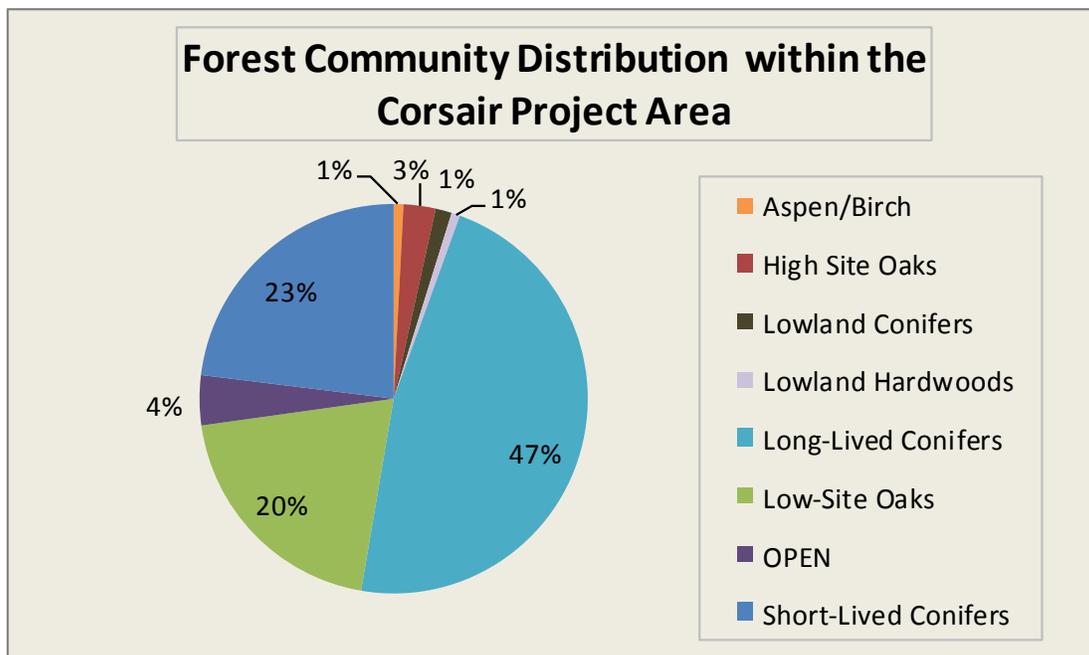


Figure 2: Corsair Forest Composition

This analysis will address three forest communities that are included in the Forests’ Plan (page II-7) vegetation composition objectives; long-lived conifer (red pine), high site oak and low site oak.

Red Pine Conifer [present condition]

Most of this red pine was artificially planted by the Civilian Conservation Corps (CCC) in the 1930s and 1940s. The younger red pine was planted in the early 1960s. Some plantations were planted to reforest

landscapes that had been cleared for farming and grazing. Other areas were planted because of timber harvesting and repeated wildfires.

Some of these plantations are now located within the Forests' designated old growth boundaries. These stands would be treated with a variable density thinning to improve old growth characteristics and help remove the row effect caused by artificial row planting. The remainder of the red pine plantations would be treated using conventional methods stocking to B levels (Figure 3).

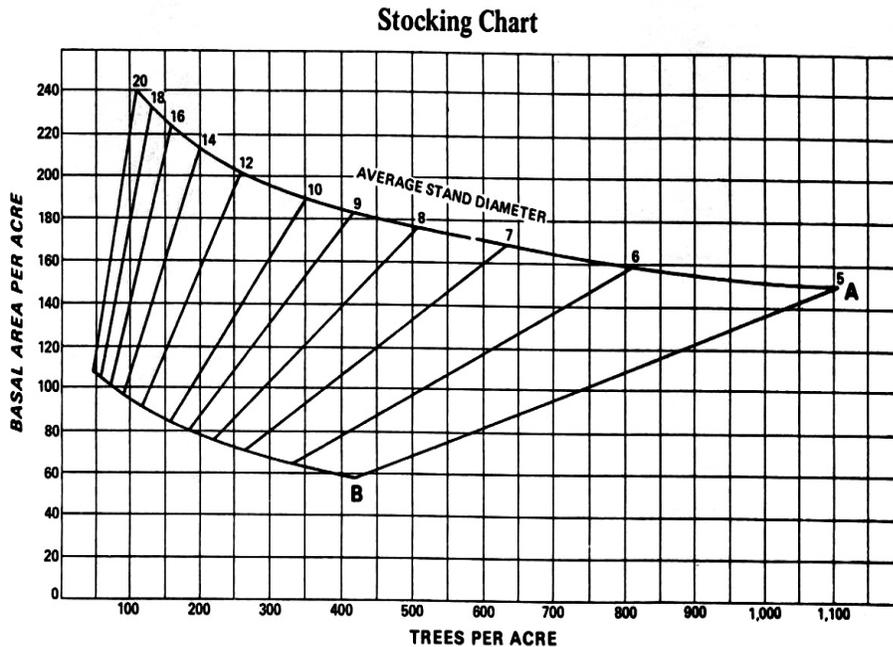


Figure 3: Stocking Chart for Red pine (Gilmore et. al; 2006)

Thinned red pine plantations produce high valued utility poles, pulpwood and veneer. The Forests' Plan (page B-23) recommends that stands with commercial value be thinned at intervals of ten years or more, and that these treatments occur several times throughout the rotation of a red pine stand.

Jack Pine Conifer-Fuelbreak Creation [present condition]

The jack pine forest type occurs throughout the project area and is commonly found on dry coarse sandy soils within glacial outwashes. These sites are considered poor because water and nutrients quickly leach through the soils. Jack pine is well adapted to these conditions and does not have much competition from other species. As jack pine ages and deteriorates, organic matter may accumulate and improve growing conditions. Other species such as red pine, white pine and aspen may become established in the understory and create an uneven-aged stand of mixed pine. The Forests' Plan (page II-17) recommends that jack pine be harvested between 40-60 years and to maintain even-aged stands of jack pine.

Historically, wildfires regenerated thousands of acres of jack pine; however, at the present time, fire suppression efforts largely prevent conditions that favor natural jack pine regeneration. Jack pine has serotinous cones which require heat from fires to open the cones and release the seed. Fire also removes the thick layer of thatch and exposes mineral soils for ideal seed germination. Due to the unpredictability

of wildfires and the increased need for a younger age class of Kirtland's warbler habitat, many of the jack pine stands on the Huron Shores District have been clearcut and planted. The Corsair Project area contains areas of low site jack pine that are identified as essential habitat for the Kirtland's warbler, and are strategically managed for breeding habitat. Shaded fuelbreaks are proposed to be created outside of Kirtland's warbler habitat.

Low Site and High Site Oak [present conditions]

The oak forest types are scattered throughout the Corsair Project area. Low site oaks (LSO) are relatively short-lived and are found on poor sandy soils. LSO includes northern pin oak, black oak and white oak. These stands are rarely homogenous and often have a pine component. Generally short-lived oaks are found on low sites and have a site index less than 55, and long-lived oaks are found on high sites with a site index greater than 55.

High site oak (HSO) are long-lived and consist of northern red, black and white oak, and primarily occur on sandy to loamy soils. These soils have a higher moisture and nutrient holding capacity and can provide better growing conditions. High site oak (HSO) may have pine, aspen, or red maple interspersed throughout the stand. Most of the HSO stands within the project area have a red maple understory but are deficient in oak regeneration. Without the oak component in the understory, these stands may eventually be replaced with a red maple or pine forest type.

The Forests' Plan (page II-17) recommends that the LSO be harvested at a 50-80 year rotation and that HSO be harvested at a 70-120 year rotation. The shelterwood method would most likely be used to regenerate the LSO. However, harvesting methods for HSO may vary depending on the amount of oak regeneration in the understory.

Direct and Indirect Effects of Alternative I

Alternative I would not meet the objective of producing timber products because timber would not be harvested and timber commodities would not be produced. Vegetation management activities would be deferred. The removal of firewood would still be permitted in designated areas.

Alternative I would also not move the project area towards the desired condition set forth in the Forests' Plan, particularly in regards to vegetative composition. Vegetation management would not be implemented and species viability needs would not be met. Selection of Alternative I does not preclude future analysis or implementation of on-going management proposals within the project areas. In the long term, the proposed project could be revisited and another alternative could be implemented.

Red Pine Conifer [Alternative I]

Red pine thinning would be deferred under Alternative I. Within the next 10 years, the red pine would remain unmanaged in the Corsair Project area. The red pine would continue to grow but at much slower rates due to limited growing space in a closed forest canopy.

Low quality, unhealthy trees would remain in the stands. Tree densities would not be lowered and growing space for residual trees would not be created. Red pine in an untreated environment tends to have small crowns with small diameters. Trees with small crowns and small diameters are susceptible to wind throw. Overstocked stands may be stressed and could be vulnerable to insects, disease and fire.

Jack Pine Conifer-Fuelbreak Creation [Alternative I]

The proposed actions would be deferred, fuel breaks would not be created adjacent to private property and biomass would not be removed or treated. The mature jack pine overstory would continue to age, slowly deteriorate, and fall apart creating canopy gaps. The canopy gaps would provide additional opportunities for species regeneration due to increased sunlight and nutrients. With the absence of fire and timber treatments, the proposed jack pine stands may succeed to a more diverse species mix that includes white pine, red pine and oak.

Low Site and High Site Oak [Alternative I]

Alternative I would defer the oak management treatments and the direct and indirect effects are as follows:

- Low Site Oak Regeneration- The short lived oak species would continue to grow but at a slower rate due to the stands age and in some cases tree stocking densities. Many of these oak stands are mature and exhibiting signs of decline. Without removing the decadent trees, oak regeneration would continue to be suppressed. However, as the over mature oak continues to decline and fall apart, understory regeneration would slowly be released.

Deferring treatment would also allow the oak to succeed to a more pine dominated forest type. This could create uneven aged stands, shift species composition and would not meet the Forests' Plan (page B-11) oak management guidelines of even-aged oak.

- High Site Oak Thinning and Timber Stand Improvement (TSI)- The long-lived oak species would continue to grow but at a slower rate due to the stocking densities of the trees in the stand. These stands are considered overstocked according to oak management stocking charts. Overstocked conditions can cause stress to trees and lower their defense mechanisms against insects and disease. Oak regeneration would continue to be suppressed if the mid-story and co-dominate crowns of red maple and oak are not thinned. Alternative 1 would not provide the necessary growing conditions for high site oak regeneration.
- TSI treatments such as prescribe burning and removal of red maple by mechanical means would not take place. The red maple understory and mid-story would continue to grow and oak regeneration would continue to be suppressed.

Direct/Indirect Effects of Alternative II and III

Alternatives II and III are analyzed together because of minimal differences in their effects on timber volume produced, vegetative composition and species viability needs. Alternative III would have slightly less acres treated and less timber volume produced. A white pine release treatment would not occur with Alternative II and Alternative III. After several field visits, it was decided that the white pine was too young to withstand the impacts of a timber harvest. A comparison of these alternatives and their vegetative management strategies, approximate acres treated, and estimated volume produced is listed in

Table 7: Vegetative Mgmt. Strategies, Acres Treated, and Volume Produced for Alternatives II and III

Vegetative Management Treatments Corsair Project	Alternative II and Alternative III	
	Acres Treated (approx.)	Estimated Volume (CCF)
Red Pine Thinning	1,167	10,500
Low Site Oak Restoration	1,770	15,930
High Site Oak Thinning	452	4,068
White Pine release (dropped from consideration)	0	0
Fuelbreak	361	3,900
Total	3,750	34,398

Alternatives II and III would meet the projects objective of producing a diverse mix of timber products because timber would be harvested and commodities would be produced. Both Alternative II and Alternative III move the projects vegetation composition towards the desired condition as set forth in the Forests’ Plan (page II-7). These alternatives include a variety of different management techniques to achieve the desired condition for each forest type proposed in the Corsair Project.

Prescribed burning may have some effect on future timber volume estimates. The unpredictable mortality caused by prescribed burning could potentially affect the areas’ stocking densities. Mortality could reduce the stocking densities below the recommended minimum. Typically an average prescribed fire on the Huron Shores District has less than 4% mortality. Fire can also cause stress to the stand and increase the risk of insects and disease, particularly the *Ips* bark beetle and armillaria root disease.

The scheduled treatments of hazardous fuel removal in red pine plantations and other forest types would not allow natural regeneration to develop. Creating and maintaining fuelbreaks would prevent seedlings and saplings from reaching merchantable size, therefore preventing future opportunities for timber harvest.

There are concerns about using prescribed fire in red pine plantations. In the short term, prescribed burning can char the bark of standing timber. However, most of the red pine is harvested before prescribed burning, without charred bark.

The proposed recreation, fish and wildlife activities, along with non-native invasive species control would have no effect on the volume of timber produced because no vegetative management would occur on these sites.

Cumulative Effects

When considered with past and present timber management activities, Alternative II and III would have a positive cumulative effect by continuing the trend of producing high volumes of timber products. The

proposed forest management alternatives would also move the project towards the desired condition in regards to species composition. Alternatives II and III would continue the trend of vegetation management by thinning red pine, maintaining the oak forest type and creating fuelbreaks to protect lives and forest resources.

Red Pine Conifer [Alternative II and III]

In the short term, Alternative II and Alternative III would provide approximately 10,500 CCF of red pine timber products. In the long term, the red pine thinning in Alternatives II and III would increase the volume for individual trees remaining in the stands. The thinned red pine plantations would allow the remaining trees to achieve optimal growth and produce high quality sawtimber. Therefore, Alternative II and III would have the same effect of increasing the volume for individual trees remaining.

Jack Pine Conifer-Fuelbreak creation [Alternative II and III]

In the short term, Alternative II and Alternative III would create 361 acres of fuelbreaks providing 3,900 CCF of timber products. A minor negative cumulative effect of fuelbreaks is the loss of acres that would be managed for timber. Depending on the frequency of prescribed burning, the remaining trees in the overstory trees would eventually succumb to mortality without any trees in the understory left to replace them.

Low Site and High Site Oak [Alternative II and III]

The modified proposed action and Alternative III would both treat low site and high site oak. Both alternatives would help meet the goal of sustaining the LSO forest type. These treatments include thinning oak, shelterwood cut and timber stand improvement (TSI). The oak treatments would allow for oak regeneration and create favorable growing conditions for the residual trees.

- Low Site Oak Shelterwood Cut- Short-term effects of harvesting 1,170 acres would provide 15,930 CCF of timber products. Both alternatives would regenerate oak by stump sprouting and releasing existing regeneration from the understory. In the long term, this treatment would help balance the age class distribution within the LSO communities by harvesting the mature oak and allowing a younger age class to develop.
- High Site Oak Thinning and TSI- In the short term, both alternatives would thin 452 acres of HSO and would have the effect of providing 4,068 CCF of timber products by removing the mid-story and intermediate red maple. In the long term, successful advanced oak regeneration would meet the requirements to implement a future shelterwood cut and create a younger age class of HSO within the analysis boundary.

3.2 Old Growth

As recognized in the Huron Manistee National Forest FEIS to the Forests' Plan (2006) no true old-growth forests currently exist on the Huron-Manistee National Forests. Thus, the old-growth design is an effort to designate geographic areas where the properties and processes of old-growth ecosystems will be restored over time. Connectivity and large, contiguous blocks were considered to be more important than individual stand considerations when the old-growth design was developed. As such, the design does not necessarily contain the oldest vegetation communities on the Forests, but rather is characterized by a connected network of large tracts of land that will attain old-growth characteristics over time.

Vegetative communities occupying areas within the old-growth design have arisen as a result of various historical land use practices including logging, plantation establishment and agriculture. In addition, factors such as catastrophic fire following the logging era and subsequent decades of fire suppression have significantly influenced today's vegetative composition within the design. Because of this, the emphasis on allowing natural process to occur would result in changes to vegetative communities. Specifically, early successional communities such as aspen, jack pine, openings and old fields, would be lost in favor of, for example, red pine, white pine or northern hardwood forests. However, some ecosystems within the old-growth design, particularly dry sandy outwash plains, support vegetative communities that have evolved with and require fire to establish and maintain. This is evident in the various community types found in the Corsair old growth designation. Therefore use of prescribed fire or mechanical treatments to mimic fire's natural role is allowed by the 2006 Forest Plan in order to expedite restoration of old-growth conditions in human-influenced vegetative communities. Further, the Forest Plan allows for "...periodic use of prescribed fire to maintain closed conifer and oak forests, while preventing the excessive buildup of fuel loads."

Although natural processes would predominate within designated old-growth areas, some timber harvesting and mechanical treatments are permissible within the design "... to restore more natural-appearing forest conditions by reducing the unnatural row effect, producing larger diameter trees, and creating or improving horizontal and vertical structural diversity."

Over the long term, management activities involving timber harvesting, if carefully executed, will reduce unnatural appearing row effects, expedite the attainment of natural or natural appearing vegetative communities that contribute significantly to ecological diversity, and provide a condition where natural processes can better function to maintain or enhance this diversity.

One of the objectives of the Corsair project is to promote old growth conditions within designated old growth areas. This section will describe the current old growth conditions in the project areas and the expected changes in those conditions based upon implementation of the proposed alternatives in moving the project forward in attainment of that objective.

Analysis Bounds

The geographical area for analyzing cumulative effects for the Corsair old growth will be the designated old growth boundaries within the project area. The old growth analysis area is approximately 4,563 acres and is illustrated in Figure 4.

Past, Present, and Future Actions

Within this area, vegetation, fuels and wildlife management activities have occurred post old growth designations. These activities include 279 acres of red pine plantation thinning, 169 acres of barrens creation, nine acres of fuelbreak creation, 20 acres of wildlife habitat seeding and planting, and 896 acres of prescribed burning for hazardous fuel reduction, barrens creation and wildlife opening maintenance. The Forest Service has also maintained and closed unclassified roads, suppressed wildfires, and maintained recreation facilities and trails.

Currently, the Corsair Project is proposing treatments in old growth that include: thinning 571 acres of red pine plantations, prescribe burning 2,401 acres for fuel reduction, 332 acres of oak restoration and

creating a 12 acre fuelbreak. Fish structures along Silver Creek would be maintained and four bridges within the Corsair/Silver valley trail system would be replaced or repaired. The vault toilets at Corsair, Wrights Lake and Silver valley trailheads would be replaced and NNIS treatments would occur at several locations throughout the old growth.

Foreseeable future activities in the old growth analysis area include maintenance of roads, continued suppression of wildfires, and maintenance of trails and recreation facilities.

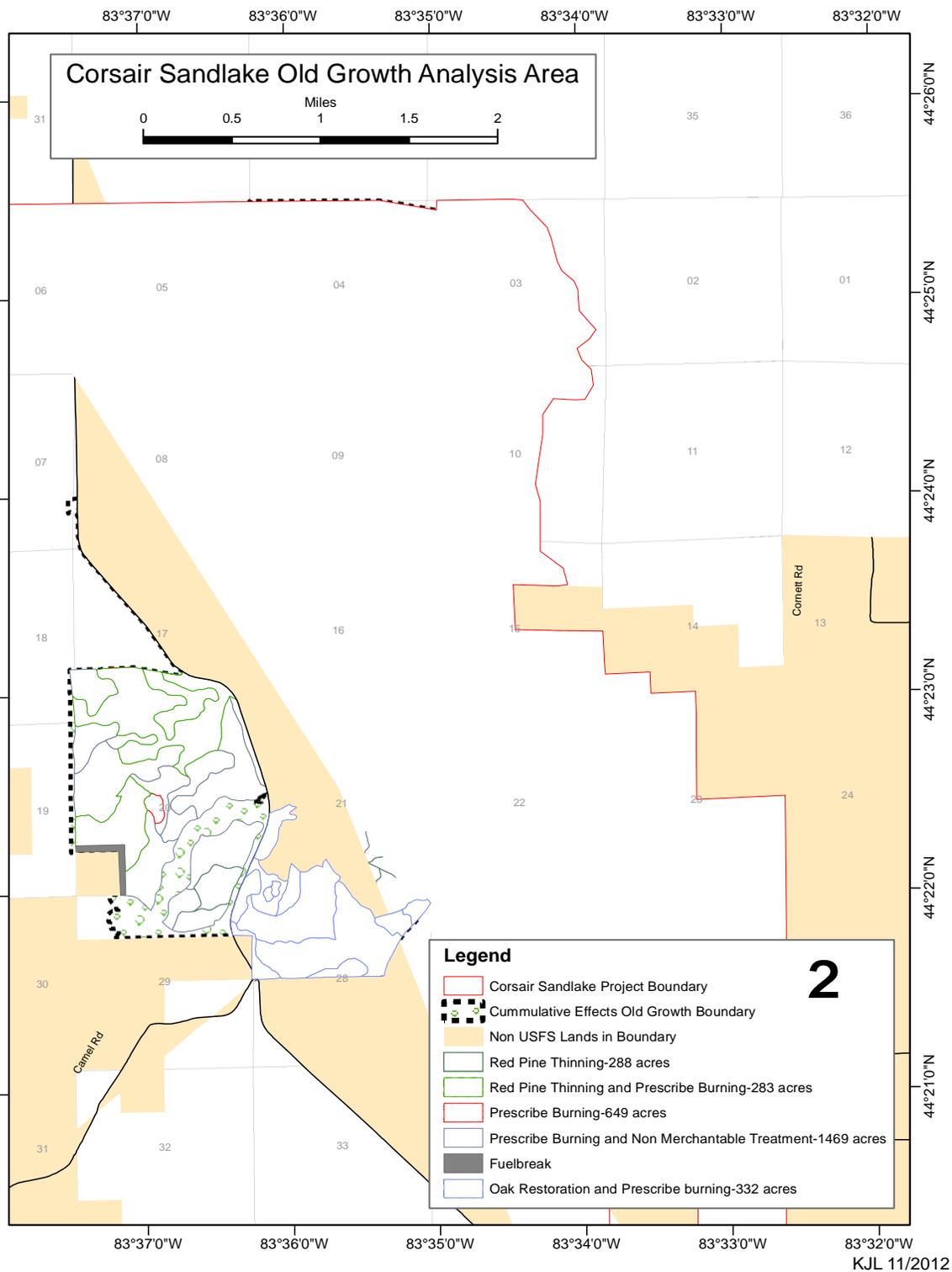


Figure 4: Designated Old Growth within the Corsair Project Area

Affected Environment

Most of the old growth on the Forest including the project area old growth is currently second growth forest, and is in the early to mid-successional stages rather than late successional or the old growth stage. These successional stages include stand initiation, stem exclusion, understory reintroduction, transitional old growth, and finally old growth (Oliver & Larson, 1996). Some ecologists consider a forest to have reached old growth or the final stage of succession only when a stand consists of climax species. A climax species is one where the forest community is stable and does not succeed to another forest type without a disturbance. The climax species for most of the projects old growth are long-lived trees such as white and red pine. Although the majority of this old growth is not considered to be currently in the old growth stage, the potential exists for these stands to become old growth over time. This could take decades or even centuries, depending on forest type, disturbance, and current successional pathways.

The old growth forest communities found within the project area are shown in Figure 4. These old growth stands include approximately 50% of long-lived conifers that include red pine and white pine, 23% of short-lived conifers that contains mostly jack pine, and 20% of the old growth consists of low site oak that includes northern pin oak, black oak, and white oak. This figure may be misrepresentative because a portion of the old growth low site oak stands also have a component of red pine, which in some cases can be the plurality of the stand. According to the Final Environmental Impact Statement (page A-7), if these red pine-oak stands have a site index < 55, they are classified as a low site oak forest community. The remainder of old growth consists of 3% lowland conifers which are comprised of northern white cedar, spruce, and fir. Four (4) % is considered nonforested or open. Less than 1% of area

has aspen birch, lowland hardwoods which are comprised of northern white cedar, and high-site oak that includes northern red oak, black oak, and white oak.

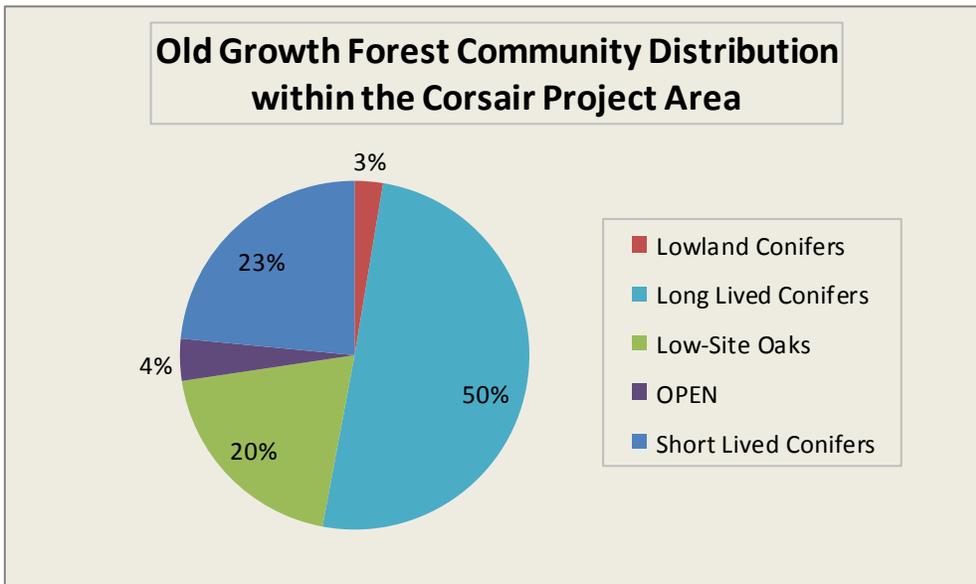


Figure 5: Old Growth Composition within Corsair

A large portion of the designated old growth is plantation red pine. Most of this red pine was also planted by the Civilian Conservation Corps (CCC) in the 1930's and 1940's. The Forests' Plan states that a maximum of four restoration efforts will be allowed to create old growth conditions. Rotation treatments may include, but are not limited to, prescribed fire and mechanical treatments. Portions of red pine plantations have already been mechanically treated and the planted rows are no longer apparent. The

proposed red pine treatments within Corsair old growth that still show evidence of rows would be treated with a variable density thinning to improve old growth characteristics.

Direct and Indirect Effects of Alternative I

Because no activities are proposed in this alternative, old growth would not experience a disturbance of either prescribed fire or mechanical treatments. Successional stages and understory species composition would remain unaltered. Provided that natural fire events could be excluded over the next several decades the old growth would follow its current successional pathway of becoming a long-lived mixed white pine red pine forest type. The existing white pine regeneration would grow into mature trees and would not be killed or set back by episodic natural fire events and thus fire tolerant short lived species that would have naturally occurred within the old growth during these intervallic periods of time would slowly decline. The exclusion of fire both natural and prescribed would help the existing second growth forests to move toward a climax forest and meet the old growth objective of a long lived forest type.

The red pine plantations proposed for mechanical thinning would continue to grow in height but tree diameters and crowns would develop at much slower rates because these trees have limited growing space in a closed forest canopy. This alternative would delay transitioning old growth red pine plantations to a more natural state. These plantations would continue to have the row appearance without any structural diversity. A fuel break within a red pine plantation would not be created and this area would continue toward attaining old growth conditions.

In the long term (decades), the less vigorous trees would become suppressed during the stem exclusion stage, creating snags and dead woody debris. In places where the mature red pine trees die, canopy gaps would be created, releasing understory white pines and providing the opportunity for recruitment of less shade tolerant species.

The proposed oak treatment within a jack pine plantation would not occur. The jack pine would continue to age, slowly deteriorate, and fall apart creating canopy gaps. The canopy gaps would provide additional opportunities for species regeneration due to increased sunlight and nutrients. With the absence of fire and timber treatments, the proposed jack pine stands would likely succeed to a more diverse species mix that includes white pine, red pine and oak.

Direct and Indirect Effects of Alternative II and Alternative III

Alternatives II and III will be analyzed together because treatment acres are essentially the same. Alternative II proposes fewer prescribed burn acres in the red pine thinning treatments.

Red Pine Conifer

The proposed variable density thinning treatments would help achieve the objective of promoting old growth characteristics at a faster rate than Alternative I by removing the row effect with different degrees of thinning throughout the plantation. Portions of the stand would be thinned heavily, other portions would be thinned moderately, and some parts of the stand would not be thinned at all. In addition to thinning, large openings would be created with aggregate retention of trees. Down woody material and snags would also be created to perpetuate accumulation of dead woody material.

Short-term effects include the removal of low quality, diseased, or trees that interfere with the growth of higher quality trees. Removing these trees would lower the stocking density and provide more growing

space for the residual trees. Additional growing space would allow the remaining trees to develop larger crowns and diameters. Reducing stocking density may also reduce competition for sunlight, nutrients and water. A thinned stand reduces stress and helps prevent damage from insects and disease and fire.

Long-term effects would be an increase of volume for individual trees remaining in the stand. The unthinned areas would put on very little diameter growth and could experience stress in a crowded environment. However, if the stressed trees die, natural canopy gaps would be created. Mechanically thinned stands can reduce the threat of wildfires when plantation stocking densities are lowered to be more representative of a natural stand.

Existing regeneration would be released in the thinned areas and the development of structural diversity would be initiated. Species diversity would increase, as additional species become established in the canopy gaps.

Low Site Oak

Oak restoration is proposed in a jack pine plantation that has grown out of Kirtland's Warbler habitat. Prior to the area being planted to jack pine it was a red pine plantation and according to Albert and Comers interpretation of the 1816-1856 General Land Office surveys this area was historically pine barrens (Albert and Comer, 2008). The jack pine was planted prior to old growth designation. The modified proposed action does not mechanically treat this stand, as no oak is present to harvest.

This area would be prescribed burned to accelerate the successional process from short lived species to long lived species. Fire would help break up the canopy structure, creating openings and preparing a seed bed for other species recruitment.

Prescribed fire is also proposed in Alternative II and III to treat hazardous fuels in old growth. Prescribed fire is not considered a natural process according to the Forests' Plan definition of natural processes but is allowed in old growth designations to meet old growth conditions and reduce high fuel hazards such as those found in the Corsair old growth. Typically, the red pine litter layer stabilizes after a few years: therefore red pine stands may not have to be burned for fuel reduction (Van Wagner, 1970). If these stands are burned for fuel reduction, they may have to be burned frequently to maintain the effects of the first burn. Fire would reduce litter layer, small woody debris, and ladder fuels (understory conifers) which could prevent a crown fire. Prescribed burning would have little effect on large dead woody material. Burning would likely cause unpredicted mortality in the overstory, but old growth is not managed for timber products, and these areas are not required to meet minimum stocking guidelines.



Figure 6: Old Growth Fire Disturbance North of Shellenbarger Road



Figure 7: Old Growth without Disturbance South side of Shellenbarger Road

Prescribed burning has the potential to cause adverse effects on old growth species composition. Fire tends to suppress young conifers and prevent them from developing into mature trees. Figure 6 illustrates a red pine plantation with a robust understory of oak, after moderate to high intensity prescribed burning was accomplished in 2010 and 2012 for barrens creation. The understory species composition was similar to that in Figure 7 before the burning was implemented. The understory species composition in Figure 6 has shifted from long lived pines to short lived oaks. Fire severely impacts young pines because pine does not regenerate after the stem has been killed whereas oak is more fire-adapted and would have hardy stump sprouting. Repeated burning would eliminate the portions of the conifer component from the understory. Once white pine becomes 80 years old it can tolerate the heat from fire (McRae, Lynham, and Frech, 1994) and a more historic fire interval may be restored

Currently, approximately one half of the old growth has established white and red pine regeneration. The white pine that has germinated in the understory took 30-50 years to develop, due to infrequent mature white pines that produce seed and aggressive fire suppression. The existing regeneration grew from seed that was transported by wind and wildlife.

The objective of managing fuel loads would adversely affect portions of long lived conifer regeneration but not old growth species composition since these species would persist in the overstory and in pockets left unburned by low intensity prescribed fire. Old growth objectives of long lived species and structural diversity along with accumulations of dead woody debris would not be achieved in this entry but will likely be achieved over several decades.

Cumulative Effects

In the short term, the proposed activities of prescribe burning (2,401 acres) and fuelbreak creation (12 acres) would disturb 2,413 acres of old growth. Combined with the post old growth designation past activities of prescribe burning (896 acres) and fuelbreak creation (9 acres), 3,291 acres or 75% of the old growth within the project area would be disturbed. These activities along with fire suppression would have adverse cumulative effects, by not allowing natural processes to take place in this designated old growth ecosystem.

3.3 Recreation

Analysis Bounds

The spatial bounds for analysis include the three Management Areas (MA's) that overlap the project area boundaries (refer to the project record for Recreation Cumulative Effects Analysis Area). These geographic bounds were chosen because they reflect a contiguous area of like management, and similar Forests' Plan standards and guidelines.

The temporal bounds of analysis will be defined as currently (2013) to ten years into the future (2023). Ten years was chosen as the future bounds because recreation trends and types change approximately every decade. Ten years is also the planning lifespan of this document.

Past, Present, and Future Actions

Picnicking at the Corsair trailhead has become less and less popular in recent years. In 2011, the Corsair trailhead water well was removed from the picnic area. No public comments were received from picnic area or trail users with regards to removing the well. This action did not cause an adverse impact to recreationists. One cabin owner that had used the well for summer drinking water complained of the loss of water access. In 2013, several of the picnic tables and barbecue grills are planned to be removed from the picnic area and placed elsewhere on the forest where picnicking does still occur. During the fall of 2012, portions of Monument Road, the main road within the heart of the project area, were resurfaced. Monument Row is a row of trees that were planted alongside Monument Road in the 1930's by Tawas Area School students. The Row has historical as well as aesthetic importance. Several of the red pine trees had to be removed as a consequence of Monument Road resurfacing.

Two gates were installed in 2012 just off from Plank Road to limit seasonal traffic along the snowmobile trail. Gates were installed to abate resource damage resulting from an illegal ATV hill climb adjacent to the snowmobile trail. The hill climb has been a place of repeated restoration and then damage. The first attempt at hill restoration occurred in the 1980's and used earthen berms, and downed trees however illegal traffic continued. In 2012 damage to the hill was repaired again this time using guardrail and permanent waterbar structures, along with the addition of seasonal gates to limit access to the hill. Placing gates on the snowmobile trail is a trend likely to continue into the future where resource damage occurs.

There are 58 miles of unauthorized roads in the project area. These roads cause resource damage, are not managed and are obliterated when found and when funding becomes available. Rehabilitating unclassified roads would continue into the future.

Erosion restoration projects along the Corsair Trail system are ongoing. Various partners and volunteers assist forest service employees with mulching, seeding, and placement of waterbars along the Corsair Trail system each year. This trend would likely continue into the future.

Affected Environment

ROS

The Forest Service uses a classification system called the Recreation Opportunity Spectrum (ROS) to help describe differences in recreation settings, opportunities and experiences and to help guide management

activities [ROS (Forests’ Plan EIS, Chapter III, pages 271-275)]. Recreation settings vary from primitive—where there is little evidence of other people, and more opportunities for self-reliance—to more developed rural areas which offer more facilities, and better access and opportunities to interact with other recreationists. The ROS is used as a tool to describe the existing array of recreation settings and activities expected by recreation users.

The Corsair Project falls within two ROS; 1) Roded Natural and, 2) Rural. The following table was adapted from the Forests’ Plan discussion on ROS and displays relevant settings and activities for the ROS classes found within the Corsair project area.

Table 8: ROS Class, Setting and Activities of the Corsair Project Area

ROS Class	Setting	Activities and Facilities
Roded Natural	<ul style="list-style-type: none"> • Opportunity to affiliate with other users in developed sites but with some chance for privacy. Self-reliance on outdoor skill of only moderate importance. Little challenge and risk. • Mostly naturally-appearing environment as viewed from trails and roads • Some obvious on-site controls of users. • Access and travel is conventional • Vegetative alterations done to maintain desired visual and recreational character 	<ul style="list-style-type: none"> • Access for people with disabilities is of only “moderate” challenge. • Rustic recreation facilities that use native materials (synthetic materials should not be evident) • Interpretation through simple wayside exhibits.
Rural	<ul style="list-style-type: none"> • Opportunity to observe and affiliate with other users is important as is convenience of facilities. Self-reliance of little importance. Little challenge and risk. • Natural environment is culturally modified • Interaction between users is high • Obvious and prevalent on-site controls • Access and travel facilities are intensified motorized use. 	<ul style="list-style-type: none"> • Access for people with disabilities is “easy” and meets standards. • Some facilities designed primarily for user comfort. • Synthetic materials permitted and complex designs permitted. • Interpretive facilities may be staffed.

Quality recreation experiences are broadly defined by forest visitor’s themselves and the activities they prefer to participate in. The National Visitor Use Monitoring (NVUM) is a nationwide Forest Service program that provides information on what activities recreationists prefer to participate in and their perception of their experience. The results of the Huron-Manistee National Forests last NVUM survey effort in 2007 revealed the Huron-Manistee receives approximately four million recreation visits a year. The most popular recreation activities on the forests are; viewing natural features, viewing wildlife, hunting, fishing, hiking and driving for pleasure. The Roded Natural ROS setting encompasses most of the project area and provides abundant opportunities for the Forests’ most popular activities.

The number of recreationists within the Corsair project area is considered average compared to other areas on the Huron National Forest. The one exception is the 7.1 MA (Concentrated Recreation) area located in the central portion of the project planning area. This is the only designated MA 7.1 occurring on the Huron-Manistee National Forests and this MA was purposely created to provide management direction specifically for the Corsair Trail System. The 28 mile Corsair Trail System was developed in partnership with the Corsair Trail Council, the Tawas Areas Chamber of Commerce and other to provide a high quality, groomed opportunity for cross country skiing. The primary objective of MA 7.1 is to provide a high density non-motorized recreation experience (Forests' Plan page III-7.1-2). The Corsair Trail system exhibits higher numbers of winter recreationists participating in non-motorized recreation use as compared to the surrounding MA's in the project area. MA 7.1 corresponds with the Roded Natural ROS setting, it is not considered semi-primitive or non-motorized.

Dispersed Recreation

Dispersed recreation is defined as those activities occurring outside of developed camping or concessionaire-operated facilities. Dispersed recreation activities are diverse and include activities such as driving for pleasure, hiking, hunting, fishing, boating, horseback riding and camping.

Dispersed recreation occurs at specific sites as well as across the project area. Dispersed recreation sites are small user-created areas in the general forest where evidence of activity occurs. Dispersed sites are not formally maintained by the Forest Service. They receive use on an intermittent or seasonal basis. Examples of dispersed sites include a camp spot or a fishing trail accessing a stream. There are an average number of dispersed sites within the project area with a higher number by Buck Pond and near the community of Sand Lake.

The Corsair project area is adjacent to the communities of Sand Lake (population 504) and National City (population 1,776). These two communities surround a chain of seven lakes that have a high number of vacation and second homes surrounding them. This demographic tends to bring both local and non-local user groups to the project area for dispersed recreation.

Motorized recreation is a very popular dispersed activity across the forests as well. Driving for pleasure is a more popular activity across the project area than it is across other general forest areas because of the closeness of the communities of Hale, Sand Lake and National City. There are 10 miles of ATV/Snowmobile Trail and 19 miles of snowmobile trail. There are 124 miles of road available for the public to drive within the project area. Approximately 99 of the 124 miles are Forest roads available for the public to drive and explore the forest.

Hunting is reported as one of the top recreational activities on the Huron-Manistee National Forest (Social and Economic Assessment for the Michigan National Forests, 2006, NVUM 2007). The number of hunters in the Corsair project area would be somewhat higher than in other areas of the forest because of its location to the communities of Hale, Sand Lake and National City. Hunting seasons start with squirrel, grouse and woodcock in mid-September. In October, November and December, local and non-local white-tailed deer hunters dominate. Wild turkey hunting is mainly a spring activity. Angling is popular on Silver Creek and Buck pond. White-tailed deer hunting is the most popular type of hunting.

ATV use is moderate across the project area. There are 10 miles of designated All-Terrain Vehicles (ATV) trails within the project area that provide access to and from the forest and communities. Local township's ordinances allow ATV's to operate on the shoulders of many of the local county roads. Approximately eight miles of county road near the Sand Lake community have been designated by township ordinance as open to ATV use.

Developed Recreation and Recreation Facilities

A recreation facility is a discrete area on a Forest that provides recreation opportunities, receives recreational use, and requires a management investment to operate and/or maintain to a standard under the direction of the district administrative unit (NRM website:

<http://fsweb.nrm.fs.fed.us/support/help/recsites/>). Recreation facilities range in development from relatively undeveloped, to concentrations of facilities and services. They are tracked and catalogued using the national INFRA database.

Bridges and buildings are considered recreation facilities. Most of the building and bridge facilities in the project area were constructed between 1930 and 1980. These include the vault toilets at Corsair, Wright's Lake and Silver Valley, and trail bridges associated with the Corsair trail system. Unfortunately many of them have now become unsafe, outdated, and have deteriorated because of deferred maintenance. Deferred maintenance is maintenance that was not performed when it should have been or when it was scheduled. These facilities now need major investment in order to bring them back up to standard. Recommendations in the Huron-Manistee Recreation Facility Analysis (2008) were that the Corsair toilets needed replacement because they did not meet the Americans with Disabilities Act requirements and were not accessible. Although the recommendation was made in 2008, these toilets still need replacing.

The four bridges in Corsair trail system were inspected by the Forests' Certified Bridge inspector in 2013.



Three of four bridges were found to be in fair to good condition with various repairs needed. The repairs needed range from deteriorating rails and posts (see Figure 8), to rotten pilings and the need to remove debris from underneath to restore free flow of the stream. One bridge, the Silver Creek East Bridge, was found to be in critical condition. The Certified Bridge inspector advised that the bridge is severely compromised in nature. This bridge needs to be replaced as soon as possible and is only capable of supporting foot traffic

Figure 8: Bridge over Silver Creek in Corsair Trail system showing repair needs.

at this time. Please refer to the engineering bridge report in the project file for specifics. Other developed recreation includes the three developed trailheads within the Corsair trail system; 1) the Corsair, 2) Silver

Valley and 3) Wrights Lake trailheads. These trailheads are used throughout the year with periodic peaks in winter when the area receives adequate snowfall for cross country skiing.

All three trailheads provide informational bulletin boards, picnic tables, and vault toilets maintained by Forest Service staff. The Corsair trailhead is used most by the public. The Corsair trailhead is the only site within the project area that charges a recreation day-use fee of five dollars per day. Due to the support of the Corsair Trail Council, a non-profit trail support group, the fees are not charged between November 1 and March 31 annually.

The Monument Road Snowmobile Trail parking lot can currently hold approximately ten cars and receives moderate to high use in the winter depending on snowfall amounts. Snowmobile trail #645 leaves from the parking lot and travels northwest to connect with trail #649 then onto the main east west trail #6. Trail #645 also picks up local Sand Lake traffic by traveling west for approximately seven miles onto Old State Road. There are 29 miles of designated snowmobile trails in the project area. In addition, snowmobiles are allowed to operate on un-plowed shoulders of county roads which in turn, increase the number of miles of snowmobiling opportunities. (Note: there is a Forest Supervisor's Closure Order that has closed the use of un-plowed forest roads to snowmobiles).

Approximately 3 miles of the Michigan Shore to Shore horse and hiking trail traverse the project area. The majority of the use of this trail is by horseback riders. The Forest Service maintains a partnership with the Michigan Trail Riders Association (MTRA) and they help maintain segments of the trail. Yearly maintenance includes brushing, cutting downed trees and refreshing trail markers. MTRA conducts several riding events per year that travel through the north portion of the project area. During events, groups of up to 80 riders and horses travel across the area in a several day period. Approximately 10 miles of horse trail was abandoned by the Michigan Trail Riders as a sponsored trail. The forest has maintained several short term partnerships for this trail segment that leaves the main east/west trail to route towards the Tawas. This 10 mile segment of horse trail is used very little and during this project review forest staff found most of the trail closed due to the lack of use and maintenance.

There are 27 miles of cross country/hiking trails in the Corsair trail system. The Corsair trail system includes the trails within Corsair, Silver Valley and Wright's Lake. Cross country ski trails are groomed in the winter courtesy of the partnership between the Forest Service and the Corsair Trail Council. The trail council also assists with maintenance projects throughout the year such as brushing, signing, and erosion abatement. There is a warming cabin located at the Corsair Trailhead that was built by the Forest Service and the Corsair Trails Council. The warming cabin is open to cross country skiers on certain weekends in the winter. This trail complex is limited to cross country skiers during the groomed snow season and hikers during the remaining seasons.

Recreation Events:

Annual special use recreation events in the project area include two Tawas High School cross country running meets held on the trails at Silver Valley each year. These events draw approximately 75-100 participants and audience. The local chapter of National City, Michigan Boy Scouts hosts two camping events at Silver Valley twice per summer. This event draws approximately 50 participants for a two week span. The Three Disciplines triathlon is held annually in August. The running portion of the race follows

Monument road north to River Road. This event draws approximately 300 participants (data on events extracted from the Forest Service INFRA database).

Direct and Indirect Effects of Alternative 1 (No Action)

ROS:

Recreationists choose settings and activities to create desired experiences. The Forests' Plan has designated this ROS setting based upon current condition at the time the plan was written. Since there would be no change or management of the landscape under the No Action Alternative, there would be no change in ROS in the short term.

Over the long term however, deferring activities would shift the ROS settings. This is because ROS settings are not only influenced by management activities on National Forest lands but are also influenced by population movement and increasing development on private land around National Forest lands. Over the long term (decades) the ROS setting would shift towards Rural. The shift to Rural would occur more slowly under the No Action Alternative than it would under the action alternatives.

Dispersed Recreation:

There would be no direct effects in dispersed recreation opportunities as a result of implementing the No Action alternative. Over the longer term (5-10 years), indirect effects would be that hunting opportunities would shift across the landscape and tend towards later successional species. Those hunters preferring early successional species would need to look outside of the project area where harvest activities were manipulating vegetation to earlier stages of succession.

The No Action Alternative would have no direct or indirect effects to driving for pleasure. The public would have the same number of miles of open legal road to drive as they do now. The Forest Service practice of closing/obliterating unclassified roads would still occur to protect and abate resource damage.

Developed Recreation and Recreation Facilities

Managed recreation and associated facilities would remain unchanged however only in the short term. Several of the bridges within the Corsair Trail system are approaching their usable lifespan. The Silver Creek East Bridge is currently in critical condition. Under the No Action Alternative, it would remain so and continue to cause safety concerns. Within approximately four years the three remaining bridges would degrade even further causing safety concerns for administrative vehicle crossings (ski groomers and Forest Service vehicles). Rotting timbers and pilings would need to be replaced on a case by case basis. In another five to seven years, entire bridges would need to be replaced.

No ATV trail would be designated on Forest Service land. The Forest Service has no jurisdiction on what county roads are open to ATV's therefore, operation alongside county roads would continue.

Not expanding the Monument snowmobile trail parking lot would directly impact users on high use days by not providing adequate parking. Indirect impacts of inadequate parking would lead visitors to park elsewhere. An indirect effect would be that it would maintain the current use of the snowmobile trail in the project area.

Toilets would not be replaced at the Corsair trailheads, and facilities would continue to remain non ABA compliant. In the long-term noncompliance with ABA would continue until facilities are closed, removed

or replaced. There would be no changes to the Monument Road Parking lot, the Shore to Shore Horse and Hiking Trail or the Corsair Trail system. Maintenance would continue only when needed.

This alternative would not meet the purpose and need of the project. It would not move the project area forward to fulfill the objective of providing quality recreation opportunities to the public. It does not take into account managing recreation uses to enhance user experiences or providing upgraded facilities.

Recreation Events

The No Action Alternative is not expected to create any direct or indirect effects to special use recreation events in the area.

Cumulative Effects of Alternative I (No Action)

Timber would be deferred on Federal land eventually leading to later successional species and age classes. Late succession would not favor hunting of the more popular early successional species such as white tailed deer, turkey, and grouse. Landowners would continue to manage private land tracts at the current rate. Harvested private land tracts immediately adjacent to Federal land may benefit Federal land only slightly by causing edge habitat for early successional species.

Visuals would continue to degrade adjacent to the Corsair Trail system as downed woody debris would accumulate. Visuals in Old Growth would continue to exhibit row effect until a natural disturbance occurred.

Besides what the Forest Service offers for recreation facilities, the project area has one local picnic park located in National City adjacent to the fire hall and the state has one boat launch. Under the No Action alternative, recreation facilities within the project area may decline without Forest Service participation.

Direct and Indirect Effects of Alternative II (Modified Proposed Action):

ROS:

In the short term (3-5 years), Alternative II would maintain the present Recreation Opportunity Spectrum classes. Opportunities for recreation users to affiliate with other users in developed sites would continue. Chances for privacy in dispersed sites would continue as well.

Proposed activities may have an effect on what recreationists choose to participate in and when. Timber harvest and prescribed burning would have the potential to temporarily reduce the feeling of seclusion in the short term. In addition, sense of place may be upset for recreationists preferring a quieter setting in the short term. Harvested areas would look manipulated rather than naturally-appearing, especially along roads and trails. Vegetative alterations would be done to maintain desired recreational characteristics. For example, fuel breaks would have scalloped edges alongside roads and trails.

Over the long term (10+ years) as management took place on National Forest lands and on surrounding private lands alike, the ROS classes would shift more quickly towards a Rural setting than it would in the No Action Alternative. Private landowner demand for an improved road system would facilitate this shift.

Dispersed Recreation:

In the immediate short term while timber harvesting and prescribed burning took place, hunters and forest users may be displaced from traditionally used areas. Treated stands would almost immediately present

new ground vegetation and as a result, increasing 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, rabbit and ruffed grouse. The increase in nutrients in the soil after a prescribed burn would increase blueberry production and picking opportunities in the short term.

Pleasure drivers in late autumn and early spring may encounter harvest equipment and trucks in active logging areas. This may deter some drivers from those areas until harvest is complete, while others may be curious about the activity. During the summer when harvest is not taking place, drivers would encounter 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.

During initial scoping, there was a proposal to designate several campsites around Buck Pond (Issue 3). Direct impacts of this proposal would be that vegetation around the campsites would become trampled. Visitors to the pond would increase as it was discovered. User created trails around the pond would increase. Campfire wood gathering near the designated sites would clear the underbrush, branches, and smaller trees in the adjacent red pine stands. In the longer term, more people would visit Buck Pond. Indirect effects of an increase in visitors may be increases in litter, traffic, and an increased potential for wildfire.

Direct effects of prescribed fire treatments would be that it would produce heat, smoke and ash. This would be unappealing to forest visitors in the immediate term. Signage would be placed along trails and roads to warn visitors of the burn. Indirect effects of prescribed burning would result in less understory vegetation. This may displace hunters who prefer to hunt species that prefer thicker understory such as rabbit or ruffed grouse.

There are a total of 58 miles of unauthorized roads within the project area. Alternative II would reduce the number by 14 miles. Closing/obliterating Level 1 and unauthorized roads would have no effect on pleasure drivers since these roads are already closed to public vehicle traffic. Closing 14 miles of the 58 miles of unauthorized roads leaves over 75% of them still available for hiking and walking. Obliterating Level 1 and unauthorized roads therefore may affect those hikers and hunters who prefer to walk linear features rather than cross country when accessing the forest on foot.

Corsair project area has a high number of miles of open roads within its boundaries (116.5 miles). Alternative II proposes to close 7.1 miles leading to a 7% reduction in all open roads. Closing/obliterating open roads would result in the direct effect of 7% fewer roads being available for driving pleasure. Those who use the specific roads slated for closure may feel there are fewer opportunities for vehicle access to the forest. An indirect effect of closing roads would be larger tracts of undisturbed land for other recreational pursuits.

Developed Recreation

Investing in recreation resources places an importance on recreation as a legitimate use of Forest Service lands. It also communicates to the public that the Forest Service cares for its recreation resources and visitors who use them. Maintained facilities encourage positive attitudes from recreationists towards managers as well and an often time manifests itself in a stronger sense of place.

Direct impacts of expanding the Monument snowmobile trail parking lot by ten spaces would be that the parking lot would be used by more visitors. An indirect effect would be that there may be an increase the number users of that segment of trail. Providing a larger parking area would provide a safer loading and unloading space both in the short and long term.

Horseback riders occasionally use the Monument Road parking lot in summertime. Expanding the lot would provide increased loading and unloading space for horse trailers and trucks. An indirect effect may be that there would be an increase in the number of horse riders on the trails and roads in the project area.

All trail users in the short term (snowmobile, Corsair trail system, and horse trail) would be aware of harvesting and chipping equipment adjacent to the trail system. Some of the trails would be crossed by this equipment and since non-merchantable harvest activities may occur throughout the year, there is the strong possibility that trail users would encounter equipment crossing the trail. This would disrupt trail users experience and produce noise in the short term. Prescribed fire adjacent to trails would be unappealing to trail users in the short term due to the direct effects of smoke, equipment and fire personnel.

Harvesting adjacent to the snowmobile trail would make the trail appear larger and increase site distances. With increased site distance, riders may increase their speed or drive off trail. This would occur until new vegetation established itself in 5-10 years.

A direct effect of relocating 2.5 miles of Michigan Shore to Shore trail would be fewer mixed users on the same trail system. Separating trail user groups would minimize the chance for user conflict. An indirect effect would be less erosion on the ski trails.

Designating ATV trail would give 19 additional riding miles within the Sand Lake communities, creating a circle riding opportunity that is not readily available in Iosco County. ATV route designation would enable the year-round use of the Monument Road parking lot created for snowmobile use.

Designating ATV trail route would put lower speed traffic on its own trail and this would provide a higher degree of safety. Designative ATV trail using existing snowmobile trail route would place ATV mixed use on approximately eight miles of forest road creating a higher degree of risk of vehicle accidents and creating a need for more frequent road maintenance. The designation of ATV trail route would place year-round ATV use near residences creating noise, dust and congestion in previously low use ATV areas of the forest.

Recreation Facilities:

Replacing toilets would provide for ADA compliance. These facilities would be safer since there is no step up into toilets and risers are standard length, not shortened. The toilets would be replaced with the vault toilet technology that was developed in the mid 80's by the Forest Service and Briar Cook. This technology is more efficient since the vaults are larger and pumped less often, and the buildings themselves are designed to minimize the smell. The Huron Shores Ranger District purchases CXT buildings made of concrete rather than wood. They have a longer service life since concrete doesn't rot, rust or burn. Providing clean, updated facilities would lessen maintenance in the short term.

Direct impacts of placing interpretive signs at Buck pond and at the Monument Trail would be that forest visitor's would be better informed of management activities and the importance of historic sites. Over the long term an indirect impact may be that this would lead to an increased respect for resources.

Repairing and replacing bridges would increase the safety of the trails in the short and the long term. A direct effect would be that bridge replacements would allow vehicle traffic to continue for administrative and trail maintenance projects. There would be more flexibility in the type of ski trail grooming equipment and vehicle widths allowed as the danger of scraping equipment or the bridge itself would be minimized.

Repaired and/or updated facilities promote positive impressions to visitors. In turn, this promotes higher quality recreational experiences that often lead to a stronger sense of place.

Recreation Events:

When proposed management activities occur along the Silver Creek trail system it may temporarily displace the cross country events in the short term. Proposed management activities may also temporarily displace the Boy Scouts camping event at Silver Creek if staging of equipment or activities occur over the same time period. The triathlon may need to find an alternate route for the running portion of the race along Monument Road if the direct effects of prescribed burning (smoke, etc.) are slated to occur simultaneously.

This alternative would meet the Forests objective of providing quality recreation opportunities to the public by adding new or updated facilities, enhancing a variety of early-mid and late-successional habitats for hunters, providing improvements to fish habitat, and establishing a transportation system that is more manageable.

Direct and Indirect Effects of Alternative III:

ROS:

Alternative II and III differ by approximately 410 acres of prescribed burning treatments and closing approximately 38 miles of unauthorized roads. Unauthorized roads are not managed as part of the transportation system and as resources are made available are closed and obliterated. They do not affect the ROS settings found within the project area.

Dispersed Recreation:

The effects of no longer managing the North/South trail horse link to Michigan Shore to Shore would be that horse riders and hikers would have 10 fewer miles of exclusive use trail to use within the project area. Having fewer miles of trail may shift horse riding to forest roads (horses are allowed to ride on forest roads) and county roads. This is unlikely since the North/South trail horse link is seldom used.

The effects to hunting are expected to be similar to those in Alternative II. The additional prescribed burning acreage over the long term would decrease the browse for white-tailed deer slightly more than in Alternative II. Fishing opportunities and/or the quality of fishing along Silver Creek is expected to increase since this alternative proposes an additional mile of fish structure maintenance and habitat creation. Not designating campsites at Buck Pond would have a positive effect on day use anglers since competition between day use anglers and camping anglers would be less.

The effects of not designating dispersed campsites across the project area, and not designating campsites on Buck Pond would be similar to those described in Alternative I. Current use patterns would be expected to continue. It would be the responsibility of the forest user to determine where it is appropriate to camp and abide by established Forest Service policy.

Closing/obliterating 17 miles of Level 1 and unauthorized roads would have no effect on pleasure drivers since these roads are already closed to public vehicle traffic. Obliterating Level 1 and unauthorized roads may affect hikers and hunters who use the roads to access the forest on foot.

Alternative III would decrease the existing miles of open roads to vehicles from 116.5 to 103. This is a 12% reduction in open roads. This is a higher percentage than Alternative II. Decreasing the miles of open roads would result in the direct effect of fewer roads being available for driving for pleasure. An indirect effect would be larger tracts of undisturbed land for other recreation activities that prefer remoteness and self-reliance. The same amount of vehicle traffic placed onto fewer roads may create the feeling of more traffic. There would be a need for more maintenance on the remaining roads.

Developed Recreation:

The effects of not proposing the reroute of 2.5 miles of horse trail and not designating ATV trail would be the same under this alternative as they are in Alternative I. Current use patterns would continue.

Recreation Facilities:

Effects to recreation facilities would be similar to those described under Alternative II.

Recreation Events:

Effects to recreation events would be similar to those described under Alternative II.

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 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.

3.4 Fish and 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

effects 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. 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.

The Huron-Manistee National Forests are required to maintain the viability of all native and desirable non-native species. The Forests ensure that this requirement is met through the Species Viability Evaluation (SVE) process. Detailed evaluation occurs only for those species, identified on the "Species Viability Evaluation List" which may have viability concerns. Following development of this list, species were grouped by associated habitat and a focal species was selected for each of these habitat groups. The effects of action alternative proposals on the viability of wildlife species will be addressed utilizing these habitat groups and focal species. A detailed discussion of the Species Viability Process can be found in the Final Environmental Impact Statement (FEIS) Appendix B, to the 2006 Forests' Plan revision (USDA Forest Service 2006).

Effects to Federally endangered, threatened, (ETS) and Regional Forester's Sensitive species (RFSS) are addressed in the Biological Evaluation (BE) located in the Biological Evaluation for Corsair in the Project file, a brief synopsis of the determinations from the BE will follow the SVE discussion.

Analysis Bounds

The cumulative effects analysis boundary includes all private and public land within the contiguous MPAs that incorporate all of the project area boundaries. These geographic bounds were chosen to reflect a contiguous area of like soils and vegetative patterns and types on a scale reflective of natural processes and disturbance regimes. This cumulative effects analysis area will be referred to as the "analysis area" for this wildlife section.

For the purpose of this analysis, cumulative effects will be bounded in time by a 15 year period. This period includes the past ten years and the reasonably foreseeable future five years. This temporal boundary was chosen to reflect the approximate period of time it would take for vegetation to respond to commercial timber sales and vegetative fuel loading to increase to a point where past treatments would lose effectiveness. Vegetation management history is available for the past ten years and is reasonably planned for the next five year period. Maintenance intervals are projected past the five year foreseeable future projects recognizing that reducing fuels and restoring fire to the ecosystem is an ongoing process. The analysis area was chosen because; 1) the patch sizes, ages, and distribution of habitats within the

analysis area would be representative of the project habitats, and 2), the Corsair Project's proposed actions would have similar effects on migratory birds and their habitat(s) as those from past, present and reasonably foreseeable future actions within the analysis area. The current vegetative condition is reflective of the habitat available to terrestrial wildlife species.

The cumulative effects analysis area is approximately 7,554 acres of combined National Forest system lands and private lands. Huron-Manistee National Forests lands make up 85% of the 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.

Affected Environment

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.

Today, the analysis area is comprised primarily of short and long rotation oak, short and long rotation conifer, and lowland forest types, with very little habitat in an 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 1% of the area is agricultural, and much of the private land is used primarily for hunting purposes.

Vegetative Composition and Age-Class Distribution of the Analysis Area

Biodiversity in the Corsair 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 many 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.

Wildlife species which require early successional habitats include species such as white-tailed deer, ruffed grouse, and chestnut-sided warbler. This habitat type is poorly represented within the project area, due to the droughty, sandy soils. Only about 1% of Forest System lands in the project area are aspen/paper birch and 78% of these are mature or over mature. Early successional habitat in the project area is only available as younger aged low site oak but this is less than 5% of the Forest System lands in the project area. The remaining deciduous forest types are also mature or over mature and do not provide early successional habitat (Figure 4). While aspen occurs as a forest type it is typically older aged, in decline, and in need of regeneration, and early successional habitat in general is not available in the project area.

Approximately 40% of the project area vegetation is short-rotation forest types with desired rotation ages of 40 -60 years (Forests Plan II-17). Low site oak represents approximately 19% and short lived conifer is approximately 23%. Approximately 60% of the low site oak is at or beyond rotation age. Forty one (41) % of the short lived conifer is also at rotation age. In fact approximately 75% of the forested stands in the project area are over 40 years old. (The age class distribution of community types within the project area is shown in Figure Table 10.)

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 most 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 and white pine stands (approximately 93%) in the project area are more than 40 years old.

Populations of disturbance sensitive species such as the pileated woodpecker, gray squirrel, and flying squirrel are fairly common on the National Forest System 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/ closed canopy forest 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*).

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. Models addressing the behavior of bird populations in such fragmented landscapes were largely influenced by the theory of island biogeography equilibrium. 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. 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 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.

Regeneration of short rotation oak through shelterwood harvest is considered the most dependable way to achieve the desired results of maintaining this vegetative type on the project area. However, shelterwood harvesting results in the temporary fragmentation of the project area, rendering songbirds vulnerable to parasitism by cowbirds. The likelihood of parasitism is reduced because the majority of the project area is forested with a closed canopy condition and therefore not optimal habitat for cowbirds. However, it is a possibility that cowbirds would find the project area and parasitize nests during the time it takes for oak 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 in the short term. Afterward, 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.

Direct and Indirect Effects of Alternative I

Implementing Alternative I would allow natural successional processes to continue, but would not noticeably alter the existing vegetative community and composition in the foreseeable future (five years). 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 small 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 the

action alternatives. Long rotation conifer (red pine) would remain the same as 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 at the micro-site level through creation of canopy gaps. Competition from overcrowding within these stands would reduce growth and make individuals more susceptible to insect and disease infestations. With the slow improvements in structural diversity created within these stands, plant and animal diversity would slowly decline. 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.

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.

Direct and Indirect Effects of Alternative II and Alternative III

Timber harvest requires using mechanical 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 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 rarely mortality. Due to the temporary nature of these disturbances direct effects would be minimal and would not affect the viability of any of the species present.

The proposed prescribed burning would indirectly benefit biodiversity by enhancing plant growth, discouraging competition and encouraging a diverse understory to develop in this fire adapted ecosystem.

Implementation of the action alternatives would not greatly alter the existing vegetative community and composition at the project level. Red pine, jack pine, 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. Harvest of jack pine and oak would improve age class distribution across the project area. The beneficial indirect effect of this action is a continuation of the mix of vegetative composition but an improved age class distribution at the project level. Maintenance (6 acres) of the existing open land 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 shelterwood harvest of low site oak areas for the first 5-10 years, as they would provide open land habitat conditions until the regenerating oak 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 more 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 oak with cavities for nesting, suitable and occupiable but after harvest when these areas are temporarily more open condition the area would be less suitable and squirrels could 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.

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.

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.

As stated previously, a wide variety of wildlife species thrive in and depend on early successional habitats for all or a part of their yearly nutritional requirements. While not a true early successional community, implementation of the proposed action would regenerate short rotation oak and help to maintain this vegetation type across the District 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 habitat component is further emphasized by analyzing the ten 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 it would stimulate and promote the growth of native vegetation.

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.

Management Indicator Species

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 9). Principal habitat characteristics and species or habitat abundance for the MIS can be found in the Forests' Plan (page 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. 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 9: Management Indicator Species (MIS) and Associated Habitat Descriptions

Indicator Species	Principal Habitat Characteristics	Existing Condition Within the Project Area
Bald Eagle <i>Haliaeetus leucocephalus</i>	Nest in super canopy trees, generally white pine and aspen, near lakes and large rivers.	Nesting habitat not present
Karner Blue Butterfly <i>Lycaeides melissa samuelis</i>	Openings and edges in oak barrens and oak savannahs with lupine.	Species not found on Huron Nat'l Forest—will not be discussed
Kirtland's Warbler <i>Dendroica kirtlandii</i>	Dense stands of jack pine 5 to 15 years old and 1.7 to 5.0 meters tall on poor sandy soils.	Habitat present and occupied
Ruffed Grouse <i>Bonasa umbellus</i>	Aspen and aspen-alder mixes, 5-25 years old, with large crowned male aspen clones.	Some poor habitat available in project area
Brook Trout <i>Salvelinus fontinalis</i>	Cold water streams	Habitat present
Mottled sculpin <i>Cottus bairdi</i>	Cool, clear, moderate and high-gradient creeks, streams, and small rivers	Habitat present

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

Management Indicator Species--Bald Eagle

Forest types and habitat conditions on the project area do not meet all the habitat requirements of bald eagle throughout the year. Due to a lack of large bodies of water and river courses and adjacent super-canopy trees, nesting and foraging habitat do not occur at the project level. Therefore, existing vegetative conditions and habitat suitability are low. Existing habitat would likely only receive occasional use as perching trees. Forest types and habitat conditions within the analysis area are sufficient for bald eagle. There is a bald eagle nesting territory immediately adjacent to the analysis area near Sand Lake.

Direct and Indirect Effects of the No Action Alternative on Bald Eagle

Under Alternative I, no action would occur and there would be no direct effects to bald eagle across the project area. Under Alternative I, no habitat would be altered or created, therefore there would be no indirect effects to bald eagle across the project area.

Direct and Indirect Effects of Alternative II and III on Bald Eagle

There is potential for some slight indirect beneficial effects from harvesting as the remaining mature trees may grow and become suitable perching trees in the future.

Cumulative Effects of Alternative II and III on Bald Eagle

Alternatives II and III propose harvesting trees and would improve growth and older aged characteristics among the remaining trees. The remaining trees could potentially be future perch trees. Although effects for both alternatives are nearly negligible since there are no large bodies of water in the project area, the action alternatives would be slightly more beneficial to bald eagle than alternative I because they would allow trees to grow faster and reach older aged conditions sooner.

Activities occurring on National Forest System and privately owned lands within the analysis area are expected to remain the same into the foreseeable future. Management on privately owned lands within the analysis area are generally tiered toward early successional habitat. These types of habitats do not benefit bald eagle. There are privately owned lands within the analysis that are low lying and wet, that present access problems for humans. These lands are not likely to be actively managed and possess old growth characteristics, characteristics beneficial to bald eagle.

Continuing to manage Forest System Lands in old growth would benefit bald eagle. As supercanopy trees are not limiting across the analysis area, the actions of alternative II would have no overall cumulative effect on bald eagles throughout the project or analysis area now or into the foreseeable future.

Kirtland's warbler

The effects to Kirtland's warbler are discussed under the ETS section.

Ruffed Grouse

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. Aspen occurs naturally across the entire range of soils on the Huron-Manistee National Forests, except the poorest outwash sands and deep organic wetlands. However only a small amount 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 mature to over mature. So, while aspen/birch habitat is abundant and available throughout the District and the Forest, across the project area habitat suitability is low because so little aspen habitat occurs in the project area and the early age classes (seedling/sapling) so critical to courtship, nesting, and brood-rearing, are absent.

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) simply do not occur. Therefore, existing conditions are considered to have low habitat suitability. Existing habitat would likely only receive seasonal use by a few grouse through the year as grouse forage on the catkins, leaves and buds available on older aged aspen trees.

Direct and Indirect Effects of Alternative I 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 due to the lack of suitable habitat available in the existing condition.

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.

Direct and Indirect Effects of the Action Alternatives on Ruffed Grouse

While not optimal, some habitat would be improved under the action alternatives, as low site oak shelterwood harvests would provide some habitat for grouse and would meet some of the needs of species which require early successional habitat. This harvest would encourage new stands of oak to regenerate through sprouting, thus increasing the project area's young, early-successional habitat component, the age class critical to nesting and brood-rearing. The action alternatives would provide some 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 across the project area, through project design criteria and would provide a beneficial food source for ruffed grouse.

Cumulative Effects of the Action Alternatives on Ruffed Grouse

The action alternatives provide 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, 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 and white-tailed deer. 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 due to the lack of aspen, and no management for ruffed grouse is expected to occur for the next five years. The action alternatives would provide a cumulatively beneficial effect by increasing suitability of habitat throughout the analysis area by creating

early successional habitat and downed woody debris (drumming logs), and would retain fruiting trees and shrubs for ruffed grouse.

Brook trout and Mottled Scuplin

Affected Environment

Brook trout require cool water temperature (maximum summer water temperature less than 23° C), suitable spawning sites, relatively stable water flow, moderate precipitation, and structural features such as overhead cover, woody debris, and deeper holes. Optimal riverine habitat is characterized by clear, cold, spring-fed water; a silt-free rocky substrate in riffle-run areas; an approximate 1:1 pool-riffle ratio, with areas of slow, deep water; well vegetated stream banks; abundant instream cover and relatively stable water flow. Mottled sculpins inhabit small, clear streams, where they occupy both riffle and pools over sand, gravel, boulders or limestone. Mottled sculpins favor clear water with some form of shelter to use as hiding cover. They are generally 3-4 inches in length. This bottom dwelling species has often been called a trout indicator, and it is a fact that, where sculpin populations exist, the water generally holds trout populations as well. Threats to habitat suitability include loss or degradation of habitat features, elevated stream temperatures and sedimentation. Beaver can adversely affect stream cover by cutting down adjacent alder and aspen thus reducing shade, increasing water temperature, blocking seasonal movements with dams, causing sedimentation of spawning areas, and altering habitat which causes increased competition from other fish species. They can also cause water temperatures to rise above 23°C by blocking stream flow with dams, in addition to reduction in tree or brush cover. Timber harvest can adversely affect brook trout habitat also due to reduction in cover by tree cutting or by encouraging aspen which then attracts beaver, where the harvest occurs immediately adjacent to streams.

Both the brook trout and mottled sculpin are found throughout the streams on the Huron-Manistee National Forests based on species distribution maps, (Au Sable River system, Zorn and Sendek, 2001).

Direct and Indirect effects of Alternative I

Alternative I would have less benefit to brook trout by not actively converting aspen to long-lived species. There would be no adverse impacts on any trout streams as there would be no timber harvesting or road building.

Direct and Indirect effects of Alternatives II and III

The management of riparian-stream habitat would have positive effects on brook trout and mottled sculpin and the habitats they occupy. Restoring aquatic habitat and increasing the within stream large wood component would help stabilization of eroding streambanks and reduce sediment delivery, resulting in lowered sand bedload. Ultimately, stream channels would become narrower, the substrate coarser and overall channel shape more complex.

Maintenance of fish structures, as proposed under the action alternatives, would accelerate the recovery of aquatic habitat and mimic natural recruitment of large wood to the adjacent stream systems. The result would be diversification of the aquatic environment, and increased within stream habitat structure.

Improvement of the transportation systems and decommissioning of certain roads that are degrading riparian and stream habitat would lead to a reduction in sediment and other non-point sources of pollution improving the habitat quality. Runoff that had been directly delivered to stream systems would be filtered

through soils and riparian areas. This would also improve stream water temperatures for brook trout and sculpin by allowing water to cool before entering the streams.

Timber harvest activities and prescribed burns proposed adjacent to and within riparian areas have the potential to adversely affect aquatic habitat. Streamside Management Zones (SMZ) in the state’s Best Management Practices are defined as areas directly adjacent to streams and water (Sustainable Soil and Water Quality Practices on Forest Land; MDNR 2009). Provisions within the SMZ typically contain sediment filter strips, a base shade level, restrictions on ground disturbance, and protection of streambank and streambeds. All of the proposed harvesting would move the overstory vegetation or maintain it in an older aged condition, in order to provide canopy closures at 75% or more in stands adjacent to the coldwater systems and thereby maintain shading.

Through design criteria the Corsair project area mitigates the threat of sedimentation into streams by following BMP’s.

Cumulative Effects Common to all Alternatives

In summary, Alternative I is not pro-active in improving habitat conditions or increasing large woody debris in the stream. Alternatives II and III are pro-active in moving adjacent stands toward long-lived species faster than natural processes and would improve within stream habitat conditions for brook trout and mottled sculpin. Long lived tree species are also less palatable to beaver. Potential for detrimental impacts relating to brook trout would be avoided by project design measures. Because of ongoing road maintenance projects, all the alternatives would continue to reduce potential for sedimentation impacts to brook trout and other fisheries.

Wildlife Species Viability Evaluation

A variety of past, present, and future federal and non-federal actions occur within the Corsair Project boundary. Although the age class table is not a direct match with all 30 communities analyzed in the FEIS, it is a tool used in this analysis of effects on wildlife habitat (Table 10).

Table 10: Age Class Distribution (Current Condition)

Community	Total Acres	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100+
<i>Aspen/Birch</i>	183.6	--	--	8.5	31.7	5.3	63.5	15.8	--	18.1	40.8	--
<i>High Site Oak</i>	723.9	113.4	--	8.2	71	--	28.7	--	--	100.2	119.8	282.6
<i>Low Site Oak</i>	4,438.1	350.3	234	211.4	606.6	363.4	10.1	46.3	429.6	752.3	935.4	498.7
<i>Northern hardwood</i>	76.5	--	--	--	--	--	--	--	--	39.1	9.5	27.9
<i>Lowland Hardwood</i>	163	--	--	--	--	--	--	--	--	17.2	49.1	96.6
<i>Lowland Conifer</i>	305.2	--	--	--	--	--	--	--	--	--	--	305.2
<i>Short lived conifer</i>	5,295.2	1,294.5	325.1	615	888.1	656.2	248.1	189.2	207.2	320.	6432.1	119.1
<i>Long lived Conifer</i>	10,658.8	417.5	--	28.5	287.9	1,152.5	496	180.8	1,085.1	5,761.8	879.5	369.2
<i>Openings</i>	939.2	--	--	--	--	--	--	--	--	--	--	--

Community	Total Acres	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100+
Grand Total	22,783.5	2,175.7	559.1	871.6	1,885.3	2,177.4	846.4	432.1	1,721.9	7,009.3	2,466.2	1,699.3

Affected Environment

Thirty habitat communities were used to conduct Species Viability Evaluations (SVE) for wildlife and fish across the Huron-Manistee National Forests in the Final Environmental Impact Statement (FEIS) to the 2006 Forests' Plan revision (USDA Forest Service 2006). Proposed actions in the Corsair Project may affect wildlife from eight of these communities (Table 11) because activities would affect or create habitat in these communities. Communities for forest types like aspen/paper birch, lowland conifer, lowland hardwood and northern hardwoods will not be analyzed because these types cumulatively represent only a small portion of the project area and there are no proposals to change habitat conditions significantly through timber harvest. Surrogate, or focal, species are identified as representatives of each habitat community, and determinations are made for the communities via surrogate species. From the focal species listed in the FEIS, the most appropriate surrogate species was selected for the specific Corsair Project area.

Table 11: Species Viability Evaluation Communities (SVE Comm) Analyzed in the Corsair Project

Species Viability Evaluation Communities Analyzed for the Corsair Project		
Community	Age Class	Surrogate Species
oak/pine (late)	60+	red-headed woodpecker
oak/pine (early-mid)	0 - 59	whip-poor-will
mixed hardwood (late)	60+	northern goshawk
red and white pine/spruce (late)	60+	northern goshawk*
jack pine (open/early)	0 - 7	Michigan bog grasshopper
jack pine (mid)	8 - 19	Kirtland's warbler
jack pine (mid-late)	20+	spruce grouse
grasslands (small openlands)	all	eastern massasauga*

*Because the surrogate species listed in the FEIS (American marten for red pine and eastern box turtle for grasslands) do not occur on the Tawas Ranger District, an alternative species was selected.

Direct and Indirect Effects of Alternative I-all communities

In the short term, Alternative I would have beneficial effects on wildlife that prefer mid-successional and mature forest because it would maintain mature forest habitat in the oak/pine late, mixed hardwood (late), red and white pine/spruce (late), jack pine (mid-late) communities which support wildlife that prefer the current vegetative condition. However, deferring proposed actions would have adverse effects on wildlife inhabiting small grasslands, and early oak/pine communities because no activities would occur that create these habitats. In the long term, deferring the proposed action would have adverse effects on wildlife inhabiting mid-successional forests because no young forests would be present to grow into mid-successional age classes and the low site oak is over mature and in decline. Alternative I would not meet the desired condition as described in the Forests' Plan (USDA Forest Service 2006a) or meet the objective of maintaining and improving wildlife habitat and providing for species viability needs.

Direct and Indirect Effects of Alternative II and III

Alternatives II and III are analyzed together because attaining the objective of maintaining and improving wildlife habitat and providing for species viability needs remains the same in both alternatives, although treatments and acres differ somewhat. Both alternatives would have adverse and beneficial effects on maintaining and improving wildlife habitat. The eight communities affected are analyzed individually because effects differ for each (Table 11).

Oak/Pine (late)

Alternatives II and III would have beneficial effects on improving wildlife habitat and providing for species viability needs in the oak/pine (late) SVE community. The wildlife surrogate species for this community is the red-headed woodpecker (Table 11). Red-headed woodpeckers select habitat that is more open than the current condition of the low site oak stands proposed for treatment. Few red-headed woodpeckers were found during wildlife surveys for the Corsair Project, although they are known to occur within project area boundaries. Red-headed woodpecker habitat is present within the cumulative effects analysis area. The oak/pine (late) community includes both short rotation oak or low site oak forests that are at least 60 years old (Table 10) and high site oak that is at least 60 years old, approximately 3,165 acres or 13% of the project area are currently in this habitat type. Proposed fuelbreak creation treatments would also affect the oak/pine (late) community.

Direct and Indirect Effects

Alternatives II and III would have no effects on individual red-headed woodpeckers because no red-headed woodpeckers were found in proposed project areas during surveys. Fuelbreak creation would improve red-headed woodpecker habitat in the long term. Creating a more open forest with associated proposed fuelbreaks along the wildland urban interface would provide red-headed woodpecker habitat if snags and mature oaks are retained. Thinning of high site oak would create a more open forest which would improve habitat for this species. Shelterwood harvest in short rotation oak would create more open habitat with retention of some mature seed trees. This habitat condition would be highly suitable for approximately five years until regeneration of seedling/saplings made the understory too dense. Treatment of the low site oak forests would have beneficial indirect impacts in the long term also as it would result in retention of this forest type.

Cumulative Effects

When considered with past, present, and reasonably foreseeable federal and non-federal activities, Alternatives II and III would have beneficial cumulative effects on the objective of maintaining and improving wildlife habitat and providing for species viability needs in the oak/pine (late) community.

Red-headed woodpecker habitat improvement would be cumulative with other red-headed woodpecker habitat created or maintained on federal or non-federal lands. Creating fuelbreaks and thinning/shelterwood harvests in high site and short rotation oak would be beneficially cumulative with the creation or maintenance of open forests in the cumulative effects analysis area. The age class table shows low site oak in the 0 – 19 age class, which would be beneficially cumulative with the proposed harvest by regenerating habitat that would be available in 40 - 60 years.

Oak/Pine (early-mid)

The proposed actions in Alternatives II and III would have beneficial effects on improving wildlife habitat including early successional habitat, and providing for species viability needs in the oak/pine (early-mid) SVE community. The wildlife surrogate species for this community is the whip-poor-will (Table 11). Whip-poor-wills nest in dry deciduous or mixed forests with an open understory, and forage in open areas such as the oak/pine (early-mid) community.

The oak/pine (early-mid) community is equivalent to short rotation oak or low site oak forests that are 0 to 59 years old (Table 10). Whip-poor-will surveys were not conducted for the Corsair Project, however, occurrences are known within proposed action areas. Whip-poor-will habitat is present within the cumulative effects analysis area, although the majority is over mature and in decline.

Direct and Indirect Effects

In the short term, low site oak shelterwood cuts would reduce nesting (mature forest) habitat while increasing foraging habitat. In the long term, wildlife habitat would be improved because oak treatments would improve suitable whip-poor-will foraging habitat for approximately 20 years after treatment. Overall, Alternatives II and III would have a beneficial effect on whip-poor-will. Prescribed burns would enhance habitat by stimulating the growth of young sapling oak and would improve reforestation. Warm season grasses and nectaring sources would also benefit from these treatments and would improve habitat conditions for a variety of species such as wild turkey, eastern bluebird and the RFSS dusted skipper.

Cumulative Effects

When considered with past, present, and reasonably foreseeable federal and non-federal activities, Alternatives II and III would have a beneficial cumulative effect on the objective of maintaining and improving wildlife habitat and providing for species viability needs in the oak/pine (early-mid) community.

Harvesting oak would create whip-poor-will foraging habitat and have beneficial cumulative effects considering the current vegetative condition. Low site oak under 60 years old is present on the project area, but only a portion is currently under 10 years old. Regeneration of habitat by shelterwood harvest would increase oak stands in the 0-9 year age class. Low site oak under 60 years old (nesting habitat) is also present within the project area. The proposed action alternatives would improve habitat within the project area. While there are no other activities that have regenerated oak within the cumulative effects analysis area, the proposed action alternatives would have a beneficial cumulative effect on the whip-poor-will.

Mixed Hardwood (late)

Overall, the proposed actions in Alternatives II and III would have beneficial effects on improving wildlife habitat and providing for species viability needs in the mixed hardwoods (late) SVE community. The wildlife surrogate species for this community is the northern goshawk (Table 11), although none are known to nest in or adjacent to mixed hardwood stands within the Corsair Project boundary.

The mixed hardwood (late) community is equivalent to high site oak over 60 years old, a small portion of the project area is in this community (Table 10). Alternatives II and III would affect habitat in the mixed hardwood (late) community through thinning and wildlife/timber stand improvements.

Direct and Indirect Effects

High site oak treatments would have beneficial indirect effects to northern goshawk in the long term, as oak thinning would improve the health and vigor of the remaining trees and would maintain the open understory condition of these stands. Prescribed burning for timber stand improvement would have a beneficial effect on northern goshawk by improving prey habitat and understory diversity. Northern goshawk is also analyzed in depth in the Corsair Biological Evaluation located in the project file.

Cumulative Effects

When considered with past, present, and reasonably foreseeable federal and non-federal activities, Alternatives II and III would have a minor beneficial cumulative effect on the objective of maintaining and improving wildlife habitat and providing for species viability needs in the mixed hardwood (late) community, as this community represents only 3% of the project area.

Red and White Pine/Spruce (late)

The proposed actions in Alternatives II and III would have beneficial effects on improving wildlife habitat and providing for species viability needs in the red and white pine/spruce (late) SVE community. The wildlife surrogate species for this community is the northern goshawk (Table 11). The red pine, white pine, and spruce forests community is equivalent to red pine plantations and long-lived conifer at least 60 years old, much of the project area is in this community (Table 10). Red pine thinning and underburning in Alternatives II and III would improve wildlife habitat within the red and white pine/spruce (late) community.

Direct and Indirect Effects

Red pine thinning and prescribed burning may have minor short-term adverse effects on foraging goshawks by temporarily opening up the understory, causing their prey species to temporarily avoid these areas due to a lack of shelter and cover. However, thinning and burning red pine forests would have a long-term beneficial indirect effect. Habitat would improve for prey species as the understory develops, and thinning allows the remaining trees to grow large faster through reduced competition, improving nesting habitat, especially in old growth areas. Habitat suitability would be further enhanced in areas where the canopy is open enough to allow tree species diversity to increase. Therefore, Alternatives II and III would have a beneficial impact on northern goshawk.

Cumulative Effects

When considered with past, present, and reasonably foreseeable federal and non-federal activities, Alternatives II and III would have an overall beneficial cumulative effect on the objective of maintaining and improving wildlife habitat and providing for species viability needs in the red and white pine/spruce (late) SVE community. Considering similar past, present, and future red pine thinning and prescribed burning, proposed actions would have short-term adverse and long-term beneficial cumulative effects on northern goshawk.

Jack Pine (open-early)

The proposed actions in Alternatives II and III would have beneficial effects on improving wildlife habitat including early successional conifer habitat, and providing for species viability needs in the jack pine (open-early) SVE community. The wildlife surrogate species for this community is the Michigan bog grasshopper (Table 11). Michigan bog grasshopper occurrences are not recorded within the cumulative effects analysis area.

The jack pine (open-early) community is equivalent to openings and jack pine forests 0 – 7 years old, a small portion of the project area is in this community ().

Table 10). Proposed fuelbreaks, openings treatments and non-native species control would create or improve habitat in the jack pine (open-early) community.

Direct and Indirect Effects

Fuel break creation would have no direct effects on wildlife species associated with this habitat type, as the former habitat (late stage jack pine) is not suitable. Non-native species control may have short-term negative effects on individuals, or may adversely affect associated species, such as butterflies and skippers that utilize spotted knapweed or St. John's wort as nectaring sources. However, fuelbreak creation, non-native species control, and openings maintenance and improvement would create or improve habitat conditions in this community by increasing the overall amount of habitat available and increasing the suitability of habitat. Warm season grasses and native nectaring sources would flourish after treatment with fire and would improve over time through maintenance activities. Treatment of NNIS would reduce competition from these undesirable species and enhance overall habitat suitability. Therefore, Alternatives II and III would have a beneficial effect on Michigan bog grasshopper and associated wildlife species such as wild turkey and eastern bluebird.

Cumulative Effects

When considered with past, present, and reasonably foreseeable federal and non-federal activities, Alternatives II and III would have a beneficial cumulative effect on the objective of maintaining and improving wildlife habitat including early successional conifer habitat, and providing for species viability needs in the jack pine (open-early) SVE community. Alternatives II and III would have beneficial cumulative effects on the Michigan bog grasshopper when combined with past, present, and future actions, particularly the creation of temporary habitat through Kirtland's warbler management in essential habitat where similar treatments temporarily create or improve early successional jack pine habitat.

Jack Pine (mid)

The proposed actions in Alternatives II and III would have no direct effect on improving wildlife habitat and providing for species viability needs in the jack pine (mid) SVE community. The wildlife surrogate species for this community is the Kirtland's warbler (Table 11). Kirtland's warblers have been documented within the project area for the last several years during the annual Kirtland's warbler census, however there are no proposed activities within occupied habitat. Activities are proposed immediately adjacent to occupied habitat, so there would be indirect effects. The jack pine (mid) community is equivalent to short lived conifer forests 8 – 19 years old, a very small portion of the project area is currently in this community (Table 10).

Indirect Effects

Habitat occupied by Kirtland's warbler would not be treated in Alternative II or III. No jack pine would be regenerated by these alternatives, and this essential habitat is still planned for Kirtland's warbler management in the future. The proposed low site oak shelterwood harvest proposed adjacent to occupied habitat has the potential to create disturbance to these species, however project design criteria would restrict operation of mechanical equipment within ¼ mile of occupied habitat to those time periods outside of the breeding and brood rearing periods (May 1 – August 31). These activities would have

indirect beneficial effects, because it would create a more open condition immediately adjacent to occupied habitat, which improves suitability for Kirtland's warblers and it would make the area more defensible if a wildfire were to occur, over the short and long terms.

Cumulative Effects

When considered with past, present, and reasonably foreseeable federal and non-federal activities, Alternatives II and III would have minor beneficial cumulative effects on the objective of maintaining and improving wildlife habitat and providing for species viability needs in the jack pine (mid) SVE community, due to the relatively small acreages proposed for treatment adjacent to this habitat type. Since Alternatives II and III would have no direct effects and only beneficial indirect effects on the Kirtland's warbler, these alternatives would also have minor beneficial cumulative effects on the species.

Jack Pine (mid-late)

The proposed actions in Alternatives II and III (prescribed underburning of jack pine), would have beneficial effects on improving wildlife habitat and providing for species viability needs in the jack pine (late) SVE community. The wildlife surrogate species for this community is the spruce grouse (Table 11). Spruce grouse are closely associated with coniferous forests, and this species is typically found in jack pine 20-30 years old. No spruce grouse were found during project surveys, no occurrences are known within the proposed action areas, and these areas are judged not to be habitat for spruce grouse because the jack pine is too mature (P. Thompson, Wildlife Biologist, professional opinion).

The jack pine (mid-late) community is equivalent to jack pine forests at least 20 years old, a portion of the project area is in this community (Table 10). Proposed low site oak shelterwood cuts and creation of fuelbreaks (Alternatives II and III) would incidentally remove some mature jack pine habitat.

Direct and Indirect Effects

The forest proposed for low site oak shelterwood and fuelbreak creation is not currently spruce grouse habitat and no habitat would be created with treatments. No jack pine stands would be regenerated in either alternative, and therefore no mid-successional jack pine would develop over the long term. This habitat type is abundant throughout the project area however, and is not considered a limiting factor to associated species. These proposals would have minimal indirect adverse effects due to loss of small acreages of habitat. Proposed underburning of this community would create some small gaps in the canopy and stimulate understory vegetation, such as blueberry and huckleberry, and native warm season grasses. This proposal would have beneficial indirect effects by increasing species diversity and enhancing the suitability of the habitat for spruce grouse and associated wildlife species.

Cumulative Effects

When considered with past, present, and reasonably foreseeable federal and non-federal activities, Alternatives II and III would have minor adverse cumulative effects on the objective of maintaining and improving wildlife habitat and providing for species viability needs in the jack pine (mid-late) community. Alternative II and III low site oak shelterwood cuts and fuelbreak creation activities would slightly reduce the amount of habitat in the jack pine (mid-late) SVE community. However, Alternative II and III prescribed underburning of this habitat would have beneficial indirect effects.

Jack pine over 20 years old makes up 69% of all short-lived conifer (i.e. jack pine) stands in the project area (Table 10). Present and future activities removing habitat from the jack pine (mid-late) community

within the cumulative effects analysis area include creation and maintenance of fuelbreaks. Present and future Kirtland's warbler habitat creation projects would create spruce grouse habitat in the long term, 20 years after planting. In ten years (2023), after implementation of the Corsair Project and other present and future planned activities, jack pine over 20 years old would still make up a large proportion of all short-lived conifer stands.

Grasslands (small open lands)

Direct and Indirect Effects

The proposed actions in Alternatives II and III would have some beneficial effects on improving wildlife habitat including early successional habitat, and providing for species viability needs in the grasslands (small open lands) SVE community. The wildlife surrogate species for this community is the eastern massasauga (Table 11). No eastern massasaugas were observed during wildlife surveys of proposed action areas, however they are known to occur throughout the project area. Eastern massasaugas inhabit open uplands associated with wetlands during the summer months in northern Michigan.

The grasslands (small open lands) community is equivalent to forest openings, and only a small portion of the project area is in this community (Table 10). Habitat exists within the Corsair Project boundary, and vegetative treatments such as proposed opening maintenance and improvements and fuelbreak creation and maintenance would create and improve habitat suitable for the eastern massasauga. Enhancements to this habitat, such as supplemental planting of warm season grasses, prescribed burning which stimulates the vegetation, planting of nectaring sources, and eradication or suppression of NNIS would provide beneficial indirect effects to butterflies, skippers and associated species.

Cumulative Effects

When considered with past, present, and reasonably foreseeable federal and non-federal activities, Alternatives II and III would have a beneficial cumulative effect on the objective of maintaining and improving wildlife habitat, including early successional habitat, and providing for species viability needs in the grasslands (small open lands) SVE community.

Kirtland's warbler habitat creation adjacent to the Corsair Project area would also continue to create habitat, albeit temporarily, for species associated with this community.

Federally endangered, threatened, and Regional Forester's Sensitive Species

A detailed analysis of effects on federally endangered, threatened (ETS) and Regional Forester's Sensitive Species (RFSS) are included in the Biological Assessment and the Biological Evaluation for the Corsair Project. A brief summary of the listed species expected to occur within the project area and the biologists determinations of how proposed project implementation would affect them is included here.

Biological Evaluations (BE) ensure that Federally Endangered and Threatened and Regional Forester's Sensitive Species (RFSS) receive full consideration in the decision making process, and ensure compliance with the legal, procedural, and biological direction in Forest Service Manual 2670.

Federally-listed Endangered and Threatened Species

To determine how the Corsair Project (USDA Forest Service, 2013) may affect federally listed and proposed to be listed endangered and threatened species, the following process was followed:

- Determine all federally listed, and proposed to be listed, threatened and endangered species that occur or have historically occurred in Michigan, based on US Forest Service (USDA Forest Service, 2006), US Fish and Wildlife Service (US Fish and Wildlife Service, 2006) and MNFI (Michigan Natural Features Inventory, 2012) records.
- From these determinations, species were selected having occurrence records on the Huron National Forest (HNF), or have the potential to occur on or near the project site based on habitat present, species habitat requirements and historical occurrences. Two important occurrence record sources include the MNFI database (Michigan Natural Features Inventory, 2012) and the USFS NRIS Wildlife database (USDA Forest Service, 2012). Other sources include the 2012 Kirtland's warbler census data (USDA Forest Service, 2012), HMNF bald eagle survey results (US Fish and Wildlife Service, 2012), and the older Huron-Manistee National Forests' Endangered, Threatened and Sensitive species database (USDA Forest Service, 2012).

Based on the results of this process, the following federally threatened or endangered species could occur in the proposed project area, and are included here in the Biological Evaluation:

- Surveys for Kirtland's Warbler were conducted within the Project Area in June of 2012. Birds were present within the Corsair Project Boundary. This is the only federally listed species that occurs within the Corsair Project Boundary.

To determine which Regional Forester's Sensitive Species (RFSS) to include the following process was followed:

- Determine Regional Forester's Sensitive Species (signed December 14, 2011) that can potentially occur on the Tawas Ranger District of the Huron-Manistee National Forests, based on species range, habitat requirements and historical occurrences. The State of Michigan's Heritage Program (Michigan Natural Features Inventory, 2012), the NRIS TESP (Natural Resource Information System Threatened Endangered & Sensitive Plants) and NRIS Wildlife databases, Forest Service corporate spatial databases for managing official plant and wildlife occurrence records (USDA Forest Service, 2012), are the primary sources for occurrence records.
- From these determinations, species were selected that have occurrence records on the Huron National Forest, and/or have the potential to occur on or near the project site based on habitats present, species habitat requirements and historical occurrences. RFSS that occur only on the Manistee National Forest have not been considered in this document.

Based on the results of this process suitable habitat was found for the following RFSS:

Table 11: Regional Forester's Sensitive Species Considered

CLASS	SCIENTIFIC NAME	COMMON NAME	Documented within the Project Area?
Mammals	<i>Glaucomys sabrinus</i>	Northern Flying Squirrel	
	<i>Myotis lucifugus</i>	Little Brown Myotis	X
	<i>Myotis septentrionalis</i>	Northern Myotis	X
Birds	<i>Accipiter gentilis</i>	Northern Goshawk	X
	<i>Buteo lineatus</i>	Red-shouldered Hawk	X
Reptiles	<i>Sistrurus catenatus catenatus</i>	Eastern Massasauga	X
	<i>Glyptemys insculpta</i>	Wood Turtle	
Fish	<i>Percina copelandi</i>	Channel Darter	
Invertebrates-- Insects	<i>Artytonopsis hianna</i>	Dusted Skipper	X
	<i>Incisalia irus</i>	Frosted Elfin	
	<i>Pyrgus centaureae wyandot</i>	Southern Grizzled Skipper	
	<i>Appalachia arcana</i>	Michigan Bog Grasshopper	
Plants	<i>Botrychium oneidense</i>	Bluntlobe Grapefern	
	<i>Botrychium rugulosum</i>	Ternate Grapefern	
	<i>Carex schweinitzii</i>	Schweinitz's Sedge	
	<i>Cirsium hillii</i>	Hill's Thistle	X
	<i>Cynoglossum virginianum</i> var. <i>boreale</i>	Northern Wild Comfrey	
	<i>Cypripedium arietinum</i>	Ram's-head Lady's-slipper	X
	<i>Dalibarda repens</i>	Robin Runaway	
	<i>Galearis spectabilis</i>	Showy Orchid	
	<i>Juglans cinerea</i>	Butternut	
	<i>Juncus vaseyi</i>	Vasey's Rush	
	<i>Linum sulcatum</i>	Grooved Yellow Flax	
	<i>Malaxis brachypoda</i>	White Adder's-mouth Orchid	
	<i>Platanthera hookeri</i>	Hooker's Orchid	
	<i>Pterospora andromedea</i>	Giant Pinedrops	
	<i>Spiranthes ochroleuca</i>	Yellow Nodding Ladies'-tresses	
	<i>Taxus canadensis</i>	Canada Yew	
<i>Trichophorum clintonii</i>	Clinton's Bulrush		
<i>Viola novae-angliae</i> ssp. <i>novae-angliae</i>	New England Blue Violet		

Systematic wildlife and botanical surveys were conducted to detect the presence of RFSS and evaluate habitat(s) within the proposed action areas in the project area in 2011 and 2012. Areas of higher diversity (e.g. riparian, swamp, and wetlands) were surveyed more intensively (multiple surveys were conducted). The following surveys have been conducted specifically for this project:

- Northern goshawk/red-shouldered hawk surveys were conducted. Two active goshawk nests were found, one in and one adjacent to the proposed action area. Two red-shouldered hawks were found within the proposed project area; one secondary nest, and one active nest was found within the proposed project area. No other RFSS were found.
- Butterfly and Michigan Bog Grasshopper surveys were conducted in August of 2011 and 2012. Multiple dusted skipper were found. No other RFSS were found.
- Eastern massasauga surveys were conducted. One eastern massasauga and no other RFSS reptiles were found during surveying.
- Anabat surveys were conducted in a portion of the Corsair Project Area. A number of *Myotis* individuals were detected.
- Botanical surveys were conducted; four Hill's thistles (*Cirsium hillii*) were found. An occurrence of ram's-head lady's slipper has been documented along the banks of Silver Creek. This area was surveyed on two different occasions in 2011 and the plant was not found. However, because individuals only reach four to five inches at maturity and it is very difficult to identify when not in flower, the presence of this species will be assumed along Silver Creek.

Alternative 1 (No Action)

- Would have no effect on Kirtland's warbler or its critical habitat, or any other federally listed species or their critical habitat.
- Would have no impact on the northern flying squirrel, little brown myotis, northern myotis, wood turtle, channel darter, ram's-head lady's-slipper, false violet, showy orchis, butternut, Canada yew, Schweinitz's sedge, and white adder's-mouth orchid.
- May impact individual northern goshawk, dusted skipper, eastern massasauga, dusted skipper, frosted elfin, southern grizzled skipper, Michigan bog grasshopper, Hill's thistle, grooved yellow flax, Clinton's bulrush, yellow nodding ladies'-tresses, New England blue violet, ternate grapefern, northern wild comfrey, Hooker's orchid, and giant pinedrops but is not likely to cause a trend towards federal listing or a loss of viability. It is my professional judgment that the impacts of deferring the actions would adversely impact Hill's thistle, grooved yellow flax, Clinton's bulrush, yellow nodding ladies'-tresses, New England blue violet, ternate grapefern, but beneficially impact northern wild comfrey, Hooker's orchid, and giant pinedrops but is not likely to cause a trend towards federal listing or a loss of viability.

Alternative II

- Is not likely to adversely affect Kirtland's warbler or its critical habitat, or any other federally listed species or their critical habitat.
- Would have no impact on false violet, showy orchis, butternut, Schweinitz's sedge, or white adder's-mouth orchid.

- Would have a beneficial impact on the little brown myotis, Michigan bog grasshopper, grooved yellow flax, Clinton's bulrush, yellow nodding ladies'-tresses, New England blue violet, and ternate grapefern.
- May impact individual northern flying squirrel, northern myotis, northern goshawk, red-shouldered hawk, eastern massasauga, wood turtle, channel darter, dusted skipper, frosted elfin, southern grizzled skipper, Hill's thistle, northern wild comfrey, Hooker's orchid, giant pinedrops, Canada yew, and ram's-head lady's-slipper, but is not likely to cause a trend towards federal listing or a loss of viability.

Alternative III

- Is not likely to adversely affect Kirtland's warbler or its critical habitat, or any other federally listed species or their critical habitat.
- Would have no impact on false violet, showy orchis, butternut, Schweinitz's sedge, or white adder's-mouth orchid.
- Would have a beneficial impact on the little brown myotis, Michigan bog grasshopper, grooved yellow flax, Clinton's bulrush, yellow nodding ladies'-tresses, New England blue violet, and ternate grapefern.
- May impact individual northern flying squirrel, northern myotis, northern goshawk, red-shouldered hawk, eastern massasauga, wood turtle, channel darter, dusted skipper, frosted elfin, southern grizzled skipper, Hill's thistle, northern wild comfrey, Hooker's orchid, giant pinedrops, Canada yew, and ram's-head lady's-slipper, but is not likely to cause a trend towards federal listing or a loss of viability.

3.5 Aquatic Resources

Analysis Bounds

The cumulative effects area for aquatic resources encompasses the 6th level watershed boundaries that lie within and outside the project area. These boundaries were chosen because this watershed size would provide the most comprehensive boundary when analyzing the cumulative effects to water quality from timber harvesting, road building, and road decommissioning within similar landform characteristics and area.

Affected Environment

Stream systems

The stream systems within the project area are predominated by groundwater recharge resulting in extremely stable flow regimes. These streams are geologically youthful, entrenched into sandy glacial outwash and moraines. Most are relatively low gradient stream systems. Thus, given the low gradient and stable flow regimes, these systems have low stream power and are stable systems with low lateral migration rates. However, due to the predominance of sandy soils within the watershed, streambank erosion potential is high. Sediment transport ability is relatively low due to the low stream power, and once sediment is introduced into the system it takes a relatively long time for it to move through.

Streambank erosion has the potential to contribute to the instream sand bedload levels within the project area. While erosion itself is a natural process, it is felt that erosional processes on the river systems of the Huron-Manistee National Forests have been accelerated by historical land uses (Verry, Hornbeck, and Dolloff 2000), leading to elevated sand bedload levels. These levels are adversely affecting aquatic habitat. Relatively small sand bedload concentrations have an adverse effect on aquatic life through a variety of mechanisms. Unstable sand substrate, severe bank erosion and a lack of large wood are typical of many streams in northern Michigan (Alexander and Hansen, 1984).

In addition to elevated sand bedload levels from streambank erosion, transportation systems, such as roads, trails and road-stream crossings, are also a major source of sediment on both the Forest and project levels. The Forest Service has begun addressing the problem by focusing on improving stream crossings within watersheds on National Forest System lands. The crossing of Monument Road at Silver Creek and Gordon Creek are notable examples of this work within the project area.

Compounding the problem with sedimentation is the fact that present-day levels of instream large wood are lower than historical levels. Evidence based upon historical records and photographs suggests that wood played an important role in the structure and function of the aquatic ecosystems of these watersheds (Zorn and Sendek, 2001). This wood plays an important role as one of the primary channel forming agents.

Large wood is a vital component of aquatic ecosystems. It provides habitat diversity; cover for fish; habitat for invertebrates, reptiles and other components of the aquatic food chain; adds nutrients to the aquatic system and protects stream banks during high flow events. Current-day levels of large wood in aquatic ecosystems on the Huron-Manistee National Forests are much lower due to: (1) historic removal for log drives; (2) cutting of the historic forest; (3) reduced levels of recruitment from subsequent second growth forests and, (4) cutting to facilitate passage of watercraft.

Riparian Areas

The Forest Service Manual (FSM) defines riparian ecosystems as the transitional area between the aquatic ecosystem and the adjacent terrestrial ecosystem. See Figure 9 below. It is identified by soil characteristics and distinctive vegetation communities that require free or unbound water (FSM 2526.05 page 18). Aquatic ecosystems are the stream channel, lake, or estuary bed, biotic communities, and habitat features that occur therein (FSM 2526.05 page 18). Wetlands are those areas that are inundated by surface or ground water with frequency sufficient to support, under normal circumstances, vegetation or aquatic life that requires saturated or seasonally saturated, soil conditions for growth and reproduction.

Riparian areas influence tree species, nutrients, temperature, sediment, and channel dynamics.

Maintaining the riparian areas ecological function provides for good quality macro invertebrate and fish habitat. Riparian areas function to:

- Provide large woody debris for aquatic and terrestrial portions of the riparian area
- Provide soil and bank stability
- Control water temperature
- Regulate water quality
- Store and conserve water
- Provide nutrient and food to aquatic systems

- Moderate microclimate
- Provide diverse and productive sites for aquatic and terrestrial plants and animals
- Provide habitat continuity and travel corridors for wildlife
- Support distinct habitats and communities

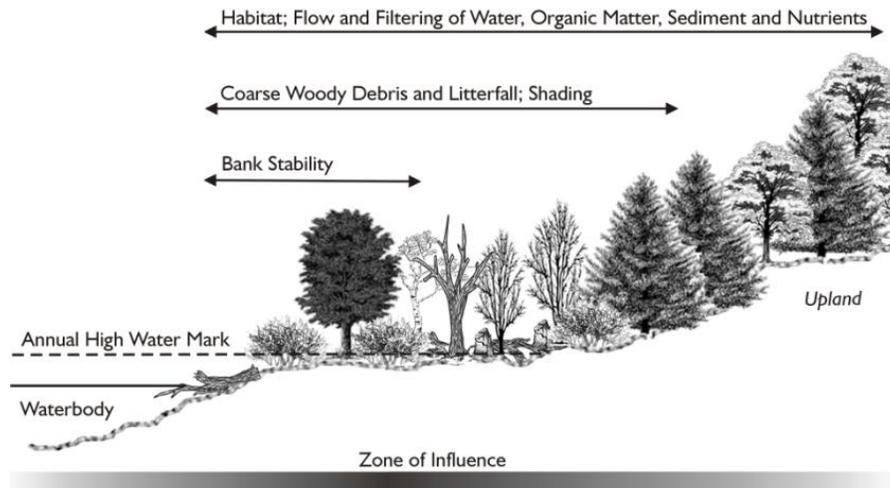


Figure 9: Riparian Area Function (<http://www.globalforestwatch.ca/riparian/figure1.png>)

Due to the extensive timber harvests of the late 1800s/early 1900s, recent (within the past several decades) red pine plantation management activities within riparian areas and natural disturbances such as beaver activity have created a general lack of large, mature long-lived trees and/or tree species diversity in some riparian areas. In addition, historical log drives cleared wood from streams and lakes to make rivers suitable for log drives. Because of this past activity most of the riparian areas across the forest are relatively young, are comprised of short lived species, or are under mature. To maintain appropriate riparian structure and function, riparian areas should be



Figure 10: Early 1900s Timber Harvest

managed for tree species diversity, large trees and shade where soils permit. Among other things, this would provide for terrestrial wildlife habitat, long term large woody debris recruitment to aquatic and terrestrial portions of riparian areas, soil and bank stability, water temperature control, and riparian area microclimate moderation.

Riparian areas defined in this analysis were based on the Riparian Management Zones, (RMZ) defined in the FEIS. An RMZ is an area where management practices are modified to protect water quality, fish, and other aquatic resources. RMZ's are typically extended to the top of the slope break to minimize impacts to water quality where possible.

Direct and Indirect Effects of Alternative I

If Alternative I were implemented, no activities would take place and habitat conditions would remain the same. Removal of vegetation along riparian areas from beaver activity has the potential to increase water temperatures as well as reduce soil and bank stability creating an increase in sediment transport and impacting the overall stream channel morphology. As a direct effect, flooding would have the potential to destroy riparian vegetation and deposit sediment.

Over time, riparian areas would naturally convert. Riparian areas provide large woody debris within the aquatic and terrestrial portions, soil and bank stability, diverse and productive sites for aquatic and terrestrial plants and animals. Maintaining healthy riparian ecological function provides for macroinvertebrate and fish habitat as well as stable banks and channel morphology for water quality.

Direct and Indirect Effects of Alternatives II and III

The proposed treatment types near water bodies are primarily red pine thinning with some shelterwood harvests proposed in oak areas. Impacts to water quality are expected to be negligible when project design features are properly implemented and maintained. Sedimentation would not be expected to occur because equipment operations would not take place beyond the slope break adjacent to water bodies. Some of the streams also have a wide alder and grass floodplain that is excluded from the treatment areas. These floodplains further separate the streams from areas of operation, thereby providing extra protection.

Small pothole wetlands or wet spots are located throughout the analysis area. There are also larger wetland complexes between uplands and adjacent to most streams. Wetlands would not be negatively impacted because these areas would not be harvested, slash would not be placed in any wetlands, and slopes adjacent to wetlands would be protected so that erosion and sedimentation would not occur. Equipment would not be operated within wetlands, except where it can't be avoided to access a stand or portion of a stand. This would only occur under frozen conditions and when no other reasonable alternative for access exists. Project Design Feature table address wetlands and various types of woodland ponds; (see the Project Design Features Table in Chapter II). No long-term detrimental water quality effects would be expected to occur from sedimentation, water temperature increases or lateral sub-surface flow in wetlands when the project design features are followed and because of the nature of the project locations. Overall, the proposed harvest treatments adjacent to the riparian corridors would help to achieve Forests' Plan goals and improve or restore aquatic/ riparian habitat in streams and lakes.

Maintenance of fish structures would provide direct and indirect beneficial effects by providing habitat diversity; cover for fish; habitat for invertebrates, reptiles and other components of the aquatic food chain; adds nutrients to the aquatic system and protects stream banks during high flow events.

Cumulative Effects

Short term effects would be expected to occur during the first growing season or the time it takes the exposed soil to become stabilized and re-vegetated. Long term effects would be expected to occur in

subsequent growing seasons, where the short term effects were more prominent on the landscape and it would take longer for the sediment to flush downstream.

Overall, the proposed harvests within the riparian corridors, would help to achieve Forests’ Plan goals and would improve or restore aquatic/ riparian habitat in streams and lakes, and therefore would have a cumulatively beneficial impact.

3.6 Fire and Fuels

Analysis Bounds

This analysis will consider management actions and other factors, such as wildfire on public and private lands within the analysis boundary. For this analysis, the short term effects timeframe is defined as 0-5 years and long term effects timeframe is defined as 5-10 years. The long term effects time frame was chosen based on the effectiveness of hazard fuels reduction treatments. The long-term duration of effectiveness for the project activities would be similar to historic timeframes, with one “maintenance” prescribed fire treatment lasting approximately seven years and mechanical treatment remaining effective for approximately ten years due to reduced over-story vegetation.

The spatial bounds of the analysis will be defined as the project area boundary. This was chosen because similar treatments will occur within the project boundary throughout the ten year planning period.

Past Present and Future Actions

Below are tables that summarize the past present and future actions both on Federal and non-Federal lands within the project analysis bounds.

Table 12: Past, Present and Future Federal Actions within Corsair Project Area

Federal Actions Within Project Area Related to Fire and Fuels Treatments	Past	Present	Future
Fuelbreak maintenance and creation	●	●	●
Wildlife opening maintenance	●	●	●
Timber harvest and reforestation activities	●	●	●
Kirtland's Warbler habitat creation and occupied habitat closures	●	●	●
Wildfire suppression activities	●	●	●
Prescribed fire activities	●	●	●

Table 13: Past, Present and Future Non-Federal Actions within the Corsair Project Area

Estimated Non-Federal Actions Within Project Area Related to Fire and Fuels Treatments	Past	Present	Future
Private utility company construction and maintenance of service lines	•	•	•
Private timber harvest activities	•	•	•
Iosco County road maintenance	•	•	•
Wildfires	•	•	•
Residential and Commercial development on private lands	•	•	•
Recreational Activities (ie hunting, hiking, camping, skiing, etc)	•	•	•

Affected Environment

Biophysical Setting Model

The Corsair Project area is comprised primarily of Biophysical Setting Model Laurentian Pine-Oak Barrens (Cox, Doug; Schillo, Becky; Slaughter, Brad). The Laurentian Pine-Oak Barrens is located on sandy outwash plains along the climatic tension zone in Michigan. It is endemic to very dry, nutrient-impooverished landscape ecosystems. Soils of this xeric, fire-prone community are generally coarse-textured, well drained sand or loamy sand with low water retaining capacity. Historically the Laurentian Pine-Oak Barrens had a canopy layer that varied from 5-60% cover.

In the Laurentian Pine-Oak Barrens frequent fire, frost and drought conditions comprised the disturbance regime. Park-like barrens with widely spaced trees and an open grass understory are maintained by low intensity, frequent fires, which occur often enough to restrict oak seedlings. Frequent fires of low intensity can maintain high levels of grass and forb diversity by deterring the encroachment of woody vegetation and limiting the dominance of the mat-forming sedges. Historically there was considerable variation in the size and intensity of fires in the pine-oak landscapes. As a result pine-oak barrens existed as a small to large patch within a matrix of prairies, barrens and pine-oak forests. (Cox, Doug; Schillo, Becky).

The Laurentian-Acadian Northern Pine-Oak forest was a mix of Vegetation Class A, B, C and D. Thirteen (13) % of the landscape was Class A defined as: barrens and open lands dominated by shrubs, sweet fern, bracken fern, blueberry, sedges, grasses and other herbaceous plants. Depending upon local site conditions (soil, climate, landforms and proximity of pine-oak seed sources) class A can succeed to either B or C. Thirteen (13) % of the landscape was Class B defined as: mixed red pine-jack pine-oak stands

with a bigtooth and trembling aspen-birch component that was established following a major disturbance event. After 30-50 years pine and hardwoods may begin to compete with pioneer aspens and birch and obtain canopy dominance. By 75-100 years aspens and birch will begin to senesce and pine and oak species reach canopy dominance. This class will succeed to Class D. Forty eight (48) % of the landscape was Class C defined as: young red pine-white pine stands less than 75 years old, jack pine could be a significant component of this mid-seral stage, especially following replacement of frequent fire events. On drier sites this class would be more fire-prone and therefore frequent surface fires would help maintain the open conditions of this class. Finally, 26% of the landscape was Class D defined as: mature red pine-white pine stands over 150 years old. There may be a subcanopy of hardwood species such as oaks and red maple. There also may be a low to mid shrub layer of witch hazel and maple-leaved viburnum (Cox, Doug; Schillo, Becky; Slaughter, Brad).

The Laurentian-Acadian Northern Pine-Oak is classified as being in the Fire Regime Group 3. Historically 16% of all the fires in this were categorized as replacement fires with an average fire interval of 295 years. Eleven percent (11) % was mixed severity with an average fire interval of 455 years. Finally, 73% of the fires occurring in this were surface fires with an average fire interval of 66 years.

Weather

In general Michigan has a humid continental climate with warm, but shorter summers and longer, cold to very cold winters (Koppen Dfb). The entire state averages 30 days of thunderstorm activity per year, and these storms can be severe.

The end of March through the beginning of June is typically the time frame with the most potential for wildfire conditions. High pressure systems often set up over the Great Lakes States in April and May to create a condition of low relative humidity (less than 25%) and warm daily temperatures (above 60° F). Drought conditions can stretch the March to June time frame through the summer months and into the fall. The data listed below utilizes the Palmer Z index to measure short-term drought on a monthly scale. The data reveals a drought return interval between 9 and 14 years. Historically the Northeastern region of Michigan shows a 10 year return interval for drought conditions that lead to severe wildfire events.

Table 14: Historic Drought for Northeastern Lower Michigan 1970-2007

Year	Month	Drought Condition	
1970	August	Extreme	
1971	September	Severe	
1976	August	Severe	
1976	September	Extreme	
1979	September	Extreme	
1980	August	Severe	TABLE KEY
1981	July	Severe	Years with 2 or more months at Severe or Higher Drought Conditions.
1983	July	Extreme	
1987	July	Extreme	
1989	July	Extreme	Extreme Drought
1989	September	Extreme	
1991	August	Severe	Severe Drought
1998	July	Extreme	
1998	August	Severe	
1998	September	Severe	
2001	July	Severe	
2002	September	Extreme	
2004	September	Extreme	
2007	August	Severe	
2007	September	Extreme	

Wildfire History

Wildfires have occurred in and around the Corsair project area in the past on a fairly frequent basis. Most were small fires, with the largest being approximately 587 acres. Figure 11 illustrates the number of fire occurrences within or around the Corsair project area from 1979-2009 that the US Forest Service and local cooperators suppressed and documented. Figure 12 illustrates the size of large fires that have

occurred within or around the Corsair project area from 1978-2010. The majority of wildland fires that occur on the Huron Shores District are human caused. Most are caused by careless debris burning in springtime.

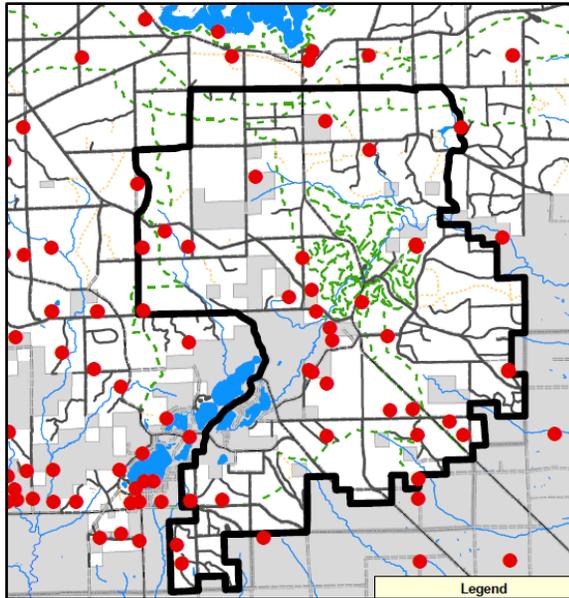


Figure 11: Fire Occurrences

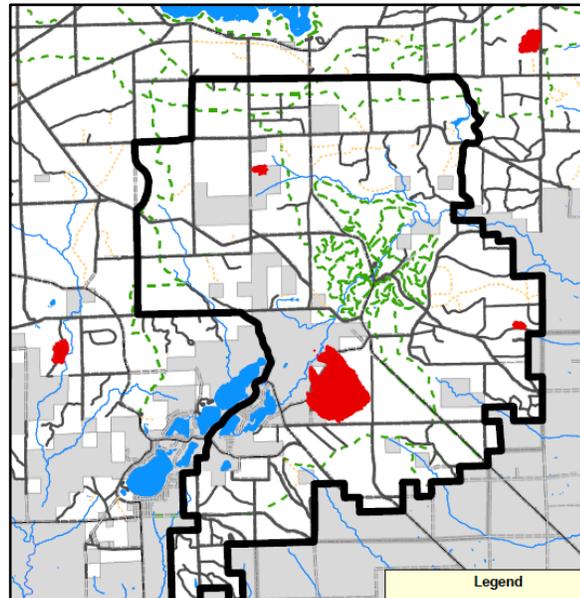


Figure 12: Fire Perimeter

The vegetation within the Corsair project area occurs on predominately dry, sandy soils which contribute to the establishment of vegetation that pose a high wildfire hazard. A risk assessment for the Huron National Forest clearly identifies most of the project area, including private property, as having potential for very high-intensity crown or surface wildland fire in either years of normal precipitation or drought. Mature jack pine, red pine, slash, and ground vegetation on National Forest System lands pose a wildfire risk to people and structures on adjacent private property.

Values at Risk

The stands of jack pine and red pine found on sandy outwash plains are part of a fire-adapted ecosystem, and therefore have a long history of periodic wildfires prior to European settlement. The suppression of fire has contributed to the development of a continuous tree canopy and abundance of small and mid-sized vegetation (ladder fuels) within these stands that allows fire to climb into the tree canopies, which may result in an intense, fast-moving crown fire (up to 277 feet per minute as observed on the Stephan Bridge Road Fire, 185 feet per minute as observed

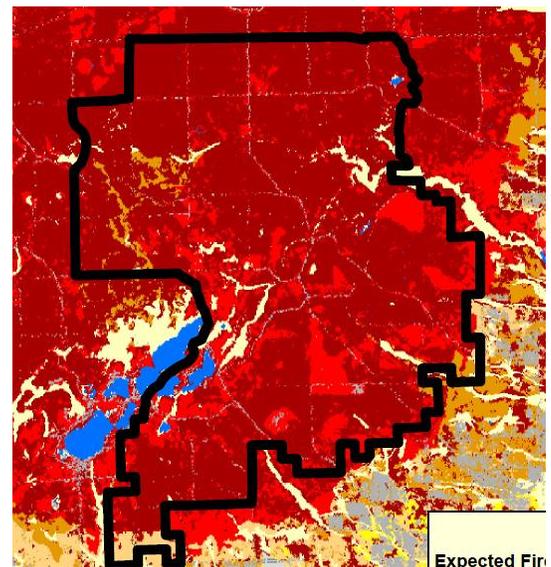


Figure 13: Expected Fire Hazard during an Average Year

on the Mack Lake Fire).

Private properties adjacent to untreated Forest lands are at a higher risk of being lost during a wildfire than properties adjacent to Forest lands where trees and shrubs are removed from around the property. In

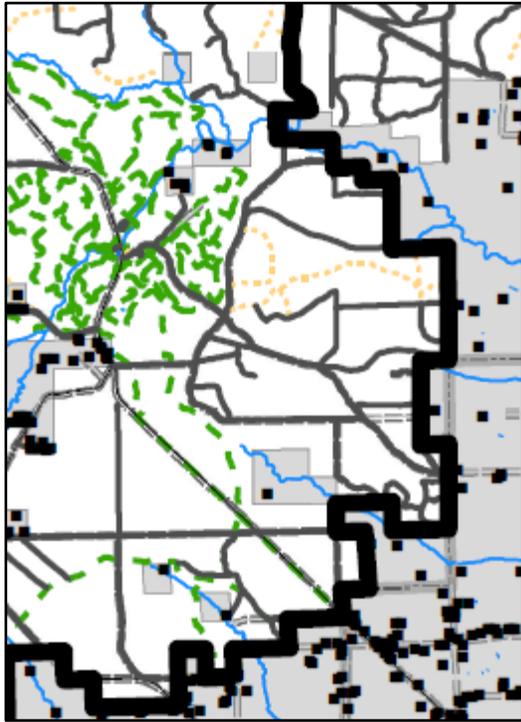


Figure 14: Private property and associated buildings

addition to the loss of private property, public and firefighter safety is at a higher risk on untreated lands where there is a greater risk for extreme fire behavior than on treated lands where fire behavior is more likely to be moderate and burning through surface fuels.

In recognition of the effects of fire suppression and the accumulation of hazardous fuels in and around the Wildland Urban Interface, (WUI) the federal government working in conjunction with state and local governments identified communities at high risk in the vicinity of Federal lands that are at high risk from wildfire. This was a collaborative effort involving the U. S. Forest Service, Bureau of Indian Affairs, Bureau of Land Management, U. S. Fish and Wildlife Service, and National Park Service. The list was published in the Federal Register (Federal Register, 2001). The State of Michigan, along with many other states, developed a comprehensive state list of communities at risk. Wilbur, Plainfield and Grant Townships are listed among the communities at high risk from wildfire.

The National Fire Protection Association (NFPA) noted in their report on the Stephan Bridge Road Fire (National Fire Protection Association) which occurred on May 8, 1990, “Northern Lower Michigan is an area with a long history of wildfires, yet people continue to build new structures dangerously close to the vegetation and too often take little or no precaution to protect themselves against known risks”. This same publication also notes: “the combination of jack pine needles and other associated litter in Michigan and other Great Lake States, especially around May of each year also provides a fuel situation that match the flammability of the California chaparral”. As noted by Simard *et. al.* in their report on The Mack Lake Fire: “in jack pine, a fire can develop from an initial spot to a running crown fire in as little as 10 minutes and to project size in 20 minutes” (Simard *et. al.* 1983).

Figure 14 illustrates the proximity of private property and associated structures to Forest lands. Not only do the private lands provide a source of human caused ignitions but they are also at high risk to wildfires established on other property and moving across the landscape.

Within treated lands fire activity has a higher potential to remain a surface fire which allows responding suppression forces the opportunity to contain the fire with minimal private and Forest land damage. However, in untreated areas where ignitions have an accumulation of fuels and the presence of ladder fuels the fire can move from the surface to the crowns. Once crown fire is established suppression efforts are mainly ineffective and tactics switch to evacuations and the protection of life.

In addition to life and property, other values at risk include but are not limited to Kirtland Warbler habitat, commercial timber stands and recreation scenic importance. State and federal monies are spent in the establishment and maintenance of this habitat in the efforts to support and increase the population of Kirtland Warblers. Severe to catastrophic fire in this area would result in the loss of money and possibly negatively impact the endangered bird population through the loss of critical habitat. Conversely, the establishment of Jack Pine (Kirtland Warbler habitat), a vegetation layer prone to extreme fire behavior, is a threat to the private property within close proximity or several miles away (spotting fire potential and historical fire spread rates).

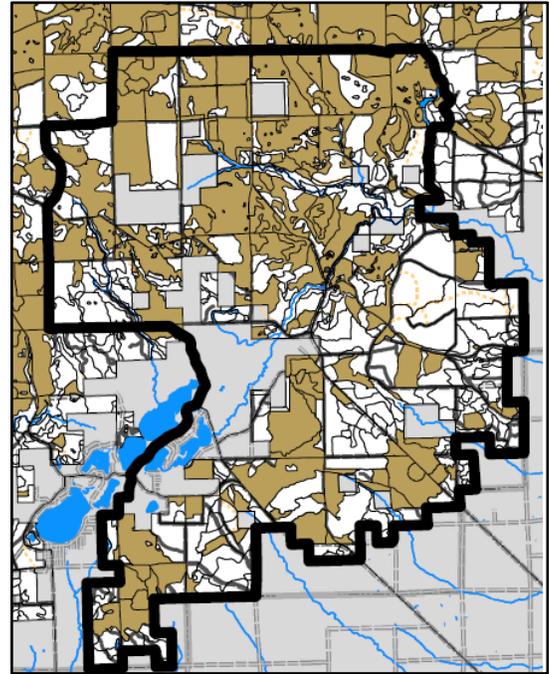


Figure 15: Presence of Red Pine within and around project area

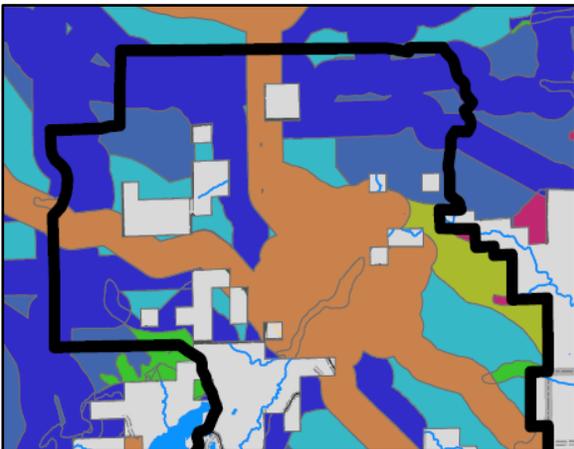


Figure 16: Different levels of Scenic Importance

Figure 15 illustrates the presence of Red Pine within and around the project area. Red Pine is an example of the possible commercial timber stands that could be at risk to the effects of catastrophic wildfire. Also at risk is the Corsair-Silver Valley trail system. In addition to its historical value of an old ski, sleigh and sledding area, a highly recreated area for hikers and cross country ski groups it is also categorized as High Scenic Importance (Figure 16) and Old Growth. The effects of catastrophic wildfire in this area would negatively impact the public’s use of this area and the ecosystem.

Current Fuel Model

The current fuel models (Scott and Burgan 2005) for the Corsair project area are divided into spring and summer or green up categories. Please refer to Table 2.

Table 15: Existing conditions adapted into fuel models using Fuel Characteristic Classification System (FCCS)

Fuel Model	Spring		Green Up		Crown Fire Potential (scale of 0-9)	Overstory Community
	Rate of Spread (ft/min)	Flame Length (ft)	Rate of Spread (ft/min)	Flame Length (ft)		
TL9	4.5	4.5	3.7	3.7	6	Jack Pine
TU2	6.1	4.4			5	Mixed Hardwoods and Pine
TL9			5	3.7	5	Mixed Hardwoods and Pine
SB3	19.3	9.9			7	Red Pine
TU1			4.9	4.1	7	Red Pine

Direct and Indirect Effects of Alternative I

In this Alternative the management activities would be deferred and projects that implement fuels reduction, fuelbreak creation and maintenance activities for the protection of life, property, and safety would not take place. Treatment of high-risk areas adjacent to private property would be deferred. Fuelbreaks would not be created adjacent to private property and biomass would not be removed or treated, thus allowing hazardous conditions like fuel loading to continue to increase. If Alternative I is selected the goals and objectives of implementing fuels reduction and fuelbreak projects where conditions are warranted for the protection of life, property, and safety would not take place. Specific management area desired conditions would not take place because restoration and maintenance of Management areas 4.2, 4.4 and 7 would not transpire. The use of prescribed burning that mimics natural processes would also not occur.



There would be no direct effect of selecting Alternative I. Fuel loadings would remain at hazardous levels and the environmental effects would not be immediately noticed. Ladder fuels in the form of tree regeneration, dead trees and associated litter accumulations, closed canopy conditions within red pine and jack pine stands and a low base canopy would remain unchanged. Private property and high value forest property would be at risk for catastrophic fire. Public and emergency responder safety would

Figure 17: Crown fire road impingement (Meridian Boundary Fire 2010)

remain at a higher risk without the implementation of fuel breaks. Fuel models would remain as identified in Table 2. Fire behavior would still be at a high probability for crown fire activity near areas of public concern (example: Silver Valley Trail system) and private property in addition to forest commercial timber.

The indirect effects would be the continual accumulation of dead and downed materials (dead trees, pine needles, leaf litter, small diameter limbs and branches) and increased potential for disease and insect damage to the forest. As these stands approach maturity or become over mature, mortality would begin to occur, leading to the establishment of regeneration which would serve as additional ladder fuels over time.

Cumulative Effects of Alternative I

The cumulative or long-term effects would be a continued increase in fuel loading within the project area. As pine stands mature and their canopies become denser, the potential for crown fires would increase. This would result in increased risk for public and firefighter safety. Fire control efforts would be increasingly difficult with a higher probability of crown fire versus surface fire. Defending structures would become extremely hazardous and virtually impossible especially if heavy fuel loadings were ignited immediately adjacent to the structure(s). It is likely that indirect suppression tactics would need to be implemented as fire intensities and lengths increase with the fuel loadings.

Forest Health would be at risk due to the damaging effects of high intensity wildfires on vegetation never exposed to fire. Long periods between fires favor the development of more shade tolerant, less fire resistant species (FEIS database, Red Pine). In a sample area of red pine dominated overstory, models conducted using the fuel models (Table 2) revealed crown fire potential to be 7 (on a scale of 0-9) and spread potential of 8.8 (on a scale of 0-9). Without fire and fuels treatments rates of spread would be from 4.9-19.3 ft/min and flame lengths from 4.1-9.9 feet. Flame lengths of this height would result in an increased resistant to fire control efforts and an increased risk to firefighter and public safety. Hardwood stands would also continue to have the potential for a high-intensity surface fire.

This alternative does not provide for the creation of defensible space (in the form of fuel breaks and/or areas of reduced fuel loading created by prescribed burning and/or thinning) needed for safer firefighting and protection of adjacent improvements. The proposed fuelbreak areas would continue to be classified as the existing fuel models listed in Table 2. During the spring, areas next to private property and homes could have flame lengths from 0-10 feet high and spread rates ranging from 0-19 feet per minute. Under typical weather and dry fuel conditions the higher rates of spread, longer flame lengths and resulting higher fireline intensities are present when large destructive fires occur. Tractor-plow and dozer fireline production rates would be very low, leading to increased time to control the fire and longer exposure times to hazardous conditions for firefighters.

Private property within the project area would continue to have dense jack pine or red pine stands immediately adjacent to structures and the arterial roads serving the project area. Escape from a major wildfire would be difficult. Emergency responders attempting to enter the area to conduct evacuations or protect homes and citizens attempting to evacuate could easily be overrun by a crown fire or intense surface fire along the arterial roads.

The intensity of a crown fire overrunning a road could trap people attempting to leave or enter the area and would cause serious injury to anyone in the fire's path. Potential flame impingement on major roads like Plank Road or Shellenbarger could be worse than what is illustrated in the photograph (Figure 17) because Plank and Shellenbarger are single lane roads. Escape under these conditions would be dangerous.

Finally, fire would not be reintroduced into fire-adapted ecosystems. Fire regimes would remain outside of historical ranges. In the short term, stand characteristics would not be changed through biomass removal, allowing for continued minimal tree spacing. Hazardous fuels would not be reduced. In the long term, Alternative I would continue to exclude fire and increase the possibility of stand replacement wildfires due to current stand characteristics.

Direct and Indirect Effects of Alternative II

Effects for Alternative II have been divided into four major categories specific to each dominant fuel type. This has been done for easier tracking.

Fuelbreaks

The Forest-wide goals and objectives of implementing fuels reduction and fuelbreak projects where conditions warrant for the protection of life, property, and safety would take place and prescribed fire would be used to mimic natural processes to accomplish resource objectives. The proposed fire and fuels treatments include the creation and maintenance of fuelbreaks adjacent to private property and biomass would be removed or treated, thus allowing fuel loading and fire hazards to decrease. Treatments of high-risk areas adjacent to private property and valued recreation sites would also be accomplished. The restoration and maintenance in accordance with identified objectives and goals of Management Areas 4.2, 4.4 and 7.1 would occur. The proposed fire and fuels treatments would accommodate seasonal closures for Kirtland's Warbler, Eastern Massasauga Rattlesnake and all other applicable closures as described in the Huron Manistee National Forests' Plan.



Figure 18: Example of fuel break with canopy spacing of 30-40 feet

The direct effects of implementing either Alternative II or III would be a decrease in fuel loading. The effectiveness of the activities would decrease as biomass increased. The indirect effects would result in fuel loadings slowly increasing within the project area without maintenance treatments. The treatments would decline in effectiveness over time, with mechanical treatments declining over a ten-year period and prescribed fire declining over seven years. The three-to-ten year maintenance schedule of the fuel breaks provide a constant benefit to the analysis area by maintaining lighter fuel loadings and thus

low fire intensity. The indirect effects also include the restoration of habitat suitable to wildlife (for example deer and turkey). The long term effects of the planned periodic maintenance treatments would

assure that that fuel loading would not increase to pre-treatment levels and the maintenance of wildlife habitat.

The use of fire (prescribed burning) that mimics natural processes would also be beneficial. Reintroducing fire both spatial and temporally back onto the landscape would create heterogeneity (diversity). Fire would create a variety of regeneration environments suitable for species colonization. Increased landscape heterogeneity consequently would lead to increased species diversity. When disturbances are intermediate in frequency and intensity, the resulting environmental heterogeneity would provide opportunities for both resident and colonizing species to persist thereby maximizing biological diversity (Pyne S. J., 1996).

Several areas are proposed for fuelbreak creation. In areas where jack pine are the primary overstory community, the creation of fuelbreaks would change the representative fuel model from a TL9 to a SB2 for spring conditions and from a TL9 to a TL6 for summer conditions (see Table 4). While the rates of spread and flame lengths increase due to the change of understory vegetation to more grasses the crown fire potential is significantly lowered from a 6 to a 4. It should be noted that even with the increase in flame lengths and rates of spread, fire suppression efforts are still aided by the conversion of the fuels from timber to grasses.

For mixed hardwoods and pines the creation of fuelbreaks changes the representative fuel models from TU2 to SB2 in the spring and TL9 to TL6 in the summer. Again, the changes in rates of spread and flame lengths are due to the increase in grasses in the understory vegetation. Removing the more flammable species like jack pine from the overstory reduces the crown fire potential from a 5 to a 4 (see Table 4).

The most pronounced change would be found in the parts of the landscape where the overstory community is comprised primarily of red pine. The creation of fuel breaks takes the fuel model from SB3 to a SB2, which lowers the possible rates of spread and the flame lengths for the spring. In summer conditions the creation of fuelbreaks takes the representative fuel model from TU1 to TL6, also lowering the possible rates of spread and flame lengths. In both spring and summer the crown fire potential is significantly lowered from 7 to 4 (see Table 4).

Table 16: Fuel Characteristic Classification System (FCCS) Modeling Results for Effects of Fuelbreak Treatments

Overstory Community	Before Treatment				Post Treatment			
	Fuel Model	Rate of Spread (ft/min)	Flame Length (ft)	Crown Fire Potential	Fuel Model	Rate of Spread (ft/min)	Flame Length (ft)	Crown Fire Potential
Jack Pine	TL9	4.5	4.5	6	SB2	14.3	6.4	4
	TL9	3.7	3.7	6	TL6	1.6	2.4	4
Hardwoods and Pine	TU2	6.1	4.4	5	SB2	14.3	6.4	4
	TL9	5	3.7	5	TL6	1.6	2.4	4
Red Pine	SB3	19.3	9.9	7	SB2	14.3	6.4	4
	TU1	4.9	4.1	7	TL6	1.6	2.4	4
Spring	Crown Fire Potential Scale 0 (lowest) to 9 (highest)							
Summer								

In addition to the mechanically created shaded fuelbreaks, the proposed fire and fuels treatments in Blocks 1, 3, 4, 13, 19, 20-24 would reduce hazardous fuels thus providing buffer areas of treated landscape between high value property (private and Forest) and proposed and established Kirtland Warbler habitat (high volumes of jack pine).

Red Pine Overstory

The direct effects of thinning and prescribed burning of red pine stands would decrease fire intensities by reducing overall fuel loading in the stands being treated. Thinning red pine stands would reduce the probability of crown fires by eliminating crown-to-crown contact. Without crown-to-crown contact the chances of a crown fire developing and the subsequent destruction of the trees on site would be greatly reduced. Overall, the probability of intense surface fires and crown fires in red pine stands would be reduced, thus providing a safer environment for firefighters and the public.



Figure 19: Unthinned red pine stand impacted by the No Pablo Fire, April 2000

There are several project areas with red pine overstory without commercial timber sales.

Blocks 1, 2, 4, 10-13, 15 and 17 would have mechanical thinning, including but not limited to brushing and limbing fuels, 50-100 feet around control features established for prescribed burning. Isolated areas of thinning activities may be required in dense stands and around recreation features within the block.

Red pine growth is generally depressed immediately following fires, but after approximately four years a surge in growth occurs that lasts for four or more years. After the initial red pine recovery period, increased growth is promoted by nutrient increases from burned or charred

organic material, removal of competing vegetation and stand thinning” (FEIS database, *Pinus resinosa*).

The three-to-ten year maintenance schedule of the red pine overstory provides a constant benefit to the analysis area by maintaining lighter fuel loadings and thus low fire intensity. The cumulative effects of the planned periodic maintenance treatments would help assure that that fuel loading would not increase to pre-treatment levels and provide for maintenance.

The Corsair-Silver Valley area has been identified as a high use recreational area and public safety is a concern in the event of a wildfire due to the accumulation of fuels. Fuels and fire treatments have been proposed to protect the scenic and visual integrity of the area by reducing the Vegetation Condition Class from a 3 to a 1 and promoting a more resilient landscape.



Figure 20: Thinned red pine stand impacted by the No Pablo Fire, April 2000

The direct effects of proposed treatments in the red pine overstory would result in a change in representative fuel models. Prior to treatments areas with red pine overstory are categorized as Fuel Model SB3 with 19.3 feet/minute estimated rates of spread, 9.9 feet estimated flame lengths in the spring (see Table 5). In Table 5, the pretreatment fuel model, rates of spread and flame lengths for summer fuels are available. With thinning only, the Fuel Model remains the same but there is a reduction in both estimated rates of spread and flame lengths. However within the summer, thinning only alters the fuel model from a TU1 to a TU2 with a slight increase in rates of spread and flame lengths due to the increase presence of grasses in the understory vegetation. The increase in rates of spread and flame lengths would not impact firefighter and public safety because of the reduction in heavy fuels and opening of the tree canopy which allows for better maneuverability within the stands. However, with the implementation of thinning and prescribed fire there is a significant reduction in rates of spread and flame lengths in both spring and summer fuel conditions (see Table 5).

Table 18: Estimated change in fuel models with thinning only and thinning and prescribed fire treatments

Before Treatment				Post Thinning Treatment				Post Thinning and Prescribed Fire Treatment			
Fuel Model	Rate of Spread (ft/min)	Flame Length (ft)	Crown Fire Potential	Fuel Model	Rate of Spread (ft/min)	Flame Length (ft)	Crown Fire Potential	Fuel Model	Rate of Spread (ft/min)	Flame Length (ft)	Crown Fire Potential
SB3	19.3	9.9	7	SB3	16.7	9.4	7	SB3	14.3	8	7
TU1	4.9	4.1	7	TU2	5.3	4.6	7	TL9	4.1	3.6	7
Crown Fire Potential Scale 0 (lowest) to 9 (highest)							Spring		Summer		

With scheduled maintenance the indirect and cumulative effects would be the conversion of the blocks to a SB3 in the spring and a TL9 in the summer which would greatly reduce flame lengths, rates of spread and fireline intensities should a fire occur, thus making for safer firefighting.

In the long term, fuels would accumulate. As fuel loadings accumulated, fire intensity would increase thus increasing risk to both the public and firefighters. The periodic prescribed burning of the blocks or sections within identified blocks would (in the short term) reduce hazardous fuels and fuel loading thus protecting the public and firefighters should a fire occur. This would be done on a three to seven year cycle in the red pine to prevent the accumulation of fuels to unacceptable levels. The indirect effects also include the restoration of habitat suitable to wildlife (for example deer and turkey). The cumulative effects of periodic prescribed burning would be the reduction of hazardous fuels conditions, the reduction of the Vegetation Condition class from a 3 to a 1 and the reintroduction of fire into fire-adapted

ecosystems thus fulfilling Forests’ Plan objectives and goals. There would also be a reduction in the probability of damage to private and public improvements should a wildfire occur, a reduction of fuel loading to provide for public and firefighter safety and protection of public and private property in the event of a wildfire.

Jack Pine Overstory

With the proposed treatments in a jack pine overstory the direct effects would be the conversion of treated areas from a TL9 to a TL5 in the spring and a TL8 in the summer (see Table 18). As shown in Table 18, with the implementation of the proposed treatments average fuels in the spring would exhibit reduced rates of spread, from 4.5 feet per minute to 1.9 feet per minute. Flame lengths would also be reduced from 4.5 feet to 2.8 feet post treatment for spring fuels. Similar reduction in rates of spread and flame lengths can be estimated in summer fuel conditions (see Table 18).

Table 19: Estimated change in Jack Pine overstory fuels with implementation of proposed treatments.

Before Treatment				Post Prescribed Fire Treatment			
Fuel Model	Rate of Spread (ft/min)	Flame Length (ft)	Crown Fire Potential	Fuel Model	Rate of Spread (ft/min)	Flame Length (ft)	Crown Fire Potential
TL9	4.5	4.5	6	TL5	1.9	2.8	3
TL9	3.7	3.7	6	TL8	1.6	2.4	3
Crown Fire Potential Scale 0 (lowest) to 9 (highest)						Spring	Summer

With scheduled maintenance the indirect and cumulative effects would maintain the conversion of the blocks to the respective seasonal fuel models. While treatments would not eliminate the risk for crown fire, with the conversion of fuel models the estimated change in fuel models results in a reduction of crown fire potential from 6 to 3. The cumulative effects of these changes would greatly reduce flame lengths, rates of spread and fireline intensities should a fire occur, thus making for safer firefighting.

The periodic prescribed burning of Blocks 3 and 8 would in the short term reduce hazardous fuels and fuel loading (thus protecting the public and firefighters should a fire occur) For jack pine stands, short-term fuel loading reductions would be from 4.7 to 21.7% (approximately 1.55 to 7.10 tons per acre respectively). In the long term, fuels would increase as the time an area was last prescribed burned increased. As fuels loading increases so would fire intensity thus increasing risk to both the public and firefighters. However, the proposed three-to seven-year prescribed burning interval or mechanical treatment would not allow fuels to accumulate to unacceptable levels.

With the implementation of the proposed treatments the Vegetative Condition Class would be reduced from a 3 to a 1 and fire resistant vegetation would be favored in order to create a buffer to assist firefighters in fire suppression efforts between high value resources (private lands, recreation areas) and Kirtland Warbler Habitat areas.

Mixed Hardwoods and Pine Overstory

The direct effects of the proposed treatments in mixed hardwoods and pine overstory would result in a change in representative fuel models. Prior to treatments areas within the mixed hardwoods and pine overstory are categorized as Fuel Model TU2 with 6.1 feet/minute estimated rates of spread and 4.4. feet estimated flame lengths in the spring (see Table 20). In Table 20, the pretreatment fuel model, rates of spread and flame lengths for the summer are available. With thinning only, the Fuel Model stays the same and there is a slight increase in both estimated rates of spread and flame lengths due to the increase in grasses in the vegetative understory in both spring and summer fuel conditions. The increase in rates of spread and flame lengths would not negatively impact firefighter and public safety because of the reduction in heavy fuels and opening of the tree canopy which allows for better maneuverability within the stands. However, with the implementation of thinning and prescribed fire there is a significant reduction in rates of spread and flame lengths in both spring and summer fuel conditions (see Table 20).

With scheduled maintenance the indirect and cumulative effects would result in the conversion of Blocks 14, 16, 17, 19 – 24 to a TL9 in the spring and a TL8 in the summer which would greatly reduce flame lengths, rates of spread and fireline intensities should a fire occur, thus providing an environment for safer firefighting.

Table 20: Estimated change in fuels in the Mixed Hardwood and Pines dominated overstory with proposed treatments

Before Treatment				Post Thinning Treatment				Post Thinning and Prescribed Fire Treatment			
Fuel Model	Rate of Spread (ft/min)	Flame Length (ft)	Crown Fire Potential	Fuel Model	Rate of Spread (ft/min)	Flame Length (ft)	Crown Fire Potential	Fuel Model	Rate of Spread (ft/min)	Flame Length (ft)	Crown Fire Potential
TU2	6.1	4.4	5	TU2	6	4.5	5	TL9	5.5	3.6	5
TL9	5	3.7	5	TL9	4.9	3.8	5	TL8	3.9	2.8	5
Crown Fire Potential Scale 0 (lowest) to 9 (highest)								Spring	Summer		

In the long term, fuels would accumulate as the time an area was last prescribed burned increased. As fuel loadings accumulate, fire intensities would increase thus increasing risk to both the public and firefighters. The periodic prescribed burning of the blocks or sections within identified blocks would (in

the short term) reduce hazardous fuels and fuel loading thus protecting the public and firefighters should a fire occur. This would be done on a three to seven year cycle in the mixed hardwoods and pines to prevent the accumulation of fuels to unacceptable levels. The indirect effects also include the restoration of habitat suitable to wildlife (for example deer and turkey).

With scheduled maintenance the indirect and cumulative effects would maintain the conversion of the blocks to the respective seasonal fuel models. While treatments would not eliminate the risk for crown fire, with the conversion of fuel models the estimated change in fuel models results in a reduction of crown fire potential from 6 to 3. The cumulative effects of these changes would greatly reduce flame lengths, rates of spread and fireline intensities should a fire occur, thus making for safer firefighting. There would also be a reduction in the probability of damage to private and public improvements should a wildfire occur, a reduction of fuel loading to provide for public and firefighter safety and protection of public and private property in the event of a wildfire.



Figure 21: Low to moderate fire intensity on a prescribed fire in Mixed Hardwood and Pine Overstory

The periodic prescribed burning of Blocks 14, 16, 17, 19 – 24 would in the short term reduce hazardous fuels and fuel loading (thus protecting the public and firefighters should a fire occur). For these blocks the short-term fuel loading reductions would be approximately 4% (approximately four tons per acre). In the long term, fuels would increase as the time an area was last prescribed burned increased. As fuels loading increases so would fire intensity thus increasing risk to both the public and firefighters.

However, the proposed three-to seven-year prescribed burning interval or mechanical treatment would not allow fuels to accumulate to unacceptable levels.

Cumulative Effects of Alternative II

It should also be noted the added cumulative effects of the proposed red pine overstory treatments over time on the landscape. The reduction of hazardous fuels accumulations, reducing the Vegetation Condition Class and the ecosystem restoration to historical Biophysical Setting Models serves as a buffer between Kirtland Warbler habitat areas. The buffers would provide firefighters areas where fire behavior would be expected to be less severe, opportunities for a crown fire to be reduced to a surface fire and the implementation of direct attack tactics. This would also buy time to implement evacuations if they are needed, rather than if the landscape had one contiguous heavy fuel bed (present conditions).

Direct and Indirect Effects of Alternative III

The identified proposed fire and fuels treatments for Alternative III are almost identical to Alternative II. Both are in conjunction with the Huron Manistee National Forests' Plan. The Forest-wide goals and objectives of implementing fuels reduction and fuelbreak projects where conditions warrant for the protection of life, property, and safety would take place and prescribed fire would be used to mimic natural processes to accomplish resource objectives. The proposed fire and fuels treatments include the creation and maintenance of fuelbreaks adjacent to private property and biomass would be removed or treated, thus allowing fuel loading and fire hazards to decrease. Treatments of high-risk areas adjacent to private property and valued recreation sites would also be accomplished. The restoration and maintenance in accordance with identified objectives and goals of Management Areas 4.2, 4.4 and 7.1 would occur. The proposed fire and fuels treatments would accommodate seasonal closures for Kirtland's Warbler, Eastern massasauga rattlesnake and all other applicable closures as described in the Huron Manistee National Forests' Plan.

All the treatments described for Alternative II would occur with minor adjustments that result in an overage acreage reduction of 71 acres for Alternative III. Adjustments were made to accommodate discussions between Agency specialists and public comments. Distinctive changes for Alternative III is the removal of the proposed treatment for oak, north of Bischoff road located in Township 23 North, Range 7 East, Sections 23 and 26. Alternative III also includes proposed hazardous fuels reduction in the entire trail system for Wright's Lake (Block7) (Township 23 North, Range 7 East, Sections 21 and 15). Finally, Alternative III allows for the expansion of the proposed treatments in Block 11 to include everything in the northeast corner of Section 3 (Township 22 North, Range 7 East) within Monument Road, FS road 4544 and Kobs Road. Adjustments were made in Blocks 10 and 14 to exclude fire from selected Red Pine stands and the oak thinning was removed from Block 16.

Smoke Management for All Alternatives

The US Forest Service, Michigan Department of Natural Resources, Michigan Department of Environmental Quality – Air Quality Division, Michigan Department of Military and Veteran's Affairs, US Fish and Wildlife, Bureau of Indian Affairs, Nature Conservancy and the City of Ann Arbor are all parties to the Smoke Management Agreement (SMP) which identifies their agreement to implement the requirements of the Michigan Smoke Management Program (hereafter referred to as "smoke management program) to fires they ignite or to naturally ignited fires that they manage. The development of the Michigan Smoke Management Plan was based upon Section VI, "Smoke Management Programs" of the U.S. Environmental Protection Agency's (EPA) "Interim Air Quality Policy on Wildland and Prescribed Fires". The purposes of the Smoke Management Plan are to mitigate nuisance and public safety hazards, reduce smoke intrusions into populated areas, prevent deterioration of air quality and National Ambient Air Quality Standards and to address visibility impacts on federal mandatory Class I areas.

Implementation of fire and fuels treatments utilizing prescribed fire would be in accordance to the provisions outlined in the program. Prescribed fire treatments conducted in the past and historical weather data indicate "Michigan generally has meteorological conditions that result in good ventilation and resultant smoke dispersion during the spring. Historically most wildland fire activity, including both prescribed and wildfire, takes place this time of year" (Michigan Smoke Management Program 2012).

As per US Forest Service policies and outlined in the smoke management program is a process for assessing and authorizing burns that includes the development of a burn plan for prescribed fire treatments. Along with many requirements of items to be documented in a burn plan there are also requirements for estimates for fuel loading (tons/acre) to be burned to estimate air quality impacts and the development of safety and contingency plans to address possible smoke intrusions.

As per US Forest Service policy and the smoke management program “daily monitoring of atmospheric conditions and weather forecasts are necessary to determine the impacts of large air masses and atmospheric disturbances on smoke dispersion. Mixing height, transport wind speed, and ventilation index are produced as part of daily Fire Weather Planning Forecasts in Michigan. For much of the year throughout much of the state, atmospheric conditions are capable of acceptably dispersing wildland fire smoke and smoke byproducts. However, seasonal trends in atmospheric dispersion potential should be part of any plans for smoke management associated with fire use” (Michigan Smoke Management Program 2012).

In the development of burn plans for prescribed fire treatments within the Corsair project areas burn plan writers would be required to follow a national interagency template which addresses many different

Table 21: Ventilation Index and Dispersion categories identified in the Michigan Smoke Management Program.

Ventilation Index	Dispersion Category
0 –130	Poor
131-299	Fair
300 – 599	Good
600+	Excellent Dispersal

elements. One of the required elements is to create a site specific smoke management plan. This plan evaluates potential impact areas, establishes mitigation strategies and techniques to reduce smoke impacts and develops contingency plans for adverse smoke impacts. Another element identifies the weather parameters or prescription under which prescribed fire treatments can be implemented to accomplish fire, fuels and smoke

management objectives. One item burn plan writers can identify when developing the burn prescription is acceptable ventilation indexes (see Table 8) in the effort to minimize smoke impacts on surrounding areas. For example, a burn plan may contain the following prescription, “the ventilation rate should be above 620 if burning with a south wind and ignitions should be conducted in a manner that lifts the smoke up and over River Road.”

Historically, most prescribed fire treatments on the Huron side of the Huron Manistee National Forest have had ignition operations complete within one burn period with minor smoke impacts the following days.

Emissions	Jack Pine		Red Pine		Mix	
	PRE*	POST*	PRE*	POST*	PRE*	POST*
PM	0.56	0.39		0.62	0.53	0.48
PM10	0.4	0.28		0.45	0.35	0.32
PM2.5	0.37	0.26		0.41	0.31	0.28
CO	3.11	2.19		3.48	4.31	3.97
CO2	50.01	36.61		53.74	49.93	43.46
CH4	0.15	0.1		0.17	0.23	0.21

*Emissions measured in tons per acre

Table 22: Estimated emissions pre and post proposed treatments utilizing FCCS and Consume Models

Screening models such as the SHRMC Simple Smoke Screening tool are available for the Prescribed Fire Burn Boss to view where smoke could travel to and determine possible impacts. Other Regional Smoke Dispersion Systems like BlueSky and HYSPLIT are available to estimate smoke emissions, possible trajectories and smoke dispersal on the day of a prescribed burn using the forecasted weather to evaluate smoke impacts.

For the Corsair project area the computer software Consume v3_0 was utilized to predict pollutant emissions based upon estimated fuel loadings, fuel moistures and other environmental factors. Table 22 illustrates the differences between emissions for fire on the landscape the first time versus a second time (post one treatment). There is a reduction in emissions in all overstory communities. While this is an estimate, the models show the beneficial effects of the proposed treatments on the landscape with a reduction in emissions post treatment. If a wildfire were to occur in similar areas post treatments during the modeled fuel conditions, the resulting emissions would be similar.

Cumulative Effects of All Alternatives

Alternative would not correspond with past, present and reasonably foreseeable future actions within the project area. Alternative I would not drive the project area toward accomplishing the Goals and Objectives and the Desired Conditions outlined in the Forests’ Plan, particularly in regards to hazardous fuels treatments. The selection of Alternative I would result in a positive cumulative affect by allowing the continued accumulation of hazardous fuels in the wildland urban interface, identified communities at risk (Federal Register, 2001), and intermix areas and increasing the threat to public and firefighter safety.

When combined with past, present and reasonably foreseeable future actions both Alternative II and III would move the project area toward accomplishing the Goals and Objectives and the Desired Conditions outlined in the Forests' Plan, particularly in regards to hazardous fuels treatments. Both Alternatives have a positive cumulative affect by reducing hazardous fuels in the wildland urban interface, identified communities at risk (Federal Register, 2001), and intermix areas and achieving fire-hazard reduction.

Alternatives II and III would also be correspond with similar decisions made in the on an adjoining landscape level project, for example the Brittle 2 Environmental Assessment (2010).

The past, present and future action for the analysis area are illustrated in Tables 9 and 10.

The cumulative effects of implementing treatments within the Brittle 1 and 2 Environmental Assessment areas, wildlife opening maintenance within and around the Corsair Project area and the proposed treatments within Alternatives II and III for the Corsair Environmental Assessment produce cumulative affects with regards to smoke production in the past, present and future of the landscape. However, as described in the Smoke Management Plan

“The use of wildland fire presents the need to weigh the trade-offs associated with the ecological benefits of fire versus the impacts of a short term increase in emissions from current and accelerated burning programs. Part of this trade-off involves the careful consideration of and application of smoke management techniques to minimize the amount and/or impact of emissions while still meeting ecological needs. An example of this trade-off to be considered is the increased fuel consumption from a wild fire burning under severe meteorological conditions vs. the reduced fuel consumption of a prescribed fire ignited that might burn under moderate weather conditions.”

As mentioned in the Smoke Management section of this report, the production of smoke must be managed to the best of our abilities (ventilation index, wind direction, etc) while striving to meet Forests' Plan Objectives and Goals. However, National Inventories of Emissions show the overall production of emissions from Prescribed Fire and Wildfires is minimal when compared to emissions from Anthropogenic sources (see Table 22) (www.nifc.gov).

When combined with past, present and reasonably foreseeable future actions both Alternative II and III continue the trend of reintroducing fire into fire-adapted ecosystems. The proposed actions are cumulative

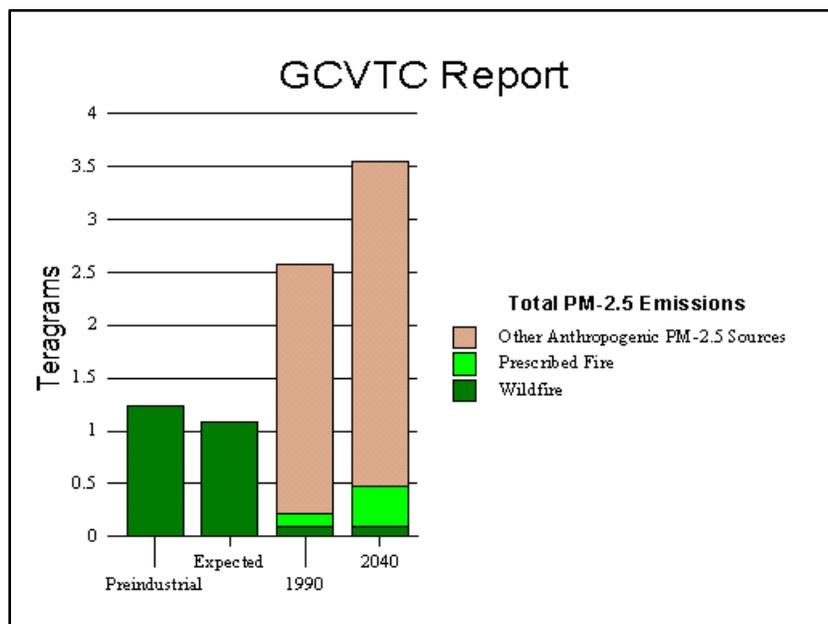


Figure 22: Comparison of Historic and Contemporary Wildland Fire and Anthropogenic Emissions. (www.nifc.gov)

with fuelbreak creation and maintenance, wildlife opening maintenance, timber harvest and prescribed burn activities.

Alternatives II and III would have a positive cumulative effect on restoring the natural fire regime by maintaining disturbances in ecosystems what have adapted over time to periodic shot-return interval disturbances (particularly fire). When combined with past, present and future activities these projects would provide short term and long term positive contributions within the analysis boundary by increasing tree spacing, reducing fuels and reintroducing fire into the ecosystem.

3.7 Transportation

Analysis Bounds

The cumulative effects analysis area for transportation resources will be defined as the project area. This geographic bound 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 five years of transportation management activities and the reasonably foreseeable future ten years. This temporal boundary was chosen because transportation management during this timeframe is closely associated with the timber management during this same timeframe.

Past, Present and Future Actions

The primary goals and objectives of the Forests' Plan are to maintain roads that meet health and safety, resource and administrative needs (Forests' Plan II-3). Roads also provide access to a variety of wildlife habitats, recreational opportunities, and access to private property.

The Jumpin' Jackpine Kirtland's Warbler Environmental Assessment decision document signed in 2008 and the Fountain Kirtland's Warbler Environmental Assessment decision document signed in 2006 identified approximately nine (9) miles of unauthorized roads for closure. These nine (9) miles of roads will be closed as resource management occurs by either planting of trees through the roads to create Kirtland's warbler breeding habitat or placing a physical closure on the roads.

Transportation projects that have been recently completed within this project area are: 1) The upgrade of Monument Road to improve the road/stream crossings of Silver and Gordon Creeks, widen the road asphalt and road shoulders and improve culvert installations and, 2) Forest Road 4103 has been upgraded to a Maintenance Level 3-4, Collector Road as part of the plans for future vegetation treatment projects.

Other than routine maintenance, no other roads maintenance projects are planned for the near future within this project area. Future temporary roads may be created for administrative use as a part of project implementation over the next decade, however temporary roads are closed within a year of project completion. Temporary roads are not included as part of the transportation system analysis.

Affected Environment

ID Team members drove all roads in the project area and assessed roads to retain on the following criteria: 1) Roads are needed for resource access, 2) roads that are not duplicates, 3) roads are not causing

resource damage, 4) roads are in good drivable condition and not overgrown, 5) roads are accessing resources, 6) roads are being used for activities such as dispersed camping or roads are being used for other recreational activities.

The Forests' transportation system provides many benefits associated with resource management and public use of the National Forests identified as:

- Access for recreationists – hunters, driving for pleasure, berry picking, and mushroom picking
- Access for private land inholdings
- Access special uses – power lines, pipe lines, telephone, and mineral developments
- Access for management – wildlife, watersheds and vegetation, fire suppression, other resources

The Forests' transportation system provides many risks and problems identified as:

- Roads serve as introduction areas for non-native species
- Cowbird parasitism – roads in mature forests increase risk to songbirds
- Road noise may prevent wildlife from using habitats adjacent to roads and trails
- Direct effect on terrestrial wildlife – reduction in habitat
- Roads cause wildlife mortality due to vehicle wildlife collisions
- Illegal human activities – poaching, trash, off-road motor vehicles
- User created (unauthorized) roads that access lands closed to motor vehicles
- Increased potential for destructive wildfire in remote locations
- Increased access for timber theft

The benefits and risks associated with the forest transportation system are part of the character of the affected environment. The Forest Service is mandated to provide sustainable access in an environmentally responsible manner, to restore areas when roads are no longer needed, maintain the minimum road system needed for sustainable public and agency access and to conduct the work in a fiscally responsible manner.

There are several designated types of roads within the project area. Definitions of common road terminology are located in Appendix B.4.

Arterial roads are roads that provide service to large land areas to form an integrated network of primary travel routes. They have been designed based on the demand for travel efficiency rather than resource management. *Collector roads* serve smaller land areas than arterial roads and they usually collect traffic from local roads onto arterial roads. *Local roads* serve the smallest land areas and are roads that connect terminal facilities with collector and arterial roads.

Within the Corsair project area there are approximately 99 miles of Forest Local and Collector roads open to the public and approximately 17.5 miles of County Collector roads. This totals 116.5 miles of Collector and Local roads that are open to motor vehicles. County roads are maintained for motor vehicle access between communities and residences and serve as collector roads for Forest resource activities. The Forest roads are maintained to conduct resource management activities and serve as public access to Forest resources.

Paved Collector roads within the project area include a primary access route known as Monument Road traversing north and south through the middle of the project area. Monument Road is a designated Federal Highway and a Federal Highway Easement has been issued to the Iosco County Road Commission to operate Monument Road as a two-lane public highway. Other Collector roads within the

project area include portions of Sand Lake Road, Camel Road, Plank Road and Essex Road. These are maintained as paved Iosco County roads. Unpaved Forest roads 4101, 4102, 4103 and 4301 are other Collector roads interspersed within the Corsair project area. Of the 116.5 miles within the Corsair Project there are approximately 34 miles of roads identified as Collector roads and are associated with Maintenance Levels 3 and 4.

Local roads within the project area are primarily native surfaced roads with some roads improved to include crowning, drainage structures or ditches, and graveled surfaces. Many of the local roads are referred to as two-tracks with very little improvement other than an identifier sign. Of the 116.5 miles of open road within the Corsair Project there are approximately 83 miles of roads identified as local roads and are associated with Maintenance Level 2 and 3.

The Forests' Plan direction is to reduce the number of miles of roads, regardless of type, by emphasizing closures of roads determined to be non-essential. The Forests' Plan also directs resource managers to maintain the minimum road system necessary to provide administrative and public access (Forests' Plan II-3 and II-5).

The Forests' Plan has established average and maximum road densities by type of road within Management Areas (MA's). The following are specific road density provisions for transportation facilities established by the Forests' Plan for the MA's within the Corsair Project boundary:

Table 23: Forest's Plan Road Densities by Management Area

Road Type	Miles/Square Mile	MA (Management Area)
Local	0-2	4.2, 4.4
Collector	1-2	4.2
Collector	0-1	4.4
Arterial	0-0.7	4.2, 4.4
All Roads*	0-3	All MA's

*The maximum average of three miles of road per square mile in all road types for all MA's.

MA 7.1 occurs within the project boundary however road densities have not been established for MA 7.1 by the Forests' Plan. Roads are present however they are gated in order to provide access for administrative needs or other permitted purposes.

National Travel Management Rule

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 roads, trails, and areas that are open to motor vehicle use. The rule prohibits motor vehicles off the designated system. Beginning in March 1, 2008, the Huron National Forest implemented the National Travel Management final rule by publishing a Motor Vehicle Use Map (MVUM). The MVUM is published annually and identifies forest roads open to public motor vehicle use. All roads not on the map (or not on the designated transportation system) are illegal to drive. Refer to the 2013 Huron National Forest Motor Vehicle Use Map in the project file.

Unauthorized Roads

Unauthorized roads are user-created roads, unplanned roads, abandoned travel ways, and off-road vehicle tracks that have not been designated and/or managed as part of the forests transportation system.

Unauthorized roads inventoried for this project ranged from old timber sale haul roads that had been closed and re-opened by users or user-created roads for access to firewood, camping and hunting spots or for off-road driving. There are approximately 58 miles of unauthorized roads inventoried in the Corsair project area.

Unauthorized roads cause resource damage. Motor vehicle use on unauthorized roads causes an array of resource issues. Illegal ATV use is occurring on these roads as well. It has been well documented that unauthorized roads, especially near communities, have higher amounts of household trash dumping, household building materials, illegal tree cutting, soil compaction, vegetation loss, higher infestations of NNIS and have a higher number of unattended burning campfires that contribute to an increase of wildfire ignitions. In many cases, unauthorized roads become severely eroded and as a result, large amounts of soil wash into streams and drainages. Unauthorized roads cost the Forest Service thousands of dollars annually in garbage pickup costs, wildfire suppression costs, and soil restoration project costs. To reduce this resource damage and the associated financial burden on the agency, unauthorized roads are physically closed to public motor vehicle use through placement of gates, berms, or other type of barriers.

This project area assessment has reviewed the Forest's inventory of unauthorized roads in the Corsair project area and has proposed to physically close 58 miles. There are also unauthorized road segments proposed to be reclassified and added to the Forest transportation system. These road reclassifications will be described in Alternative II and Alternative III.

Roads closed to public motor vehicle use include 12 miles of Administrative roads that are a part of the inventoried Forest transportation system. Administrative roads are generally Maintenance Level 1 and 2 roads, and may have a physical closure such as a guard rail, gate or earthen berm to restrict motor vehicle access.

Fifty eight (58) miles of unauthorized roads have been inventoried. The decision to inventory and identify unauthorized roads was completed in 2008 with the National Travel Management Regulation and publishing of the Forest MVUM. Unauthorized roads are not part of the Forest Transportation System and are not open to public motor vehicle use and are not included in the road density evaluation (open roads). However, unauthorized roads are included in this analysis and linear routes on the landscape because unauthorized roads allow motor vehicle access to areas that result in resource impacts and require physical closure by the Forest Service to stop motor vehicle use. Miles of unauthorized road, densities and numbers of unauthorized roads identified within this document will not be included as part of the final decision to decommission roads as that decision was made in 2008 with the publishing of the Forest's MVUM.

The Forest's inventory of unauthorized roads finds that there are 15 road segments that may be needed for private access. There are two (2) electric power distribution lines with roads as part of the utility special use authorization; these power line access/maintenance roads are currently identified as unauthorized roads. Reclassifications of unauthorized roads to higher Maintenance Levels within the Corsair project area would be considered in the project decision. For example, in Alternatives II and III, several

unauthorized roads are proposed to be opened to public use or proposed to be used as administrative roads for resource activity.

Current Road Densities in Project Area

Table 24 displays the existing roads in the analysis area by road type, MA, miles, and road densities. The Forests' Plan defines the maximum road densities for all MA's as 0-3 miles of road per square mile.

Table 24: Current Road Statistics for the Corsair Project Area Roads

Road Type	Management Area	Miles within Project Area	Miles/Sq. mile in project area	Forests Plan Miles/Sq. Mi.
County/Forest Service Collector	4.2 Roaded Natural	20.1	0.61	1-2
County/Forest Service Collector	4.4 Rural	9.3	2.32	0-1
County/Forest Service Collector	7.1 Conc. Recreation	3.9	--	--
Forest Service Local Roads	4.2 Roaded Natural	63.3	1.92	0-2
Forest Service Local Roads	4.4 Rural	13.1	3.28	0-2
Forest Service Local Roads	7.1 Conc. Recreation	6.8	--	--
Total Roads Open to Public Use		116.5	2.78	0-3
Administrative Roads		12		
Unauthorized Roads		58		
Private Roads on Private Property		14.2		
Total Project Area Roads*		201		

* Does not include trails that are not a road.

Within the road miles displayed in Table 24, the Forest recognizes that several roads may be needed for access to private lands that have not been formalized by issuance of a Forest Service special use permit or easement. The Forest's inventory of Local roads finds that there are eight (8) road segments that are ¼ mile in length or less that serve only the private landowner and are not needed for resource management or public access. There are six (6) private roads special use permits that have been issued for roads leading to private land. Three (3) of these special use roads are identified as system roads open to public motor vehicle use and three (3) of these special use road permits have allowed a gate that closes the road to public motor vehicle use. The Forest continues to work with private landowners on a case by case basis to create and maintain authorizations for private access across National Forest System lands.

The 201 total miles of roads physically located on the Corsair Project area landscape are displayed on the Corsair/Sand Lake Existing Condition Transportation Map, Appendix B.4. It is interesting to note that the greatest distance that a person could find themselves from a road is approximately ¼ mile. The proximity to population areas make the Corsair Project area extremely accessible for all types of users and compound the landscape scale benefits of having higher road densities. Consequently, having such high road densities also highlights the problems and risks associated with having so many roads.

Direct and Indirect Effects of Alternative I

Implementation of the No Action alternative would not result in the addition or decommissioning of any forest system road miles or densities. Existing forest road densities would remain unchanged. Road maintenance or improvements (brushing, spot gravel and culverts, grading) associated with resource activities would not occur. The addition of culverts and gravel aprons at highway approaches and road intersections in order to facilitate access would not occur. Temporary roads would not be constructed as no resource actions would be implemented.

System roads would continue to be maintained as the Forest budget allocations would allow by localized brushing and spot gravelling as part of the road maintenance program. Maintenance would occur as funding is available on Collector roads, Level 3 and Level 4 Maintenance Level roads. With no management activity planned; Local roads, Level 2 and Level 1 Maintenance Level roads would not receive maintenance. Miles of road available for public motor vehicle use will not be affected.

Decommissioning of unauthorized roads would continue, however, the number of roads the Forest would be able to physically close would be minimal as funding is generally not provided for road closures unless associated with other resource management activities.

Alternative I addresses Issue 2 described in Chapter 1 (Management of the roads system). Specifically, it addresses those commenters who wanted fewer road closures. Alternative I does not address the Forests' Plan management direction to reduce the number of miles of roads.

Cumulative Effects of Alternative I

The Corsair Project's existing condition transportation map displays the entirety of the road system on the Corsair Project area landscape (refer to Appendix B.4). There are approximately 33.3 miles of Collector roads inventoried in the Corsair Project making up approximately 29% of the open road system. These roads are well-established and distributed evenly across the project area. Road maintenance is often times directed to higher maintenance levels roads (for example Collector Roads) because higher maintenance level roads are more traveled. The Forest continues to place the majority of available maintenance dollars into Collector roads.

Collector roads densities within Management Area 4.4 exceeds the Forest Plan direction of 0-1 miles per square mile, however, because these roads are in a Rural setting around the private lands status and location and the proximity to the Sand Lake /National City community these roads are needed as Collector roads.

The No Action Alternative would perpetuate the risks and problems identified in the Affected Environment portion of this section (refer to page 103). When unauthorized roads are not physically

closed, this condition invites continued driving, high amount of illegal dump sites of household garbage, building materials waste, scrap tires, illegal firewood cutting and wildfire ignitions.

Issue 2 suggests management of the Forest Service road system. Alternative I addresses fewer road closures however it does not address the need to reduce the net number of miles. Existing conditions exceed the standards for road densities. Alternative I when considered with past, present, and foreseeable future actions would allow the continued existing condition of high to excessive road densities in Local road types according to Forests’ Plan direction.

Direct and Indirect Effects of Alternative II

Alternative II proposes:

- 14 Forest road segments (7.1 miles) identified as “Level 2 System Roads Open to the Public” be obliterated and removed from the Forest road system.
- 1 Forest administrative road segment (.7 miles) identified as “Level 1 System Road Closed to Public Motor Vehicle Use”) be obliterated and removed from the Forest road system.
- 46 unauthorized road segments (14 miles) identified to obliterate as part of the Corsair Project.

Implementation of the Modified Proposed Action, (Alternative II) would decrease the existing 116.5 total miles of *open* road to 109.4 miles. No Collector Roads are proposed for closure by Alternative II. Thirteen Local roads in MA 4.2 would be obliterated, reducing the Local road mileage. One Local road is proposed to be obliterated in MA 4.4 reducing the Local road miles from 13.1 miles to 12.59 miles.

Table 25: Alternative II Road Statistics for the Corsair Project Area Roads

Road Type	Management Area	Miles within Project Area	Miles/Sq. mile in project area	Forests Plan Miles/Sq. Mi.
County/Forest Service Collector	4.2 Roaded Natural	20.1	0.61	1-2
County/Forest Service Collector	4.4 Rural	9.3	2.32	0-1
County/Forest Service Collector	7.1 Conc. Recreation	3.9		
Forest Service Local Roads	4.2 Roaded Natural	56.71	1.72	0-2
Forest Service Local Roads	4.4 Rural	12.59	3.14	0-2
Forest Service Local Roads	7.1 Conc. Recreation	6.8		
Total Roads Open to Public Use		109.4	2.60	0-3
Administrative Roads		11.3		
Obliterated Roads		7.8		
Unauthorized Closed by Other EAs		9		

Road Type	Management Area	Miles within Project Area	Miles/Sq. mile in project area	Forests Plan Miles/Sq. Mi.
Unauthorized Roads		49		
Private Roads on Private Property		14.2		
Total Project Area Roads*		201		

* Does not include trails that are not a road.

Roads would continue to be maintained as the Forest budget allocations would allow. Maintenance emphasis would continue on Collector, Level 3 and Level 4 Maintenance Level roads as funding became available.

Road maintenance or improvements (brushing, spot gravel, culverts, grading) from resource activities would provide for improved road stability and improved public access. The addition of culverts and gravel aprons at highway approaches and road intersections would occur if necessary as part of the project implementation.

This Alternative reduces unauthorized road miles from 58 miles to 44 miles. Unauthorized road closures would be limited to those located in close proximity to the management of other resources as funding is generally not provided for road closures unless associated with other resource management activities. Decommissioning unauthorized roads would place emphasis on the 14 miles of unauthorized roads proposed for closing in Alternative II (refer to page 21).

Alternative II addresses public and internal comments that suggest the Forest Service consider closing more roads. Commenters cited examples of resource damage and illegal dumping as part of Issue 2: Managing the Road System.

Temporary roads may be constructed with the implementation of management activities. They would be closed within a year after harvesting.

Cumulative Effects of Alternative II

The Alternative II *Recreation and Roads* Map in Appendix B.3 display the proposed physical location of the transportation system changes in relation to the proposed resource activities. For comparison, the Project's *Existing Condition* transportation map in Appendix B.4 displays the entirety of the road system on the Corsair Project area landscape.

Management direction requires that the Forest Service manage roads to reduce the number of miles of roads and provide the minimum number of miles of roads required for management purposes and public access. Alternative II allows excess roads to remain on the landscape.

These activities, when considered with past, present, and foreseeable future actions would have the following effects on recommended Forests' Plan road densities within the analysis area;

Alternative II would reduce the total number of miles of *open* roads on the landscape by 7.1 miles; from 116.5 total miles to 109.4 total miles. Alternative II would reduce the total number of miles of *all* road types on the landscape by 22 miles, from 201 total miles to 179 total miles. This is approximately a 10% reduction in miles of roads that would improve the cumulative risks and problems identified in the Affected Environment narrative (page 103).

Issue 2 suggests that the Forest consider fewer road closures. Alternative II addresses the need to reduce the number of miles of Forest road to maintain a road system described by the Forest's Plan as maximum average of all roads at 0-3 miles/square mile. There are 4.78 miles per square miles for *all* roads found within this project area. Alternative II reduces the overall project area road density to 4.26 miles/square mile. This alternative does not reduce road densities to the Forest's Plan standard of 3 mi/square mile.

Roads selected for decommissioning in Alternative II were identified as roads excess to resource needs. For example, Forest Road 4697 is located directly adjacent to the snowmobile trail. It has not been maintained and attracts garbage dumping. The snowmobile trail is being used as the road by most users and therefore Forest Road 4697 was selected for road closure. Cumulatively the trail will receive additional use from this closure; however, the road will be closed during the snowmobile season to all vehicles except for snowmobiles. In another example, Forest Roads 4014 and 4015 are parallel roads that receive limited use and provide access for motor vehicle use on the snowmobile trail within a Kirtland's warbler management area. Both of these roads are signed as open roads and invite motor vehicles onto narrow, un-cleared roads that present hazards to operators of vehicles and potential vehicle damage. The roads have become overgrown and also have suffered from garbage dumping. All 14 road segments identified for closure were identified as sections of the Forest that have adequate resource and public access and excess road densities.

The Forest's transportation inventory finds 44 miles of unauthorized road that that would be closed as funding becomes available. Unless roads are physically closed with a berm or a gate, Forest Service personnel find continuous evidence that people drive them. Without a physical closure in place these roads would continue to be subject to use by persons that disregard the Forest road use policy, resulting in risks and problems identified in the Affected Environment section of this analysis (page 103).

This transportation inventory review found that some of the unauthorized roads are needed for private and utility use within the Corsair Project area, and are included in the development of Alternative III to better describe the road system and management needs. Alternative II proposes to obliterate roads identified as unauthorized in the Forest road database, but upon field examination found that five (5) of these obliterations were proposed for roads that are being used for access to private property, one (1) was a parking area for access to a small pond and one (1) was a power line access road for power line maintenance.

Direct and Indirect Effects of Alternative III

Alternative III proposes the following:

- 13 Forest road segments (5 miles) identified as Level 2 system roads open to the public be obliterated and removed from the Forest road system.

- 25 Forest road segments (12 miles) identified as Level 2 system roads open to the public be administratively closed to public motor vehicle use and be maintained as Level 1 roads.
- 19 Forest road segments (3 miles) identified as unauthorized or Level 1 Administrative roads be changed to Level 2 maintenance level roads open to public motor vehicle use.
- 25 Forest road segments (8 miles) identified as unauthorized be changed to administratively closed Level 1 roads.
- 3 Forest administrative road segment (0.3 miles) identified as Level 1 system road closed to public motor vehicle use be obliterated and removed from the Forest road system.
- 5 Forest road segments (2 miles) identified to issue a special use permit to Iosco County.
- 204 unauthorized road segments (38 miles) identified to obliterate as part of the Corsair Project.

Implementation of Alternative III would decrease the existing 116.5 total miles of *open* roads to 103 miles of open roads to public motor vehicle use. Existing open Forest road densities would decrease from 2.78 to 2.45 miles/square mile of Forest road which is within the maximum Forest Plan density established for all management areas of 0-3 miles/square mile. No Collector Roads are proposed for closure by Alternative III. Eleven Local roads in Management Area 4.2 would be obliterated, reducing the Local road mileage from 63.3 to 50.9 miles which equates to a road density of 1.54 miles/square mile which is within the Forest Plan maximum road density of 0-2 miles/square mile. Two Local roads are proposed to be obliterated in Management Area 4.4 reducing the Local road miles from 13.1 miles to 11.8 miles which equates to 2.95 miles/square mile, exceeding the Forest Plan direction for maximum road densities of 0-2 miles/square mile, however, using the entire Management Area 4.4 acreage in the Sand Lake Community the cumulative Local road density calculates at 29.3 road miles divided by 16.3 square miles to 1.79 miles per square mile which is within the Forest Plan direction for maximum road density of 0-2 miles/square mile.

One (1) Local road within Management Area 7.1 was found to serve a private landowner and would be designated an administrative road upon issuance of a special use permit to the private landowner, reducing the Local road mileage in Management Area 7.1 from 6.8 to 6.5 miles.

Table 26: Alternative III Road Statistics for the Corsair Project Area Roads

Road Type	Management Area	Miles within Project Area	Miles/Sq. mile in project area	Forests Plan Miles/Sq. Mi.
County/Forest Service Collector	4.2 Roaded Natural	20.1	0.61	1-2
County/Forest Service Collector	4.4 Rural	9.3	2.32	0-1
County/Forest Service Collector	7.1 Conc. Recreation	3.9	--	--
Forest Service Local Roads	4.2 Roaded Natural	50.9	1.54	0-2
Forest Service Local Roads	4.4 Rural	11.8	2.95	0-2
Forest Service Local Roads	7.1 Conc. Recreation	6.5	--	--

Road Type	Management Area	Miles within Project Area	Miles/Sq. mile in project area	Forests Plan Miles/Sq. Mi.
Total Roads Open to Public Use		103	2.45	0-3
Administrative Roads		31.7		
Obliterated Roads		5.3		
Unauthorized Closed by Other EAs		9		
Unauthorized Roads		38		
Private Roads on Private Property		14.2		
Total Project Area Roads*		201		

* Does not include trails that are not a road.

Roads would continue to be maintained as the Forest budget allocations would allow primarily using brushing and spot gravelling as part of the road maintenance program. Maintenance emphasis will continue as funding is available on Collector, Level 3 and Level 4 Maintenance Level roads.

Road maintenance or improvements (brushing, spot gravel, culverts, grading) from resource activity will provide for improved road stability and improved public access. The addition of culverts and gravel aprons at highway approaches and road intersections in order to facilitate road access would occur if necessary as part of the project implementation.

Alternative III would reduce the *open* road mileage from 116.5 miles overall to 103 miles of open road within the project area.

Alternative III addresses the commenters, public and internal, that wanted the Forest Service to consider closing more roads (Issue 2: Managing the Road System). These commenters wanted additional road closures citing examples of resource damage and illegal dumping. Seventeen miles of Local roads are proposed to be closed by this alternative, however, three (3) miles of closed road is proposed to be opened to motor vehicle use with a net closure overall of 14 mile reduction in Local roads.

Transportation management activity would obliterate 38 miles of unauthorized roads as part of the other resource activity or maintaining existing closures to allow natural regeneration of unauthorized roads. Decommissioning of unauthorized roads will continue as resource dollars become available. Alternative III proposes to physically close and maintain closures on 38 miles of unauthorized road miles.

Should temporary roads be needed for resource extraction, they would be constructed or unauthorized road use as temporary roads would occur with the implementation of management activities. Temporary roads would be closed within one year of the completion of each resource project activity.

Cumulative Effects of Alternative III

The Alternative III Recreation and Roads Map in Appendix B.3 display the transportation system changes. For comparison, the Project's Existing Condition transportation map in Appendix B.4 displays the entirety of the road system on the Corsair Project area landscape.

Management direction requires that the Forest Service manage roads to reduce the number of miles of roads and provide the minimum number of miles of roads required for management purposes and public access. Alternative III addresses this management direction by closing roads determined to be in excess.

These activities, when considered with past, present, and foreseeable future actions would have the following effects on recommended Forests' Plan road densities within the analysis area.

Alternative III proposes a 12% reduction in open Forest road miles over the 42 square mile Corsair Project area (116.5 miles of open road to 103 miles of open road). No changes are proposed for the 33.3 miles of Collector roads. The Collector roads within the Corsair Project area are well established and periodically maintained. Road densities for each of the management areas within the Corsair Project are within the Forest Plan Standards and Guides.

Alternative III would reduce the total number of miles of *open* road by 14 miles, from 116.5 total miles to 103 total miles. Alternative III would reduce the total number of miles of *all* roads on the landscape by 52 miles, from 201 total miles to 149 total miles. This is approximately a 25% reduction in total road miles that would improve the cumulative risks and problems identified in the Affected Environment narrative (page 103).

Issue 2 suggests that the Forest consider fewer road closures. Alternative III does not address fewer road closures however it does address the need to reduce the number of miles of Forest road to maintain a road system described by the Forest Plan as maximum average of all roads at 0-3 miles/square mile. There are 4.78 miles per square miles for all roads found within this project area that are not physically closed and drivable. Alternative III reduces the overall Project area road density to 3.55 miles/square mile. This alternative does not reduce road densities to the Forest's Plan standard of 3 mi/square mile however it does come closer to that standard than Alternative II.

Roads selected for decommissioning in Alternative III were identified as roads excess to resource needs. Many of the roads identified as excess to resource needs are signed as open roads and invite motor vehicles onto a narrow and un-cleared road presenting hazards to operators of vehicles and potential vehicle damage.

The Forest's transportation inventory found 38 miles of unauthorized road that that would be closed. Without a physical closure in place these roads would continue to be subject to use by persons that disregard the Forest road use policy, resulting in risks and problems identified in the affected environment section of this analysis.

This transportation inventory review finds some of the unauthorized roads are needed for private and utility use within the Corsair Project area, and are included in the development of Alternative III to better describe the road system and management needs. The Forest will work on a case by case basis with

private landowners and utility companies needing legal authorization to occupy National Forest System lands. A separate environmental assessment will be conducted depending upon the individual case needs.

3.8 Soils

Analysis Bound

The spatial effects analysis boundary will be defined as the specific treatment sites for each action alternative. This boundary was chosen because management impacts to soils do not typically have an impact to other surrounding areas that are not being treated.

Temporal cumulative effects will be bounded in time by a fifteen year period. This period includes the past five years of management activities and the reasonably foreseeable future of ten years. The past five years was chosen because affects to the types of soil in the project area are short term. A ten year timeframe for future effects was chosen because it parallels the timeframe of the management actions proposed in this EA.

Past, Present, and Future Activities in the Analysis Area

The Forest Service has managed for dispersed and developed recreation, timber, wildlife, wildfire suppression, closed and maintained roads in the project area. Federal activities such as fuel break creation, wildlife opening and maintenance in the planning area has been ongoing and will continue. Large acres of Kirtland's warbler habitat regeneration have also been an ongoing activity and will continue into the future. Non-federal activities include maintenance and reconstruction of a portion of Monument Road and timber sales on private lands.

Affected Environment

The soil types within the project are typical of the dominant sandy soil type across the Huron National Forest. Approximately 85% of the project area soil is classified in the Grayling sand series. The Grayling series consists of very deep, excessively drained soils formed in sandy glaciofluvial deposits on outwash plains. Grayling sands have little to no flooding potential and surface runoff is negligible to low. Grayling sands occur where the mean annual precipitation is 30 inches and mean annual temperature is 43F. Surface organic materials consist of oak leaves or jack pine needles and some twigs and roots in various stage of decomposition. Major precipitation events occur when soils are frost-free. Grayling sands favor good water infiltration and sub-surface percolation.

The remaining 15% of the 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. Management activities are not slated to occur on heavier organic soils so effects to these soil types will not be discussed.

Direct and Indirect Effects of Alternative II and Alternative III

Depending on the treatment, the two action alternatives have the potential to have two primary effects on the soil resource: 1) biomass removal and/or 2) physical disturbance and compaction. Compaction problems would not be an issue because of the sandy soil types throughout the project area. Sandy soils do not compact easily and often in fact, exhibit the opposite problem of not compacting when needed for such actions as road construction.

Biomass removal from timber harvest would primarily be in the form of thinning overstocked red pine plantations, fuelbreak construction and maintenance, prescribed burning, wildlife opening maintenance, and overstory removal in oak stands. Removing biomass would increase oxidation (decomposition) of organic matter. 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.

Low- to moderate-intensity surface fire from prescribed burning would only remove the upper portion of the litter layer and a minority percentage of downed and dead woody material. In the short term, burning would make some nutrients in the soil more available. The Huron National Forest is a fire dependent ecosystem and has adapted to repeated fire. There would be an indirect beneficial impact to the soils by helping maintain healthier forests.

Short term soil disturbance would occur from skid trails, log landings, maintenance and use of existing roads. The organic layer would remain throughout the harvest areas protecting the mineral soil except on a small percentage of acreage that has skid trails, landings, and existing roads. Best management practices, and Forests' Plan guidelines for soils and stream management zones coupled with well drained soils and generally flat to gently rolling terrain would eliminate erosion concerns. Proper road design in areas with slopes, as well as spot surfacing as needed for hardening roadbeds, would be utilized to prevent erosion. All disturbed areas of soil would be closed to vehicular traffic and revegetated through natural means or seeding/planting as needed.

Proposed treatments would have no effect or minor adverse effects to soils. The sites that are disturbed would quickly recover and adverse effects would be minimal based on soils types, mitigations measures, and historic success with revegetation.

Cumulative Effects

Effects to soils would be site-specific to management activities and the potential for multiple actions to cause a significant cumulative effect of any type to the soil resource is not likely. Based on the short duration and minimal direct and indirect effects to the soil resource, there is no expectation of a significant negative cumulative effect to the soil resource.

Closure and reforestation of areas with illegal motorized use would have a minor beneficial cumulative impact by eliminating the continued expansion of illegal motorized routes within the closure area. Roadbeds would be allowed to recover.

Overall biomass levels in the project area would continue to increase. Dead and snag trees and dead and down material left in harvesting units would contribute to soil nutrients and biomass.

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 organic soils. Compaction would occur to some degree however, risk of compaction in the 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.

3.9 Visual Quality

Visual quality is being addressed based on several comments received during scoping. Commenters raised concerns about visuals along roads and trails and also on how proposed management activities would impact visuals in designated old growth. Public comments related to the Forests' designations in its Scenery Management System. The Forests' plan gives higher importance on the visuals adjacent to roads, trails and designated old growth and commenters reflect this concern.

The following section first describes the effects to visuals on the project area in general. Then a separate section describes the effects to visuals on roads, trails and designated old growth.

Analysis Bounds

The cumulative effects analysis area for the visual resource discussion will be defined as the project boundary. This geographic bounds was chosen because the project area would receive similar management and treatments over the next ten year project implementation period.

Temporal cumulative effects will be bound by a fifteen year period. This period includes the past five years of management activities and the reasonably foreseeable future project implementation of ten years. This temporal boundary was chosen to reflect one "age class" of timber, and the approximate ten-year timber sale program planned for the project area.

Past, Present, and Future Activities

In the past five years, vegetation management within the project area includes fuel break creation and commercial timber harvests. The Galion Fire occurred in 2007 and burned 557 acres of mixed conifer and oak in the north-central portion of the project area. This fire opened up the view shed along both sides of Camel Road for approximately ½ mile. Within the past five years on Federal land there have been a total of 1,619 acres of clear cut harvest and a total of 697 acres of oak/pine thinning across the project area. The largest clear cuts were Jack Pine regeneration cuts for the endangered Kirtland's warbler and have occurred in the East-central portion of the project area. These cuts have opened up the landscape and expanded the view shed along Galion Road, Plank Road and Lorenz Road. In 2012 a small portion of Monument Road was straightened and new culverts were installed on Gordon Creek. New intersection stop signs have been installed along many of the Forest Service roads, especially in the northwest portion of the project area.

A review of recent aerial photography (Google maps, 2013) shows no recent or notable (notable being over 100 acres or more) harvesting activity on private lands within the analysis area. Driving the project area and hiking the trails at Corsair did not reveal any noteworthy changes either.

Affected Environment

In the Scenery Management System, landscape character is defined as the combination of physical, biological and cultural attributes that give a geographic area its visual and cultural image. Landscape character contains those features that make each landscape identifiable or unique. The landscape character of the Huron National Forest has been shaped and influenced by natural as well as cultural influences. Landforms observed today are the results of glacial action and

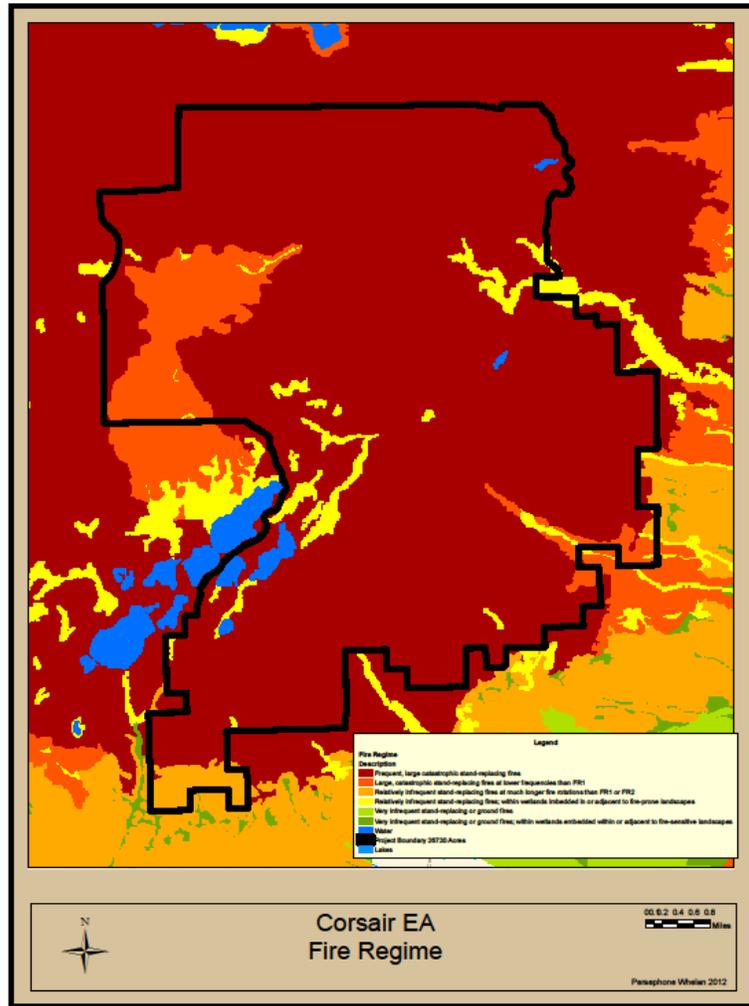


Figure 23: Corsair Project Area Fire Regime

subsequent postglacial erosion and continuing soil formation processes. The Corsair Project area is identified as glacial outwash plain with soils that are excessively drained sands. Fire has been a major influence on historical vegetation patterns for outwash plains. Historically, large stand-replacing wildfires were common and often spread for many miles. Vegetation of the well-drained outwash plains is predominantly xeric conifer forests with extensive pine barrens.

Scenic attractiveness measures the scenic importance of a landscape based on human perceptions of the intrinsic beauty of landform, water characteristics, vegetation pattern, and cultural land use. Scenic attractiveness is classified in three categories:

- Distinctive-landscapes whose attributes and patterns combine to provide unusual, unique or outstands scenic quality
- Typical-common quality
- Indistinctive-landscapes having low scenic quality

The Huron National Forest found that using land type association groupings for the Fire Regime classes served as an excellent way to delineate scenic attractiveness. Fire regime (FR) classes are categorized 1-4. FR 1 represents landscape ecosystems historically experiencing frequent, large catastrophic stand-replacing fires. The dominant forest types are short-lived jack pine forests and consist primarily of pine barren landscapes. An FR 4 on the other hand, represents landscape ecosystems historically experiencing very infrequent stand-replacing fires. The dominant forest types are long-lived northern hardwoods, basswood and white ash.

- Fire regime class 3W and 4W represent Distinctive Scenic attractiveness.
- Fire regime classes 3 and 4 are group and illustrative of Typical Scenic attractiveness.
- Fire regime class 1 and 2 are grouped and illustrative of the Indistinctive Scenic attractiveness.

As Figure 23 demonstrates, approximately 90% of the Corsair project area falls within FR 1 and is therefore defined as having an Indistinctive scenic attractiveness rating. Approximately 8% of the project area is represented by the Typical scenic attractiveness (shown in orange). The remaining 2% of the project area is represented by Distinctive scenic attractiveness. The Distinctive scenic attractiveness is directly associated with the water and relief features of the Silver Creek corridor (shown in yellow on the figure).

Scenic integrity is another concept of the Scenery Management System, which is used to determine the relative value and importance of scenery in the National Forest System to the public. 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 (5) to Very Low (1). 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.

Table A.2 in the Forests' Plan (page A-13) displays the long term scenic integrity objectives by MA. For MA 4.2 and 4.4 with a scenic importance degree of 3 or below, the long term objective is an overall scenic integrity of low.

A low scenic integrity rating represents the majority of the Corsair project area. Corsair is considered low because the landscape is lacking diversity. There are few natural features in the project area that the public considers important for scenic attractiveness such as water or topography. Natural water features are limited to Silver Creek, Gordon Creek and Buck Pond. There is little to no relief with the exception of topography adjacent to the creeks. Little vegetative diversity exists in the area. The vegetation is limited to dense red, white, and jack pine forests with interspersed low site oak. Vegetative age classes are present in the Kirtland's warbler management areas and areas where there have been fires.

There are two locations where the scenic integrity is rated high. The first includes areas immediately adjacent to the paved roads of Monument, Camel, and Essex and the snowmobile trail. The second is MA 7.1 which includes the Corsair trail system and designated old growth. These high ratings mean that the public places a greater value on visuals along roads and trails and in designated old growth. Thus, managing visuals within these areas should be done with more consideration.

Direct and Indirect Effects of Alternative I

Deferring treatment under Alternative I would not change any of the variables used to measure scenic importance such as vegetative composition and water characteristics. Therefore under this alternative, the current and the future scenic attractiveness would remain indistinctive.

Over time, vegetation would begin to age as natural succession occurred across the landscape. This may eventually change vegetation patterns. No harvesting would occur for at least a 20 year period. Within this timeframe the depth of view within the forested stands would disappear giving timber stands a denser, thicker appearance. Existing mature to over-mature oak and jack pine components that occur within the pine-hardwood communities would continue to drop out creating an understory of dead and decadent timber. Recruitment of longer lived conifers may occur in these areas of oak and jack pine decline leading to a visual appearance that would be dominated by dead and downed timber with thick stands of conifer regeneration. This appearance would continue to persist for the foreseeable future and may not be visually appealing to forest visitors who prefer older late successional forest types.

With the decline of oak and jack pine components, hazardous fuels would continue to accumulate producing dead and downed debris with thick regenerating understory vegetation. As hazardous fuel levels increase the potential for large scale wildfires would be expected to increase. Large scale fires such as the 2007 Galion fire would serve as the primary force in the creation of large scale openings. A direct effect of these large scale wildfires would be the initial creation of even-age vegetation classes at various locations across the landscape. These early successional communities would be transitional over the foreseeable future going from grass-shrub to short lived pine-hardwoods to long-lived conifer dominated community types.

Scenic integrity would remain low as well. The deferment of treatment over the long term would not foreseeably enhance the visual integrity of the project planning area.

Roads, trails and Old Growth

Deferring management would continue the current trend of viewing an overabundance of hazardous fuels along the Corsair trail system. A direct effect would be that hazardous fuels would continue to build causing unsightly views adjacent to trails of the forest. Hazardous fuels would accumulate more quickly along the trails than in the general forest area. This is because when the trails are cleared of brush, it is only dragged a few feet into the forest and not randomly spread out. This visually results in linear unnatural looking wind throw.

Without treatment, the row effect of pine stands within old growth would remain visible. A direct effect would be that many of the old growth stands would remain unnatural in appearance. Over the long term, trees would thin themselves creating a more visually appealing environment.

Direct and Indirect Effects of Alternative II and Alternative III

Ninety (90) % of the Scenic Attractiveness of the project area is considered indistinctive due to the lack of diversity in vegetation, flatness of terrain and limited water features. Since management activities in Alternative II and III do not propose to change any of these features, the long term scenic attractiveness would not be expected to change. Scenic attractiveness would remain indistinctive in both alternatives in the short term and over the long term. This is also the case for the remaining 8% of the project area defined as typical attractiveness and the 2% defined as distinctive scenic attractiveness.

Short term effects

Scenic integrity (the state of naturalness or completeness) may be temporarily changed by management activities. The Scenic Integrity is defined as low for the general project area (except for those areas adjacent to major roads, trails and old growth where they are defined as high). Timber harvested and prescribed burning treatments may move portions of the project area from a low to a very low rating in the short term. A direct effect of prescribed burning would be the visual presence of smoke in the area for a few days. Prescribed burning would leave behind blackened vegetation and stumps thus temporarily reducing scenic integrity to a very low. As trees are removed during commercial timber sales and fuelbreaks are created, residual limbs and tops may be left behind and areas along timber skid trails would likely have exposed soil. In addition to these short term effects, local residents and forest users may notice machinery and large trucks removing timber.

Long term Effects

Vegetation management has a great potential to alter the landscape and impact the scenic resource. Timber harvest practices can cause long-term effects on scenery by altering landscape character through reduction in species diversity, manipulation of the prominent age class, and alteration of opening size, location, and frequency. The potential effects may be positive or negative, depending on the consistency with the desired condition of the landscape. Of the management applications, fuel break creation may be the most visually impacting. This activity would create open hardwood dominated stands with grassy understories along boundaries of adjacent private property and KW habitat within the planning area. Views within these treatment areas would transition from an open oak woodland appearance to a more densely forested community.

Commercial thinning and repeated prescribed burning would allow for greater visual permeation within timber stands, interrupt the uniformity of the canopy by reducing row effect, and gradually replace it with a more open landscape. This in the long term would likely contribute to and improved visual affect.

Once new seedlings and saplings are established in harvested areas 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 scenic integrity level would return to low.

Roads, trails, and Old Growth

Fuel breaks along roads, trails and in designated old growth would have scalloped edges and maintain several overstory decadent trees to break up the visual perception of a long and narrow open strip. Edges would gradually blend the openness of the clearing into the surrounding forest to help enhance long-term visual scenic integrity objectives. Large clearings created adjacent to busy roads like Monument Road, Camel Road, and Essex Road and near residential areas would retain irregular shapes. Clumps of reserve

trees would be left in place to disperse visual impacts spatially in the landscape or hinder noticeable view-time as vehicles pass through a cleared area.

Treatments are encouraged in designated old growth when they are for “enhancing old growth character; protecting public health and safety and the soil and water resources” (Forests’ Plan III-7.1.1). To protect the scenic integrity of old growth areas, fuels and fire treatments would “address high fuel hazards that may occur in old growth when public safety and property are at risk” (Forests’ Plan III-7.1-4). The Corsair-Silver Valley area has been identified as a high use recreational area and public safety is a concern in the event of a wildfire due to the accumulation of fuels. Fuels and fire treatments have been proposed to protect the scenic and visual integrity of the area by reducing the Vegetation Condition Class from a 3 to a 1 and promoting a more resilient landscape.

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, especially Kirtland’s warbler management blocks. 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,. 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 interspersed. 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.

3.10 Civil Rights and Environmental Justice

Environmental Justice means that to the greatest extent practicable, and permitted by law, all populations are provided the opportunity to comment before decisions are rendered, and are allowed to share in the benefits of, are not excluded from, and are not affected in a disproportionately high and adverse manner by the government programs and activities affecting human health or the environment (USDA, DR 5600-2).

Analysis Bounds

The cumulative effects analysis area for economics and community well-being is Iosco County, Michigan. These bounds were chosen because data sources cited on demographics, population, industry and environmental justice are well-organized by counties.

Past, Present, and Future Actions

Since 1960, historical population data for Iosco County shows that the county has consistently grown at a rate greater than the region or the state. The county population increased in excess of three times the state and regional rates during the decade between 1960 and 1970. Closing of the Wurtsmith Airbase in 1992 resulted in a sharp decline in population between 1990 and 1994. In more recent decades, there has been a slower upward trend in growth (<http://iosco.m33access.com/population.htm>). One of the more well-received recent projects in the county has been the conversion of the base’s housing into the Villages of Oscoda. Many of the homes formally associated with the base have become second homes for retirees.

Affected Environment

Iosco County is dependent on agriculture, forestry, manufacturing, and retail trade for their economic livelihood. The county has approximately 50% public ownership in U.S. Forest Service and State of

Michigan forest lands. In the year of 2010, Iosco County had a population of 25,887 people. The majority of the population lives along the US-23 corridor and in the cities of Tawas City, East Tawas and Oscoda. The County experiences a large influx of seasonal residents and weekend tourists especially during the summer months. Many local businesses in Iosco County cater to tourists and seasonal residents' needs. Iosco County is bordered on the east by the second largest Great Lake, Lake Huron. Ninety five (95) % of the property along the Lake Huron's shoreline is private. The county seat is Tawas City. Service-related businesses provide the majority, approximately 30% of the jobs. The next largest industry is retail which employs 20% of area workers.

The analysis area for determining effects on civil rights and environmental justice is Iosco County, Michigan. The 2010 U.S. Census shows the median household income for Iosco County is \$31,321. The U.S Census shows the median household income for the state of Michigan as \$44,667. Based on the Census, the minority population in Iosco County is 1.9%. The minorities are 1.4% American Indian and 1% Hispanic. The state of Michigan as a whole has a 25% minority population.

The guidelines for a minority or low-income community to which U.S. EPA environmental justice activities apply is if the low-income population or minority population percentage is greater than twice the state-wide percentages (Michigan Environmental Justice Plan, 2009). Given this definition and given the demographic information of Iosco County, it is not qualified as an environmental justice community.

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

None of the proposed management actions are 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.

3.11 Economics

Affected Environment

The affected environment for production of a diverse mix of timber products (Objective 2) will be defined as Iosco County, MI. As stated in the previous section, approximately 50% of the jobs in Iosco County are service related and retail based. According to the Iosco County Economic and Development Plan, only 0.48 percent (less than ½%) of the county is employed by the fishing farming and forestry sector. One of the objectives of the Iosco County Economic Plan is to further “preserve the economic viability of farming and timbering by working with local, regional and state organizations to attract value added industries for such products” (page 17).

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 three Corsair alternatives display various costs of preparing

environmental documents, field surveys, and preparation, and administration associated with the management activities. 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 are based on most recent transaction evidence appraisal values from the Huron Shores Ranger Station. Estimated volumes are based on past sales, experience and professional judgment.

Table 21: Estimated Dollars Costs and Returns of the Alternatives

Economic Indicators	Alternative I No Action	Alternative II And Alternative III
Projects Outputs		
Red Pine Thinning value	\$0	\$440,895
Low site oak restoration value	\$0	\$173,796
High site oak thinning	\$0	\$154,218
Fuel breaks	\$0	\$154,011
TOTAL RETURN FROM PROJECT	\$0	\$922,920
Project Costs		
Environmental Assessment Preparation, Field Preparation, & Administration ¹	\$57,625	\$154,037
Prescribe Burn of Units ²	\$0	\$661,650
TOTAL COSTS OF PROJECT	\$57,625	\$815,687

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 Corsair 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. Prescribed burning of the proposed acres of management @ \$75-100/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 (Modified Proposed Action) and Alternative III

Alternative II and Alternative III project activities would generate approximately 34,398 CCF and of timber products. This is a considerable potential impact for providing important material for local mills. Harvest related activities would also provide employment opportunities for local logging contractor's wood products industries and local contractors.

Dollar costs associated with these alternatives are estimated at approximately \$815,687. 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 prescribed burning, 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 \$922,920.

Cumulative Effects

Implementation of Corsair Project activities would result in a gain in return versus cost of project. In addition, it would create positive effects to local economics by continuing current trends of providing timber products and jobs related to timber harvesting and site preparation in Iosco County. The money that local forest industry workers and companies earned would be circulated within businesses of local communities. A small percentage of the timber receipts are retained by the county treasury for local projects.

Chapter 4: List of Preparers

The following Forest Service employees helped with the preparation and were consulted during this Environmental Assessment process:

Shawn Cochran – Responsible Official; Huron Shores District Ranger

Karlis Lazda –Silviculturist

Paul Thompson – Wildlife Biologist

Sierra Patterson—Botanist

Liz McNichols –GIS Specialist

Gordon Haase – Recreation and Roads Specialist

Kari Vanderheuel –NEPA Planner

Persephone Whelan—Fire and Fuels Specialist

Paul Lyden – Forester

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B.4

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Transportation Definitions and Terminology

Appendix A

CFR Part 218—New Administrative Process

Please note this project is now subject to a new administrative review process. The Department of Agriculture’s final rule for the establishment of a pre-decisional administrative review process (36 CFR 218) was published in the Federal Register on March 27, 2013 (Volume 78, No. 59, pp. 18481 to 18504); these regulations are effective immediately (<http://www.gpo.gov/fdsys/pkg/FR-2013-03-27/pdf/2013-06857.pdf>). The final rule replaces the appeal process (36 CFR 215) with a pre-decisional administrative review process (also referred to as the objection process) for only those project decisions made for environmental assessments and environmental impact statements. The objection process already exists for projects planned under the Healthy Forest Restoration Act (HFRA). The final rule expands the agency’s authority to use a pre-decisional objection process for non-HFRA projects, while continuing to be consistent with the notice and comment provisions of the Appeal Reform Act (Public Law 102-381).

Specific written comments are defined by 36 CFR 218.2. This section says, “Written comments are those submitted to the responsible official or designee during a designated opportunity for public participation (218.5(a)) provided for a proposed project. Written comments can include submission of transcriptions or other notes for oral statements or presentation. For the purposes of this rule, specific written comments should be within the scope of the proposed action, have a direct relationship to the proposed action, and must include supporting reasons for the responsible official to consider.”

Pursuant to 36 CFR 218.25, comments on this proposed project will be accepted for 30 days beginning on the first day after the date of publication of the legal notice the paper of record (*Oscoda Press*, Oscoda, Michigan). If the comment period ends on a Saturday, Sunday or Federal holiday, comments will be accepted until the end of the next Federal working day.

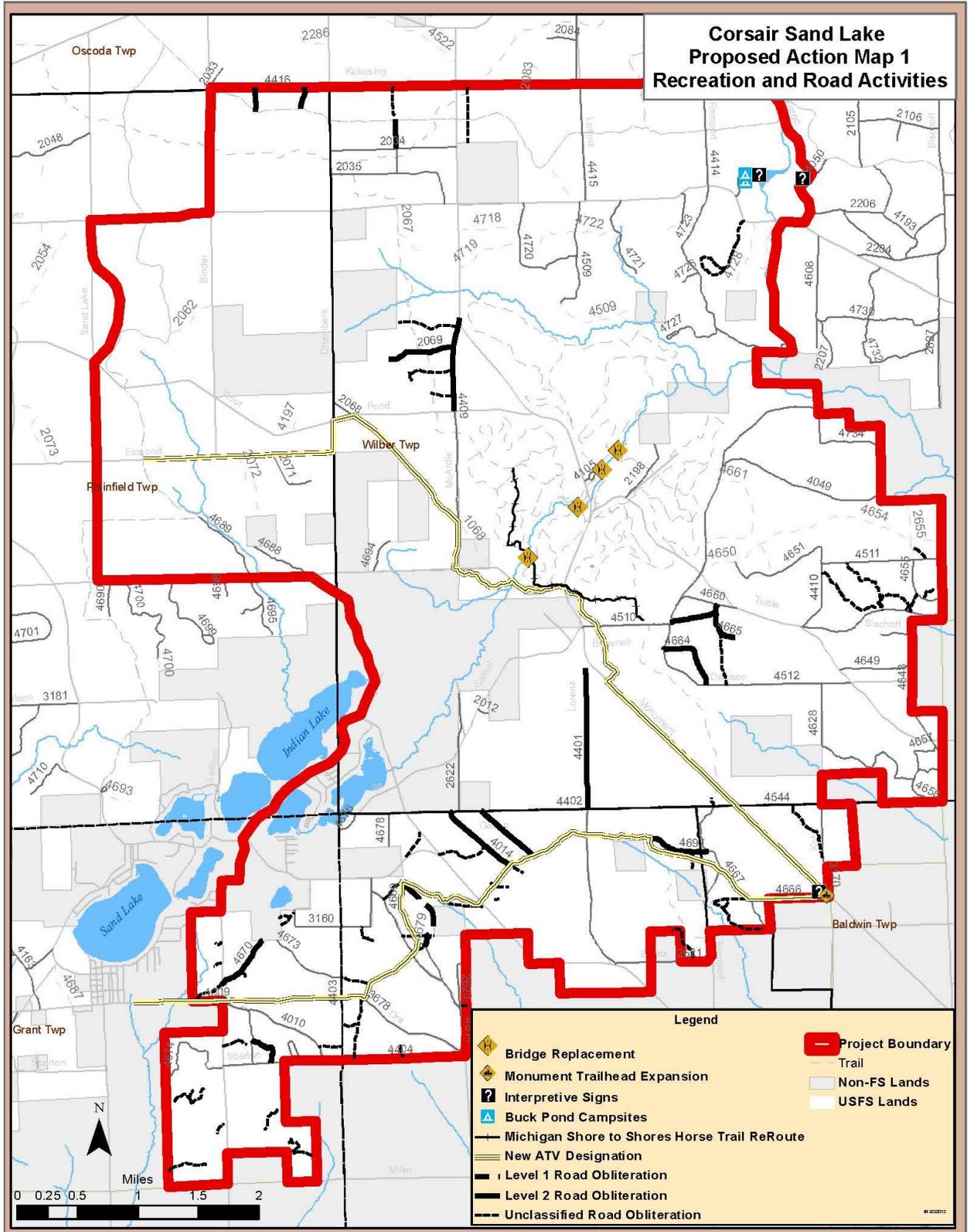
Only individuals or entities (as defined by 36 CFR 218.2) who submit timely and specific written comments (as defined by 36 CFR 218.2) about this proposed project or activity during this or another public comment period established by the responsible official will be eligible to file an objection. Other eligibility requirements are defined by 36 CFR 218.25 (a)(3) and include name, postal address, title of the project and signature or other verification of identity upon request and the identity of the individual or entity who authored the comments. Individual members of an entity as defined in 36 CFR 218.2 must submit their own individual comments in order to have eligibility to object as an individual. A timely submission will be determined as outlined in 36 CFR 218.25 (a)(4).

Submit comments to the Responsible Official, Shawn Cochran, Huron Shores District Ranger, by one of the following methods; mail: 5761 North Skeel Ave, Oscoda, Michigan 48750, telephone: 989-739-0728, facsimile: 989-739-0347, or email: comments-eastern-huron-manistee-huron-shores@fs.fed.us (please put “Comments on Corsair Project” in the subject line) in order to be considered. Office hours, for those who wish to hand deliver their comments, are 8:00 a.m. to 4:30 p.m., Monday – Friday (except Federal holidays). Acceptable formats for electronic comments are text or html e-mail, Adobe portable document format, and formats viewable in Microsoft Office applications. Comments must be submitted by 11:59

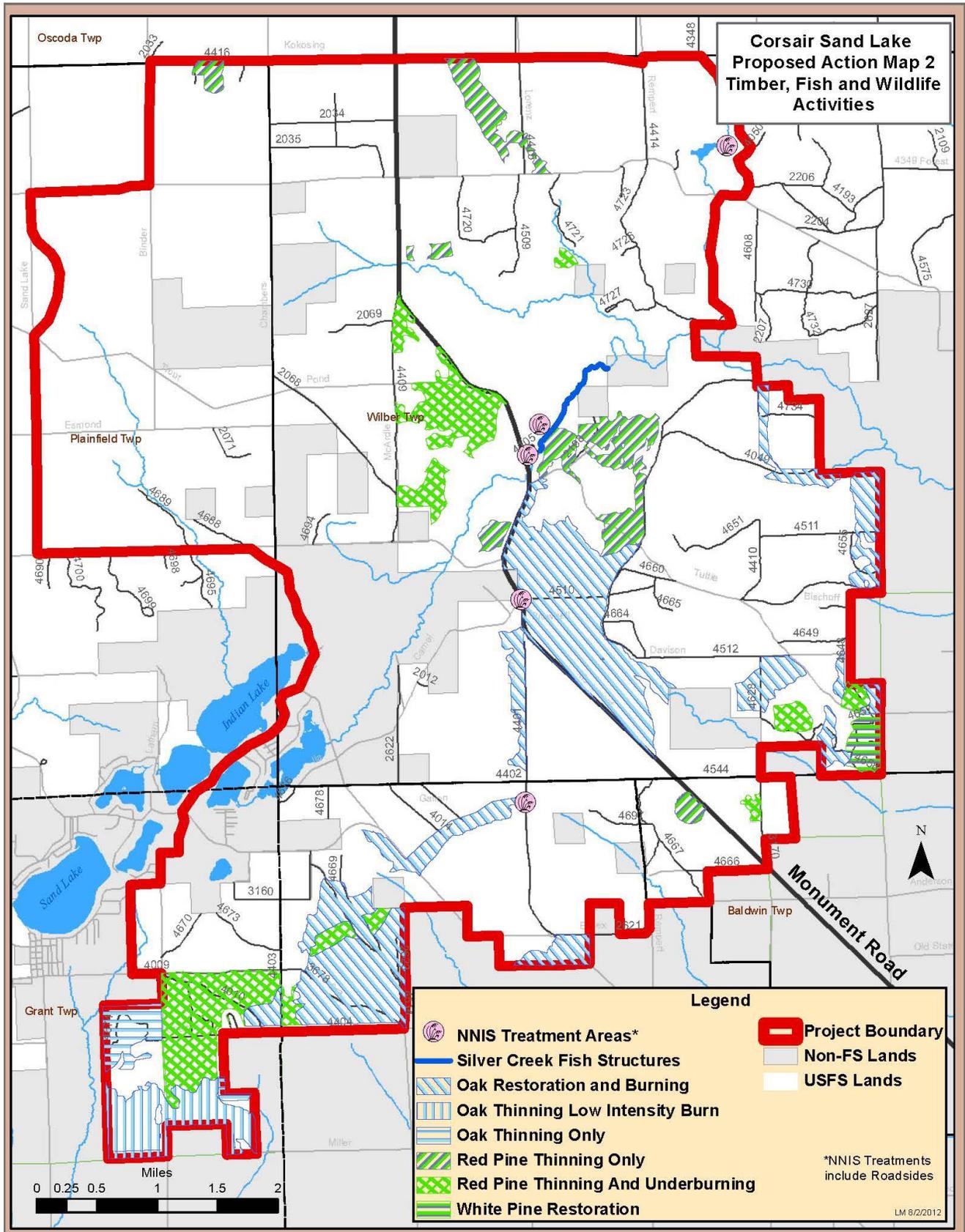
p.m. Eastern Time on the closing date of the comment period. It is the responsibility of the sender to ensure timely receipt of any comments submitted.

After the 30-day comment period for the Corsair EA has ended, a draft decision and EA for this project will be sent to those parties who submitted comments as outlined above or to those who request a copy. The objection period will begin for the draft decision and EA upon release of a separate legal notice pursuant to the regulations outlined in 36 CFR 218. The draft decision will include further instructions for filing objections. These new regulations are available through the link provided above.

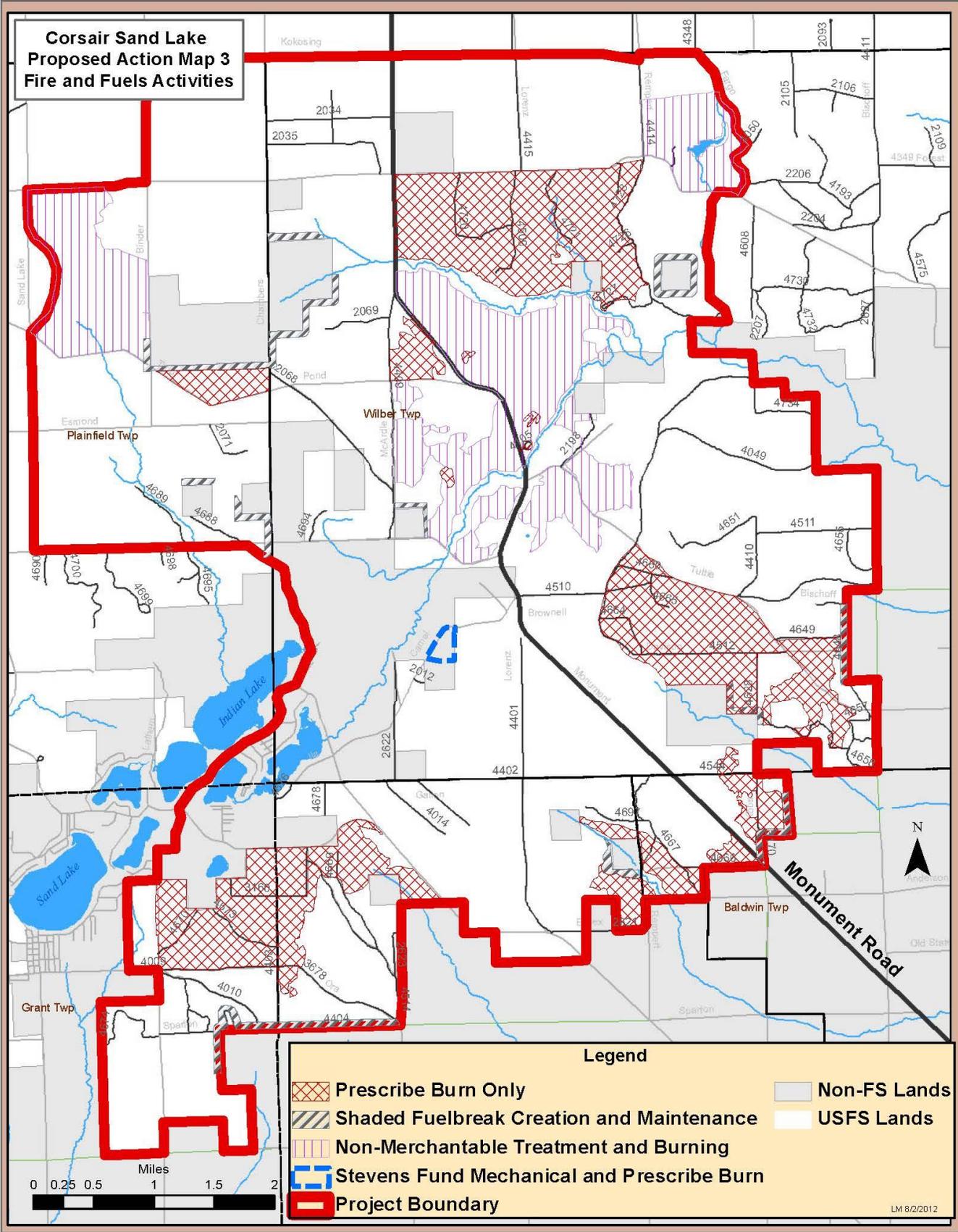
Appendix B.1 Map 1



Appendix B.1 Map 2



Appendix B.1 Map 3

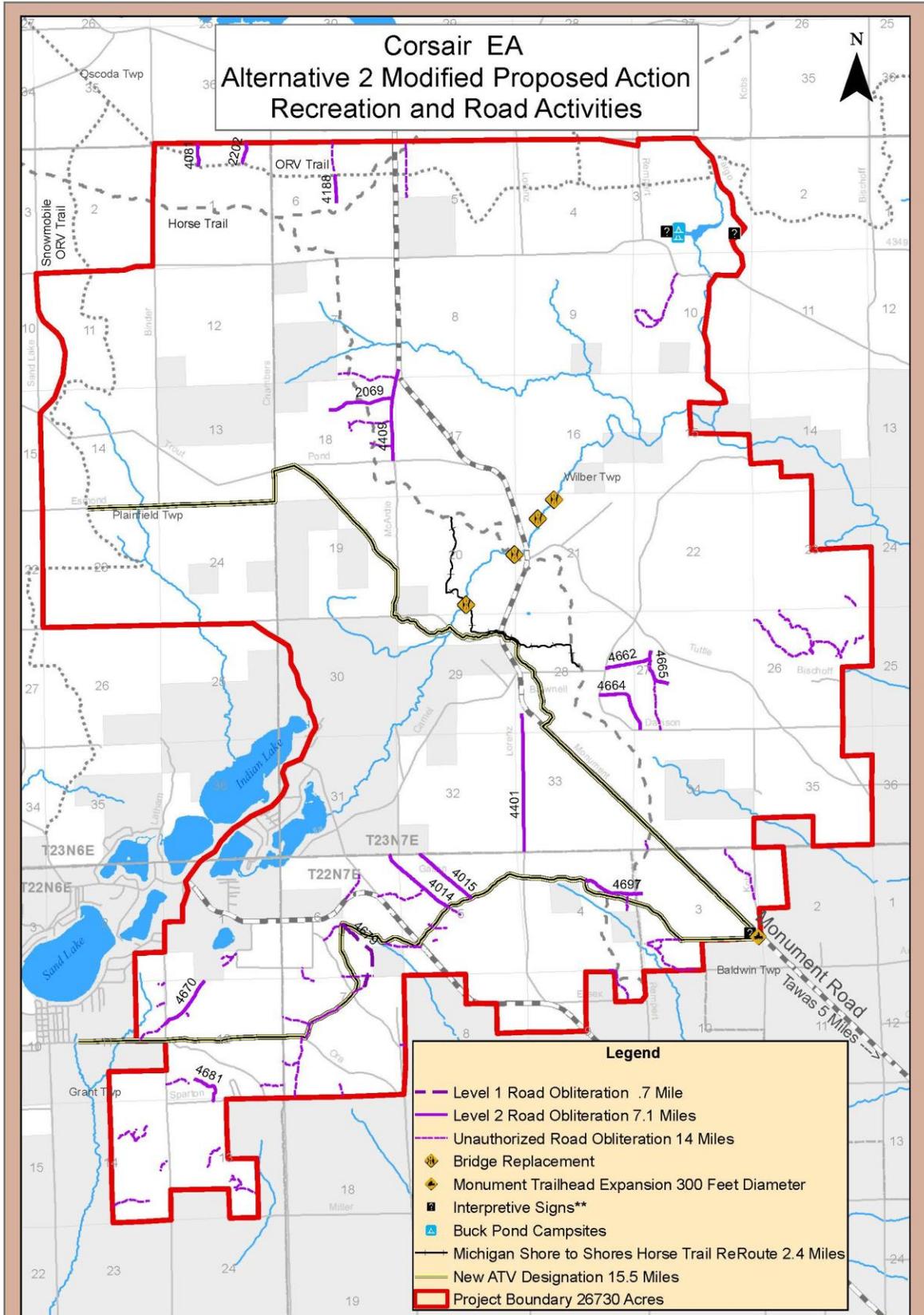


**Corsair Sand Lake
Proposed Action Map 3
Fire and Fuels Activities**

Legend

Prescribe Burn Only	Non-FS Lands
Shaded Fuelbreak Creation and Maintenance	USFS Lands
Non-Merchantable Treatment and Burning	
Stevens Fund Mechanical and Prescribe Burn	
Project Boundary	

Appendix B.2 Map 4

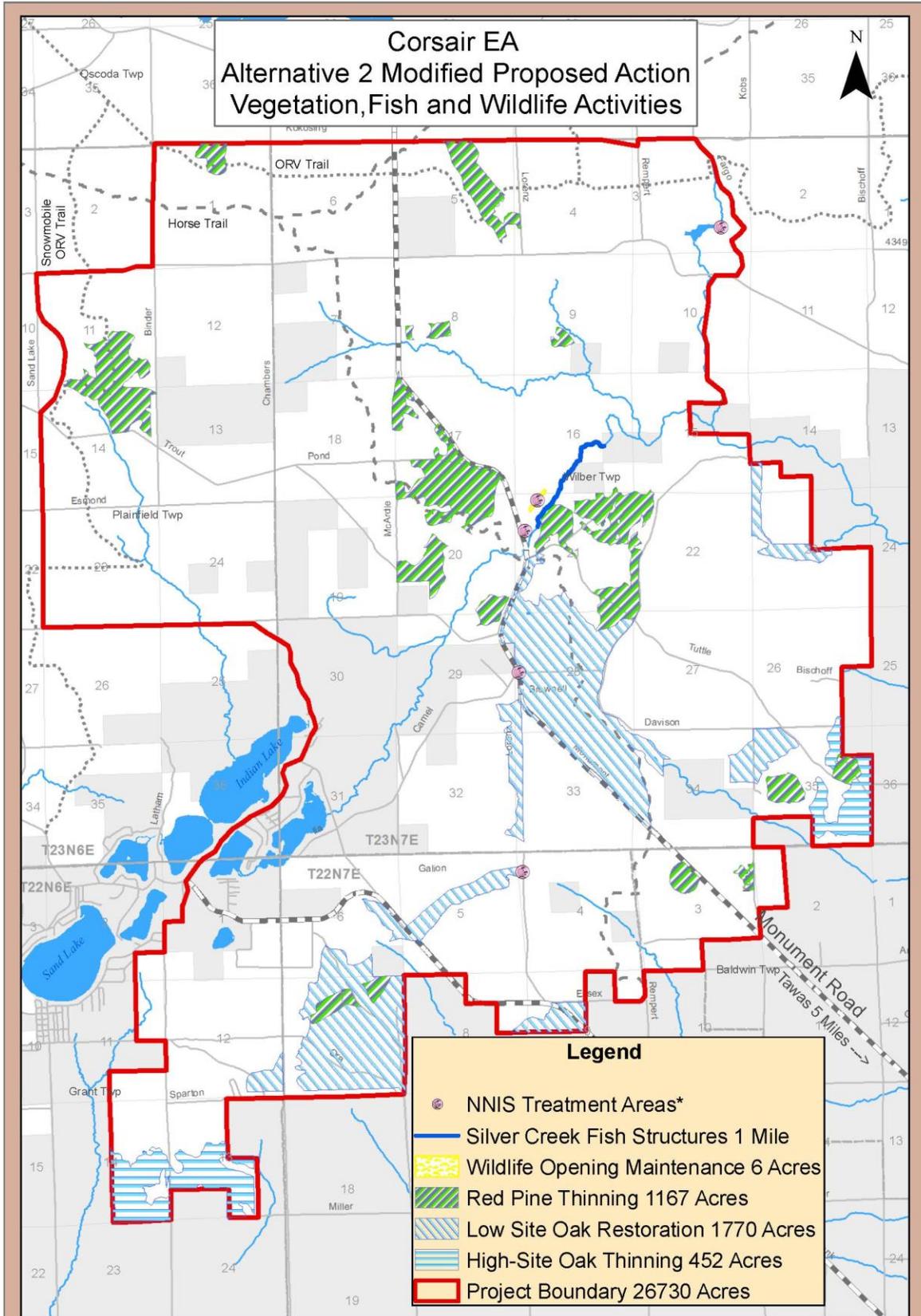


*The Forest Service uses the most current and complete data available. They may be developed from sources of differing accuracy, accurate only at certain scales, based on modeling or interpretation, incomplete while being created or revised, etc. Using GIS products for purposes other than those for which they were created may yield inaccurate or misleading results. The Forest Service reserves the right to correct, update, modify, or replace GIS products without notification. The Forest Service will not be liable for any activity involving this information. Providers of other data should be consulted regarding the accuracy and scale of their data." For more information contact: GIS Coordinator; Huron-Manistee NPs: 1755 S. Mitchell Street, Cadillac, MI 49601. (231)775-2421

**Additional Interpretive Signs to be Determined



Appendix B. 2 Map 5

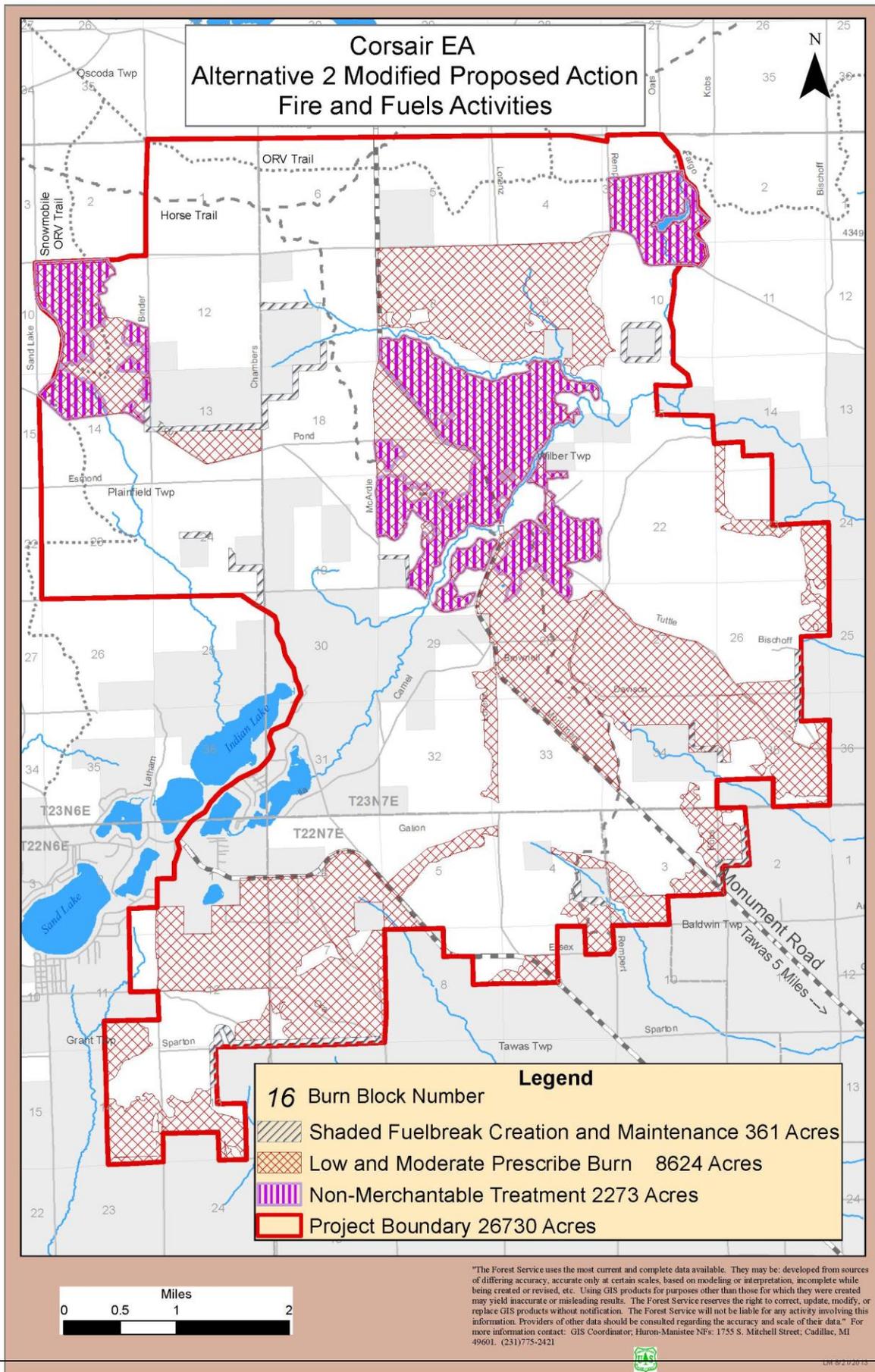


*The Forest Service uses the most current and complete data available. They may be developed from sources of differing accuracy, accurate only at certain scales, based on modeling or interpretation, incomplete while being created or revised, etc. Using GIS products for purposes other than those for which they were created may yield inaccurate or misleading results. The Forest Service reserves the right to correct, update, modify, or replace GIS products without notification. The Forest Service will not be liable for any activity involving this information. Providers of other data should be consulted regarding the accuracy and scale of their data." For more information contact: GIS Coordinator, Huron-Manistee NFS: 1755 S. Mitchell Street, Cadillac, MI 49601. (231)775-2421

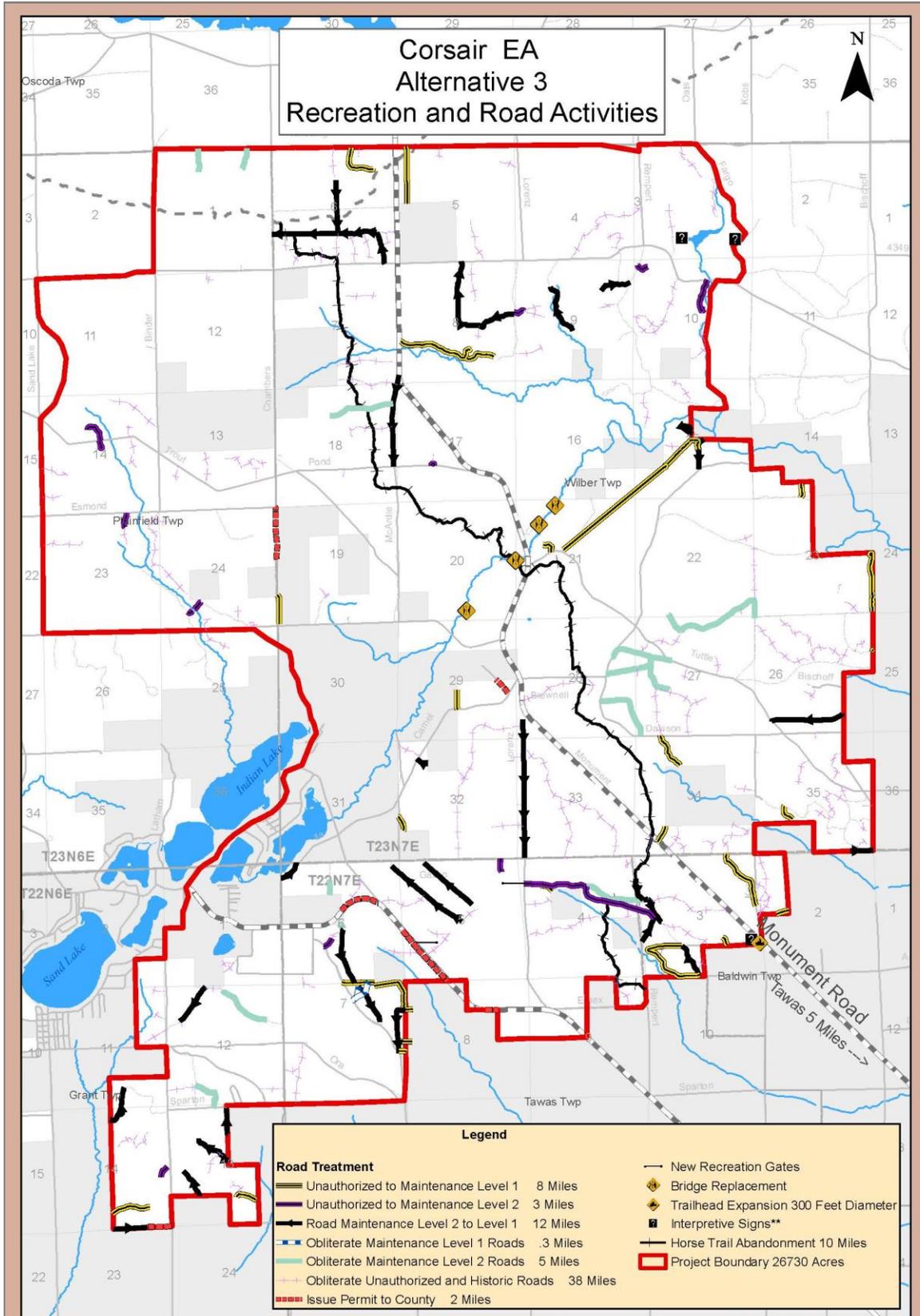
*NNIS Treatments include Roadsides



Appendix B.2 Map 6



Appendix B.3 Map 7

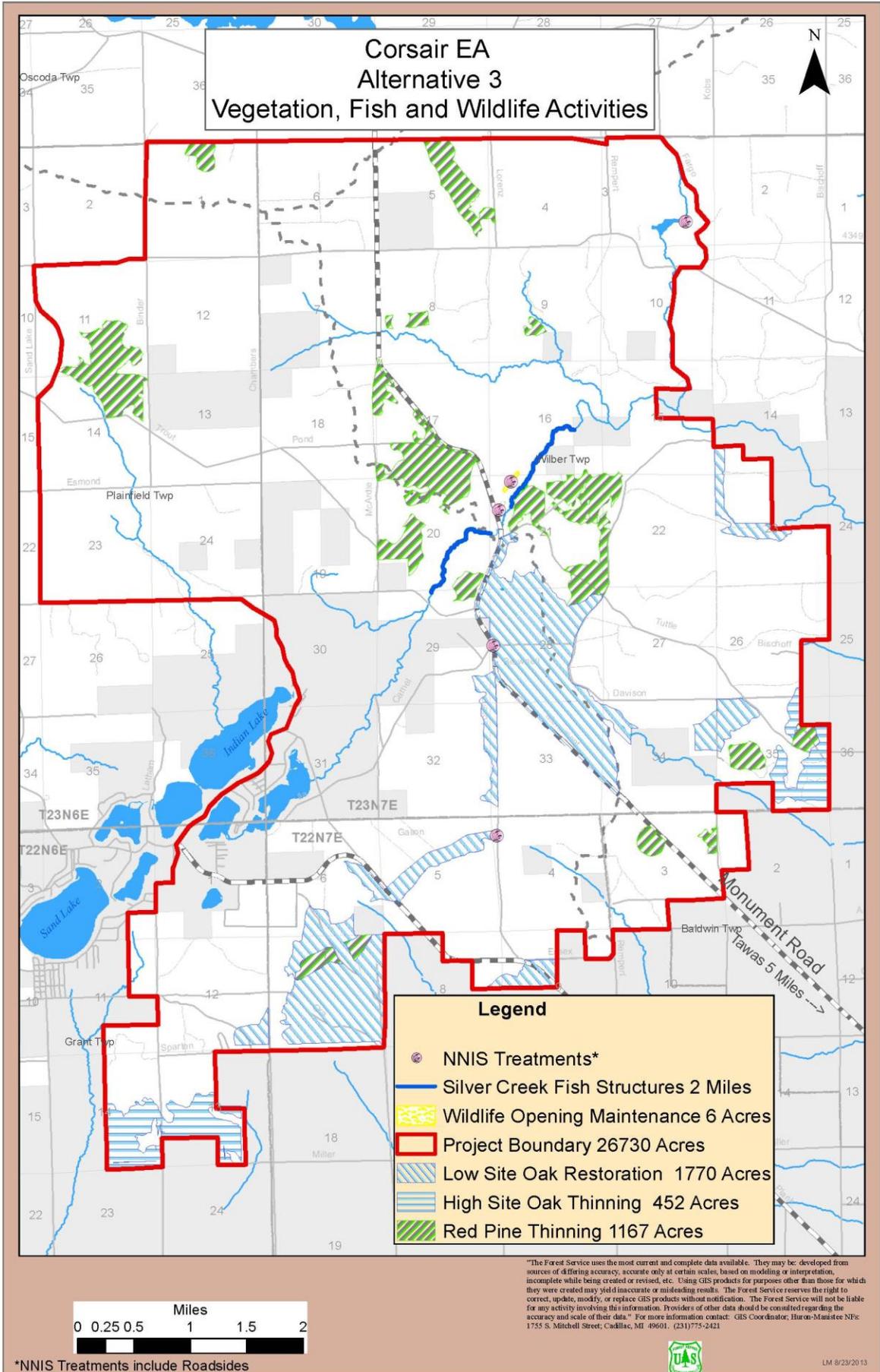


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**Additional Interpretive Signs to be Determined

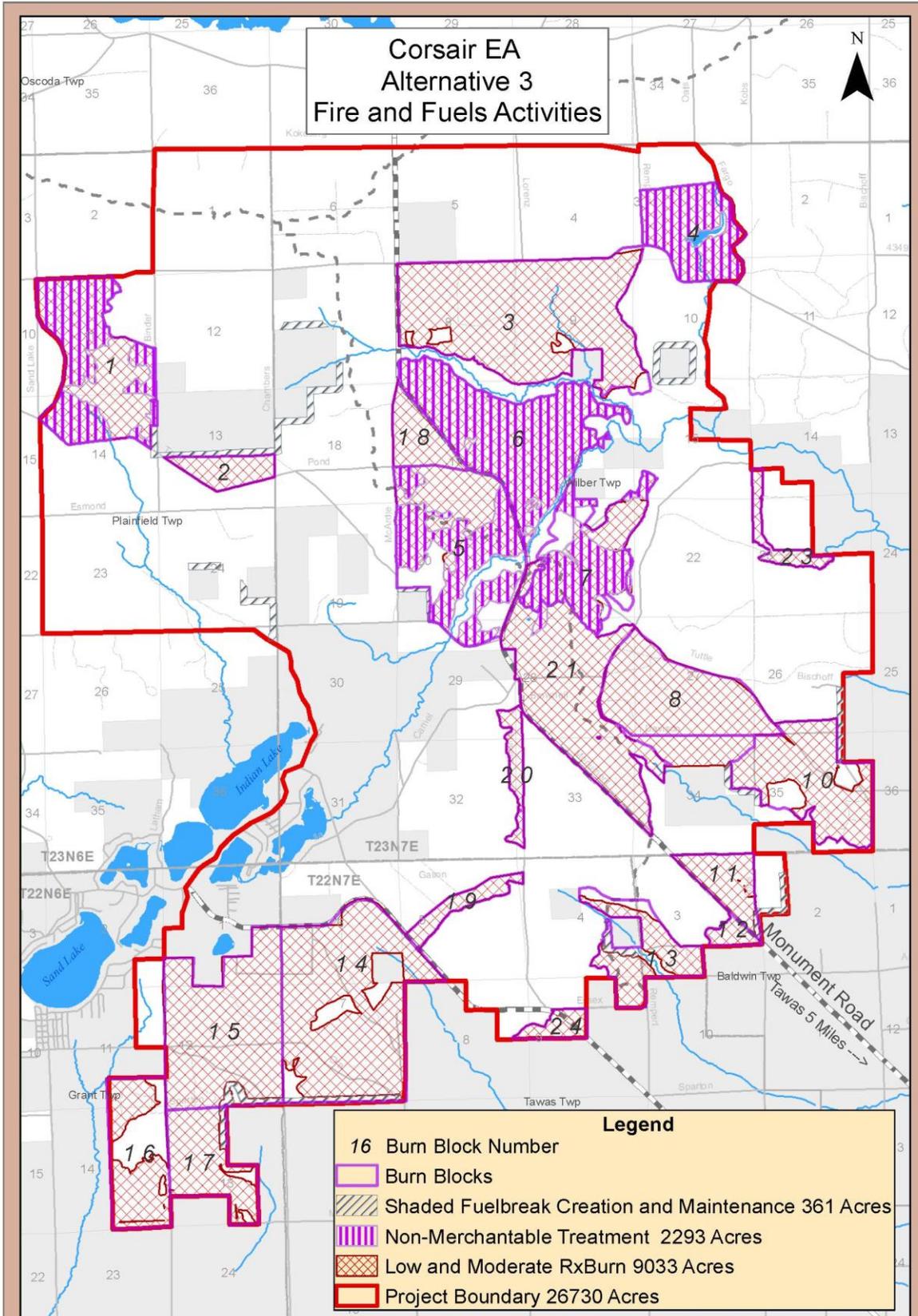


Appendix B.3 Map 8



*NNIS Treatments include Roadsides

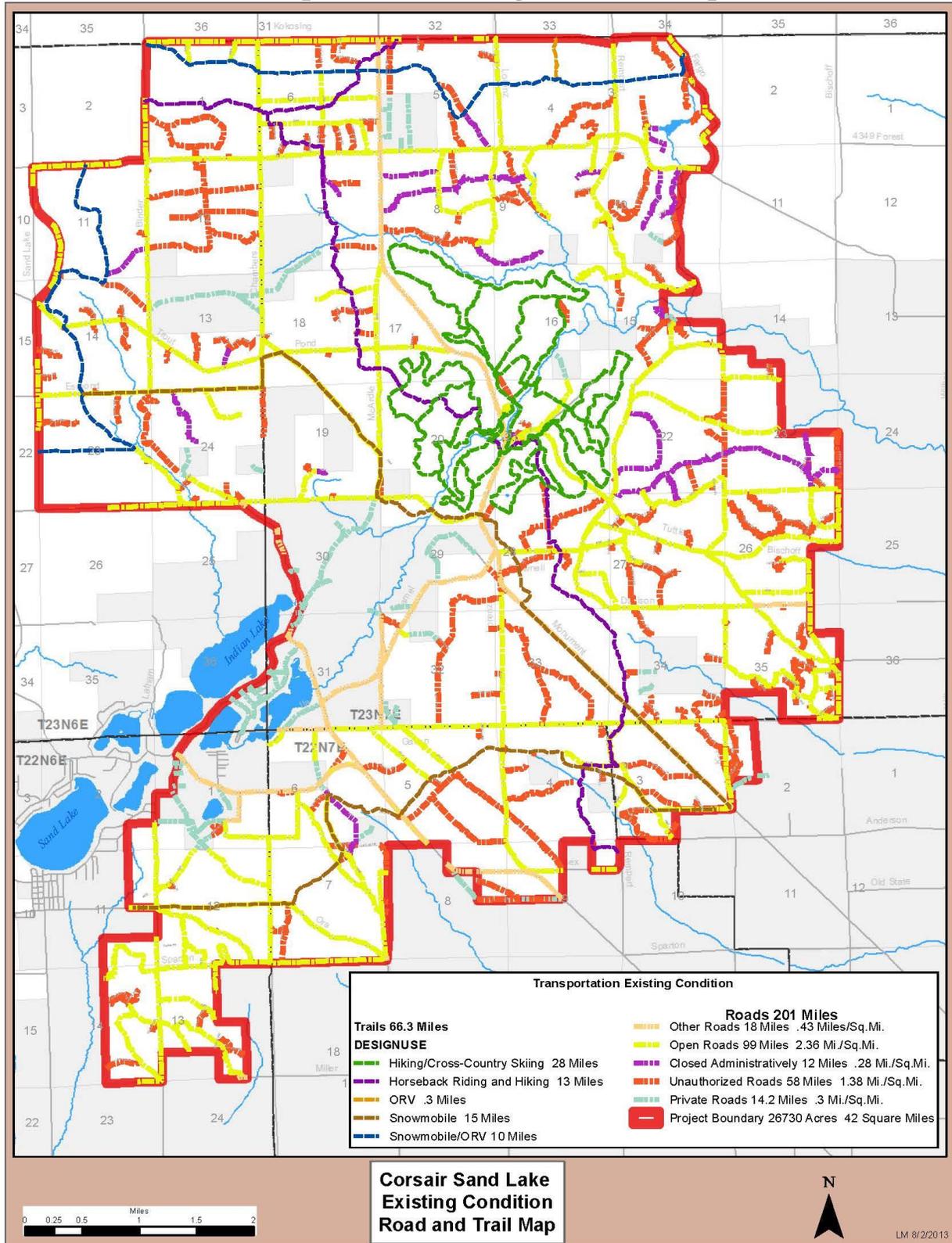
Appendix B.3 Map 9



"The Forest Service uses the most current and complete data available. They may be developed from sources of differing accuracy, accurate only at certain scales, based on modeling or interpretation, incomplete while being created or revised, etc. Using GIS products for purposes other than those for which they were created may yield inaccurate or misleading results. The Forest Service reserves the right to correct, update, modify, or replace GIS products without notification. The Forest Service will not be liable for any activity involving this information. Providers of other data should be consulted regarding the accuracy and scale of their data." For more information contact: GIS Coordinator, Huron-Manistee NPS, 1755 S. Mitchell Street, Cadillac, MI 49601. (231)775-2421



Appendix B.4 Transportation Existing Condition Map



Appendix B.4

Transportation Section Definitions and Terminology

Maintenance Levels and Road Types - Forest road types (local, collector, arterial) generally coincide with the maintenance levels established for Forest System roads. Road Maintenance Levels are a formally established criterion that prescribes the intensity of maintenance necessary for the planning operation of a road. The four maintenance levels identified in this project area and the road type associations are described as:

Local roads - Are roads associated with **Maintenance Level 1 and 2** Forest roads that connect terminal facilities with collector or arterial roads. Location and standard usually are controlled by a specific resource activity rather than travel efficiency. A forest local road may be developed and operated for either long-term or short-term service.

Maintenance Level 1 – This level is used for intermittent service roads during the period of time that management direction requires the road to be closed or blocked to traffic. Basic custodial maintenance is performed as required to protect the road investment and to see that damage to adjacent lands and resources is minimal. Drainage facilities and runoff patterns are maintained. While being maintained at Level 1, roads will be closed or blocked to traffic.

Maintenance Level 2 – This level is used on roads where management direction requires that the road be open for a limited amount of traffic. Traffic normally is minor, usually consisting of one use or a combination of uses: administrative, permitted, dispersed recreation, or other specialized uses. Level 2 roads are normally characterized as single lane, primitive-type facilities intended for use by high clearance vehicles; passenger car traffic is not a consideration.

Collector Roads – Are roads associated with **Maintenance Level 3 and 4** Forest roads or may be a county public road and serve smaller land areas than an arterial road, and is usually connected to a public highway. These roads collect traffic from Forest local roads and/or terminal facilities. Its location and standard is influenced by both long-term, multi-resource service needs and travel efficiency.

Maintenance Level 3 – This level is used on roads where management direction requires the road to be open and maintained for safe travel by passenger cars. Traffic volumes are minor to moderate. Level 3 roads normally are characterized as low speed, single lanes with turnouts and spot surfacing. This level normally is used for local or minor collector roads.

Maintenance Level 4 – This level is used on roads where management requires the road to provide a moderate degree of user comfort and convenience at moderate travel speeds. Some Level 4 roads may be single lane and some may be paved and/or dust abated. This level normally is used for collector or minor arterial roads.

Arterial Road Types – Provide service to large land areas and there is usually a public highway connecting with other Forests' arterial roads to form an integrated network of primary travel routes. Its location and standard is often determined by a demand for maximum mobility and travel efficiency rather than specific resource management service. It is usually developed and operated for long-term land and resource