United States Department of Agriculture

Forest Service

Eastern Region

March 2013

Revised Environmental Assessment for the Redboat Resource Management Project

Ottawa National Forest

Gogebic County, Michigan

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Chapter 1 - Purpose and Need for the Proposal

The USDA Forest Service has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA), the Forest Plan, and other relevant federal and state laws and regulations. This document has been revised to supplement information and the analysis disclosed in the original May 2012 EA for this project.

The Responsible Official signed a Decision Notice and Finding of No Significant Impact on September 18, 2012, selecting Alternative 2 for implementation. However, an administrative review of this project resulted in a finding that some of the effects specific to the proposed activities had not been disclosed and therefore the September 2012 Decision Notice was withdrawn. It should be noted that these activities and their effects are not associated with the four issues analyzed (see Section 1.6 of this EA for a description of those issues). Withdrawal of the Decision negates the ability of the Forest Service to implement any activity outlined in the September 2012 Decision. A new decision is necessary for the Responsible Official to authorize implementation of an alternative for this project. This new decision will be based upon additional public involvement (Section 1.5); the analysis outlined in this Revised EA; the supporting information in the project file; and the decision framework for this project (Section 1.3).

The majority of this document remains unchanged from the information disclosed in the May 2012 EA. Therefore, the purpose and need for this project, the majority of the proposed activities and the analysis for the four issues identified in Section 1.6 have not changed. In re-evaluation of the transportation system, three additional roads (a total of about 1 mile) have been identified for reconstruction (see Sections 2.5 and 3.10 for more information). Road reconstruction was not identified as an issue under the 2012 EA. Other minor errors have been corrected and additional clarifications have been made, including the May 2012 EA's errata and modification of design criterion (as disclosed in Appendix 1 of the September 2012 Decision and project file). For the remainder of this document, new information is denoted by bold, italicized text.

1.1 Document Structure

The document is organized into four parts:

- **Purpose and Need for this Project:** Chapter 1 includes information on the history of the project proposal and the purpose of and need for the project. This section also details how the USDA Forest Service informed the public of the proposal and how the public responded.
- **Comparison of Alternatives, including the Proposed Action:** Chapter 2 provides a detailed description of the agency's proposed action as well as an alternative for achieving the stated purpose and need. Alternatives were developed based on issues raised by the public and agency requirements. Finally, this section provides a summary table of the activities ***and effects*** associated with each alternative.
- **Environmental Consequences:** Chapter 3 describes the environmental effects of implementing the proposed action and other alternatives. This document focuses on an

issue-based analysis; ***however, a summary of effects anticipated from project implementation is provided for non-issues as well as*** agency-driven requirements.

- **ID Team Members and Persons Consulted:** Chapter 4 provides a list of preparers and staff consulted during the development of this EA.
- **Appendices:** The appendices include maps, proposed design criteria and monitoring, as well as a literature cited section to support the analyses presented in the EA.

Our objective is to furnish enough site-specific information to demonstrate our consideration of environmental consequences of the proposed alternatives as they apply to the issues identified (see Section 1.6). A reduction of paper as specified by 40 Code of Federal Regulations (CFR) 1500.4 has been an important consideration in the preparation of this Environmental Assessment (EA). Additional documentation is located in a project file (e.g., a compilation of documents prepared for this project), which can be reviewed upon request. This document, as well as the scoping letter, ***2012 EA, 2012 Decision Notice and Finding of No Significant Impact*** and other information, is also available on the Internet at ***http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=35518***.

Definitions of the terms used in this document ***as well as a list of acronyms*** are located in the glossary section of the Ottawa National Forest's 2006 Land and Resource Management Plan (Forest Plan), which is available upon request. This documentation is also located on the Internet (***http://www.fs.usda.gov/detail/ottawa/landmanagement/planning/?cid=stelprdb5110725***).

1.2 Background

The purpose of this EA is to describe the activities included in the proposed alternatives; and disclose the consequences (or effects) of implementing these activities, which includes the analysis needed for the Responsible Official to determine whether significant effects would occur. This information enables the Responsible Official to make decisions with an understanding of the alternatives' environmental consequences and allows the USDA Forest Service to disclose to the public, the nature and potential consequences of proposed actions.

The Responsible Official for this project is ***Norman E. Nass***, the Bessemer District Ranger for the Ottawa National Forest.

The project area is located ***primarily*** on National Forest System (NFS) lands, within Gogebic County, Michigan, on the Bessemer Ranger District as shown in Figure 1. This project was initiated in May 2011 and uses an interdisciplinary approach that integrates physical, biological, economic and other science resource areas to identify management opportunities resulting in proposals for

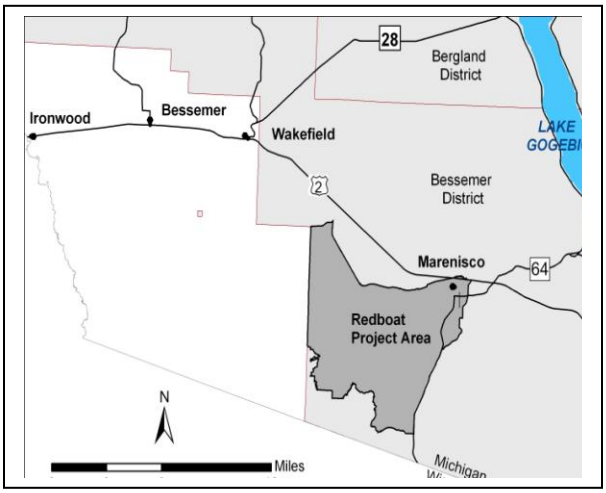

Figure 1. Vicinity Map

several different projects

The detailed description of proposed actions is outlined in Table 3. In summary, this project includes timber harvest to improve vegetative and wildlife habitat conditions; adjustments to the amount of old growth classified; transportation system refinements for administrative and public access needs; actions to enhance habitat to benefit several resources; and improvements to recreation.

The proposed activities are designed to move the project area toward, or maintain the area within, the desired conditions as outlined in the Forest Plan. The Ottawa is divided into several management areas (MAs) with differing vegetative emphases (Forest Plan, p. 3-1). The Redboat Project area falls mostly in MA 2.1 (80% of the project area), with the remainder encompassing portions of MAs 6.2 and MA 8.1 (see Map***s*** 4 ***and 5*** of Appendix ***3***). The following provides a summary of each MA's emphasis; more information about the desired conditions in each MA is located in the Forest Plan (pp. 3-6 to 3-10; 3-61 to 3-66; and 3-71 to 3-81.9). Tables 4 and 5 illustrate the current and desired vegetative conditions in MAs 2.1 and 6.2, which will be used for this analysis.

- Approximately 19,787 acres of the project area are in MA 2.1. The emphasis for this MA is late-successional, uneven-aged northern hardwood forest types, interspersed with aspen and softwoods. This portion of the project area supports a roaded natural motorized recreational environment.

- Management Area 6.2 encompasses approximately 768 acres in the southwest portion of the project area. The desired condition in MA 6.2 is predominately northern hardwoods and aspen with some areas of conifers mostly in lowlands. This MA supports a semi-primitive motorized recreational environment.

- Management Area 8.1 emphasizes protection and management of Wild and Scenic River (WSR) corridors via direction provided by the Ottawa's Wild and Scenic River Comprehensive River Management Plan (CRMP). Approximately 6,887 acres of the project area are in MA 8.1, including the entirety of the West Branch Presque Isle, and portions of the South Branch and main stem of this river.

The WSR corridor includes a semi-primitive motorized recreational environment in the Scenic segments and a roaded natural motorized recreational environment in the Recreational segment. The Forest Plan outlines the river values per segment (Forest Plan, pp. 3-81.1 to 3-81.2).

1.3 Decision Framework

The ID Team and Responsible Official have considered Forest Plan Goals, Objectives, standards, and management practices, together with public issues and concerns, and management opportunities. The ID Team evaluated the affected area, formulated alternatives, developed design criteria, disclosed environmental consequences, and compared the alternatives through an issue-based environmental analysis documented in this ***Revised*** EA and its associated project file.

The Responsible Official can decide to select the no action alternative, to defer activities, or to implement a management alternative or portions of several alternatives. From this analysis and the supporting project file, the Responsible Official will determine:

- Selection and site-specific location of appropriate vegetative management practices, if any. Included in this decision would be silvicultural prescriptions (including whether temporary openings resulting from clearcut harvest would exceed 40 acres in size), logging systems, slash treatment (which may include biomass harvesting), riparian protection, travel corridors, reforestation ***(which may include the use of fire***), mitigation measures, design criteria and monitoring.

- Selection and site-specific location of the appropriate transportation system, if any. Included in this decision would be a designated system for public access by class of vehicle; road closures; roads removed from the system through decommissioning or obliteration; and roads requiring reconstruction, construction, and temporary construction to provide access to achieve resource objectives. Also included would be road access restrictions or other actions necessary to meet resource needs.

- Selection of the amount, type and distribution of projects for wildlife, aquatics, recreation, as well as old growth classification, if any.

1.4 Purpose and Need for the Proposal

The Goals, Objectives and Management Area (MA) desired conditions outlined in the Forest Plan are a driving force in the development of the Redboat Project. The objective of this project is to implement the Forest Plan, by addressing needs and opportunities within the project area boundary. The desired conditions ***of MAs 2.1, 6.2 and 8.1, the corridor for the Presque Isle Wild and Scenic River system (see Figure 2)*** were integral in the Team's evaluation of current conditions.

Figure 2. South Branch Presque Isle River *(Management Area 8.1)*

These conditions also assisted the ID Team to identify a need for change in several resource areas in the project boundary and develop the project's purpose and need. ***These desired conditions are outlined in the Forest Plan (pp. 3-7 to 3-8; 3-62 to 3-64 and 3-74 to 3-81.3) and summarized in Sections 1.2 and 3.2.***

Timber Resources

The purpose and need for timber resource management is to work towards meeting Forestwide Goals and Objectives by applying silvicultural treatments to restore structural component and species diversity to more representative native conditions within the project area for MAs 2.1 and 6.2 ***as outlined in the*** Forest Plan, pp. 3-7 and 3-62 ***and Tables 1 and 2 below.***

Table 1. Vegetative Conditions within MA 2.1 at the Forestwide and Project Area Scales

Forest Type	Desired Vegetative Composition %[1]	Current Condition %	
		Forestwide %	Redboat Project %
Aspen/Paper Birch	15-20	12	15
Long-lived Conifers (Red Pine, White Pine, White Spruce, Hemlock)	0-10	5	4
Short-lived Conifers (Jack Pine, Balsam Fir, Lowland Conifer)	10-20	20	31
Northern Hardwoods (Upland and Lowland Hardwoods)	50-70	63	45
Additional Desired Vegetative Characteristics			
Old Growth	8-10	7.4	***2.8***

Table 2. Vegetative Conditions within MA 6.2 at the Forestwide and Project Area Scales

Forest Type	Desired Condition Composition %[1]	Current Condition %	
		Forestwide %	Redboat Project %
Aspen/Paper Birch	10-55	27	50
Long-lived Conifers (Red Pine, White Pine, White Spruce, Hemlock)	1-45	4	0
Short-lived Conifers (Jack Pine, Balsam Fir, Lowland Conifer)	1-30	7	31
Northern Hardwoods (Upland and Lowland Hardwoods)	15-90	61	11
Additional Desired Vegetative Characteristics			
Old Growth	10+	9.8%	***0%***

[1]*Desired condition is a long-term goal, based on total NFS acres, which may not be achieved in the planning period for the current Forest Plan.*
[2]*This percentage includes 8% of the project area that are non-forested types.*

Specifically, the need for timber management would have the following purposes.

Northern Hardwoods: The northern hardwood composition percentage is close to the desired range outlined in the Forest Plan for MA 2.1 and within the desired range for MA 6.2 (pp. 3-8 and 3-63). Most hardwood stands in the project area are second-growth stands that resulted from the extensive cutting in the early 1900s. Many stands are dominated by shade-tolerant species and comprised of over-stocked, smaller pole-sized trees; many of which are of poor form and quality. The densities and age classes within these hardwood stands do not conform to recommended structure and stocking levels for vigorous growth.

The project area has northern hardwood forest types that either because of site productivity, species composition, or stand history, does not possess the desired quality that would needed for longer-term, uneven-aged management. These conditions provide opportunities for the development of forest type communities other than northern hardwood species; this is

especially true in stands that have an aspen component. There is a need to develop both uneven-aged and even-aged conditions of northern hardwood stands in order to increase canopy layers, improve tree species diversity, and improve habitat for wildlife. These resulting conditions would adhere to the intent of the Forest Plan's Goals, Objectives, and desired conditions (pp. 2-2, 2-6, 3-9 and 3-63).

Aspen/Paper Birch: Many of the aspen and paper birch stands in the project area are over-mature and at high risk to mortality. Both aspen and paper birch require a major, stand replacing disturbance, such as large scale wind events and fire, to regenerate and become a component in stands. In the absence of disturbance, stands typically convert to shade-tolerant species, such as hardwoods and fir/spruce. Re-establishing these tree species in areas that have converted to other forest types is difficult and expensive.

The aspen composition percentage is at the lower end of the desired range outlined in the Forest Plan for MA 2.1 and within the desired range for MA 6.2 (pp. 3-8 and 3-63). There is a need to maintain the aspen component on the landscape, through regeneration of existing aspen forest types; leading to restoration of an age-class distribution in aspen forests. This includes creating a young age-class (0-9 years), which is lacking in the project area. ***Conversion of aspen to other forest types can occur rapidly in overmature aspen stands; these stands would not regenerate to aspen unless some type of disturbance occurs.***

To provide the 0-9 year age-class, there is also a need to convert some forest types to aspen ***in areas where aspen regeneration is anticipated to be successful.*** Field surveys have shown that some spruce/fir forest types are experiencing effects of spruce budworm infestation. These types of stands can be evaluated as candidates for conversion to provide additional opportunities for aspen regeneration. The 2009 Monitoring and Evaluation Report ***(pp. 22-23)*** findings state that the Forest, as a whole, is regenerating aspen at a lower rate than anticipated due to a variety of factors and therefore, the Ottawa needs to actively look for opportunities to regenerate aspen ***(USDA Forest Service, 2010a)***. Based on these findings, and to improve opportunities for retaining aspen in the project area, there is a need to create temporary openings resulting from aspen regeneration in areas of more than 40 acres in size. An increase in the amount of aspen on the project area landscape would progress current vegetative conditions towards desired conditions as outlined for MA 2.1 and maintain the aspen component within the desired range for MA 6.2 (***Forest Plan,*** pp. 3-8 and 3-63). The purpose and need would also adhere to the Forest Plan's Goals and Objectives for aspen management (p. 2-2 ***[Goal 1, Objective b]; p***. 2-6 ***[Goal 16, Objectives a, and b];*** and ***p.*** 2-8 ***[Goal 27, Objective a]***).

Long-Lived Conifer: There is a need to maintain the health, growth and vigor of long-lived conifers, which would subsequently lead to more resilient conditions. The project area contains white spruce and red pine, which are present in rowed plantations that were planted between the 1930s and 1960s. Current stand densities are higher than what is recommended for good growth. The close spacing between trees results in smaller crowns and reduced growth rates, leading to reduced tree vigor, making trees more susceptible to insect and disease problems. These overcrowded conditions can result in increased mortality rates. In addition, given the desired conditions, there is also a need to consider opportunities for increasing the amount of long-lived conifers through underplanting. These resulting conditions would adhere to the Forest Plan's Goals and Objectives for long-lived conifer management (***p.*** 2-2 ***[Goal 1, Objective c; Goal 2, Objective a]; p.*** 2-6 ***[Goal 17];*** and ***p.*** 2-8 ***[Goal 27]***) and the desired conditions established for MAs 2.1 (p. 3-8).

Short-Lived Conifer: The short-lived conifer composition percentage is well above the desired range within the project area and on the high end of the desired range at the Forestwide scale indicated in the Forest Plan for MA 2.1 (p. 3-8). This vegetative type consists of balsam fir, jack pine and swamp conifers such as black spruce, tamarack and northern white cedar. Some of the spruce/fir forest types contain over-mature aspen and balsam fir. Mature fir is the preferred host of spruce budworm making the short-lived conifer stands susceptible to defoliation and subsequent mortality losses. There is a need to ***remove*** mature and overmature spruce/fir to reduce the incidence of spruce budworm that could negatively impact younger trees, including reducing vigor. Given that the short-lived conifer forest type is at the higher end of the desired range, and the purpose and need for aspen, there is a need to ***convert*** these stands to other forest types, ***such as aspen*** (where practical).

Support Local Community Economy: The forest products industry is vital to the local economy of the western Upper Peninsula of Michigan and surrounding areas. The demand for forest products from the Ottawa is expected to increase over the coming decades (Forest Plan, Final Environmental Impact Statement [FEIS], Vol. I, p. 3-85). There is a need to provide for a long-term production of a mix of forest products, as part of the Forest Plan Allowable Sale Quantity (Forest Plan, Appendix E***, p. E-1***), to support the economy of local communities. This includes providing a mix of species and products consistent with demand. The purpose and need for the timber resource would adhere to the Forest Plan's Goals and Objectives for contributing to the social and economic vitality of local communities and providing a sustained yield of timber products (p. 2-2 ***[Goal 1]; p.*** 2-4 ***[Goal 7];*** and ***p.*** 2-6 ***[Goal 14, Objectives a, and b]***).

Old Growth Resource

Old growth ***forest*** is desired to maintain healthy, diverse, and productive ecosystems, as well as to provide recreational opportunities. Old growth ***forest*** is also important to provide large blocks of habitat ***that are large enough to meet the need of*** those plants and animals dependent on ecosystem components not found in younger forests. ***Classification of old growth on the Ottawa is considered in those areas that meet, or have the ecological potential to meet, specific conditions outlined in the Forest Plan, such as stands that contain a large tree component in large blocks of land (Forest Plan, pp. 2-24 and 2-25). Once a stand is classified as old growth, it is generally no longer considered for timber harvest (Forest Plan, p. 2-24).***

The project area currently includes 819 acres classified as old growth forest. The original purpose and need for the old growth resource disclosed in scoping remains the same, which includes retaining ***511 acres in MAs 2.1 and 8.1 where conditions are consistent with Forest Plan direction.*** There is a need to classify one new stand (Compartment 207, Stand 28 ***as outlined in Appendix 3, Maps 4 and 5***) of old growth ***forest*** that has been determined to possess all of the old growth characteristics outlined in the Forest Plan (Table 2-2, p. 2-25). ***However, there*** is also a need to declassify some old growth stands in MAs 2.1 and 8.1 where conditions have been determined to no longer meet Forest Plan direction. Reallocation of old growth where stand conditions have been deemed to meet Forest Plan direction would lend to maintaining old growth forest in the project area landscape to adhere to the Forest Plan's Goals ***and*** Objectives (p. 2-2 ***[Goal 1, Objective e], p.*** 2-8 ***[Goal 26]);*** and MA desired conditions (pp.3-7, 3-8 and 3-75).

Wildlife Resource

The purpose and need for wildlife resources within the project area is to maintain and enhance wildlife habitat conditions to support a diverse mix of wildlife species, bringing the landscape closer to the Forest Plan Goals and Objectives for MAs 2.1, 6.2, and 8.1. Specifically, the need for enhancing and maintaining components of wildlife habitat would have the following purpose:

Figure 3. Black Bear in Den

Northern Hardwoods: Many northern hardwood stands in the project area lack structural complexity, such as multiple canopy layers, tree species diversity, large diameter snags and large downed woody material, which can provide wildlife roosting and denning opportunities. The purpose and need stated in the Timber Resource for northern hardwood forest would serve to provide these wildlife habitat characteristics.

Some areas in MA 8.1 also lack structural diversity in northern hardwood forest for wildlife habitat needs. There is a need to increase structural complexity and add a component of dead and down woody material that would enhance and maintain wildlife habitat for a host of birds, mammals, reptiles, and other wildlife, which would also adhere to the Forest Plan's Goals and Objectives (pp. 2-2 ***[Goal 1, Objective a]*** and 2-8 ***[Goals 26, Objectives a through d and 27]***). Resulting conditions would further progress the project area toward the desired conditions established for wildlife and vegetation resources in MA 8.1 (Forest Plan, pp. 3-7***4*** and 3-***81.6***). The Forest Plan allows activities in Wild and Scenic River (WSR) corridors provided that such activities are necessary for the protection and enhancement of the established river values (p. 3-81.6).

Aspen/Mixed Aspen Types/Paper Birch: Many aspen stands are overmature and are converting to other forest types. There is a need to retain the forest type in existing aspen stands and stands of other forest types where aspen is a component, which would increase aspen across the project area and provide young aspen communities vital to wildlife species, such as ruffed grouse, woodcock, beaver, chestnut-sided warbler ***and black bear (see Figure 3)*** to adhere to Forest Plan Goals ***and*** Objectives (p. 2-2 ***[Goal 1, Objective b]*** and p. 2-8 ***[Goal 26, Objectives a through d; and p. 2-9, Goal 31***]) and desired conditions (pp. 3-7, 3-8, 3-11, 3-61 to 3-63, 3-75 and 3-81.2). In MAs 2.1 and 6.2, the Forest Plan calls for providing areas where aspen is present in large areas (exceeding 60 acres) to provide foraging habitat for forest raptors and ruffed grouse (pp. 3-10 and 3-65)***. This*** underscores the importance of the need for exceeding the temporary opening restriction discussed in the Timber section.

Wildlife is an outstandingly remarkable value for the Scenic segment of the West Branch Presque Isle WSR. Regenerating aspen in this segment would provide foraging habitat for beaver, which has been identified as important in this area for creating wetlands and ponds that benefit a host of wildlife species (Forest Plan, page 3-81.2).

There is also a need to assure that the paper birch forest type remains on the landscape and provides for tree species diversity. There are small stands of aging paper birch in the project area that would benefit from regeneration, which would result in improved habitat conditions for wildlife to adhere to Forest Plan Goals ***and*** Objectives (pp. 2-6 ***[Goal 16, Objective b]*** and p. 2-8 ***[Goal 12, Objective a]***). ***Paper birch is a species that has also evolved to regenerate after fires. There is a need to include consideration for regenerating paper birch through the use of prescribed fire in lieu of, or in conjunction with, mechanical (i.e., harvest) means***. ***This species' rapid early growth after disturbance, such as fire, gives it an advantage over other species in recently burned areas.***

Wild Rice: There is one very large rice bed within the project area in the Presque Isle Flowage. The only other lake in the project area with suitable conditions for wild rice is Mink Lake. Wild rice provides important hiding cover and food for fish and wildlife, as well as food for people (Forest Plan, Final EIS, p. 3-99). There is a need to establish additional rice beds in the project area to restore rice on the Ottawa to its former abundance and distribution, which would adhere to Forest Plan direction (p. 2-3 ***[Goal 3, Objective d]***).

Long-lived Conifer: Long-lived conifers, such as hemlock and white pine, provide wildlife habitat features that northern hardwood forests do not typically provide. Conifers provide hiding cover, winter thermal cover, and produce seed cones to support forage for small mammals. There is a need to maintain and increase the long-lived conifer forest type within the project area. There is also a need to ***reduce competition for growing space for*** understory long-lived conifers in some areas in MA 8.1 to ensure continued growth and retention of these forest types on the landscape, which would adhere to Forest Plan Goals, Objectives and desired conditions (Forest Plan, p. 2-2 ***[Goal 1, Objective c and d; and Goal 2, Objective a]; p.*** 2-6, ***[Goal 17]; p.*** 2-8 ***[Goals 26 and 27]; and pp.*** 3-74 and 3-75).

Aquatic/Fisheries/Riparian Resource

The purpose and need for this resource is to progress the project area closer to Forest Plan Goals, Objectives and desired conditions for MA 2.1 and 8.1 by improving riparian, lake and river aquatic habitat and by improving problems that are impairing aquatic resources in the project area.

Specifically, the need for improving these resources would have the following purposes:

Figure 4. Example of Existing Large Woody Material in West Branch Presque Isle River

Increase the Amount of Large Woody Material: Many of the lakes and rivers in the project area lack shoreline and submerged large woody materials, resulting in low cover and less habitat diversity for aquatic species. ***An example of large woody material is shown in Figure 4.*** Increasing the amount of large woody material in these lakes and rivers would improve habitat conditions for aquatic species, which would adhere to Forest Plan direction (pp. 2-3, 2-7 and 2-

10). The resulting conditions would also benefit fish, ***as well as*** enhance the hydrologic condition ***of rivers through creating channel diversity (e.g. pools and riffles) in*** the West and South Branches of the Presque Isle WSR to adhere to Forest Plan desired conditions (pp. 3-74***; see WSR Section 7 documentation in the project file).***

Erosion Prevention: There are locations within the project area where erosion on roads, not used for harvest activities, is occurring or where a historical road is interfering with or diverting a stream/drainage channel. There is a need to repair these areas of erosion or stream channel diversion, which would adhere to Forest Plan Goals and Objectives (p. 2-3 ***[Goal 3, Objective a]; p.*** 2-7 ***[Goal 20, Objective b];*** and ***p.*** 2-12 ***[Goal 41]***). ***There is a need to reduce erosion potential resulting from timber harvest near Wild and Scenic Rivers through the placement of large woody material on specific slopes. There are several areas where slopes near Wild and Scenic Rivers have little to no downed woody material that would disrupt overland flow and trap sediments. Timber harvest occurring farther up these slopes has the potential for some soil particle movement during high precipitation events. Placement of large woody material on these slopes would reduce risk of this material reaching the Wild and Scenic Rivers, thereby protecting water quality.***

Recreation

The overall purpose and need for recreation management is to provide for safe, quality recreation experiences while improving the condition of the natural resources in the project area. Management of recreation opportunities would have the following purposes:

Motor Vehicle Use: There is a need to improve access for off-highway (OHV) and passenger vehicles. This includes addressing the conditions of some roads that are currently designated to ensure that these conditions can sustain continued use (Forest Plan, pp. 2-4 and 2-12). There is also a need to evaluate the current access system to determine if providing additional access would improve recreation opportunities. The 2012 Motor Vehicle Use Map (MVUM) is considered the existing condition to which all changes proposed will be analyzed.

Figure 5. Area of Resource Damage from Motorized Traffic Use

In areas where resource damage is occurring ***as shown in Figure 5,*** or has the potential to occur, ***there is*** a need to remove designated access ***and close roads*** (Forest Plan, p. 2-4 ***[Goal 9]; p.*** 2-7 ***[Goal 20];*** and ***p.*** 2-12 ***[Goal 41]***). Changes in the transportation system can also result in opportunities for public access to the project area as roads are improved for management activities if consistent with Forest Plan desired conditions (pp. 3-8, 3-63 and 3-74).

Dispersed Recreation: The project area offers several opportunities for quiet and remote recreational experiences. The Forest Plan calls for maintaining or increasing opportunities for

these types of experiences within the project area. ***Two areas, Hawk and Mishike Lakes have been identified as having a need to establish carry-in boat/canoe access at these sites and address resource concerns associated with the access to these sites. However, the lack of motorized road access to reach these sites is limiting public use. There is no access to the Hawk Lake shoreline via federal land. This concern has been raised by the public visiting this area in the past. A means of accessing Hawk Lake can be addressed through road reconstruction to facilitate timber harvest. The site conditions at Mishike Lake currently offer means for boat/canoe access, and only minor work would be needed to provide adequate access to this lakeshore.***

Snowmobile Trail Re-route: Snowmobile Trail 11S currently uses all of Forest Roads 8154, 8158 and 8170-C, as well as portions of Forest Roads 8150 and 8170. There is a need to ensure user safety on these roads during harvest. This would be accomplished by re-routing snowmobile traffic to avoid dual-use access concerns. This action would adhere to Forest Plan Goals and Objectives (p. 2-4 ***[Goal 9];*** and ***p.*** 2-12 ***[Goal 41]***).

Transportation

The overall purpose and need for transportation management is to provide a safe, efficient, and effective road system that supports both public and administrative uses (Forest Plan, p. 2-12 ***[Goal 41]***). The purpose and need for refining the project area's transportation system considered recreation and private land access, other government jurisdictions, vegetation management access needs, areas of potential resource damage, steep slopes, wet areas, open road density as part of the remote habitat area (Forest Plan, p. 2-9 ***[Goal 31, Objective b]***), heritage sites, aquatic organism passage at stream crossing structures, wildlife habitat, appropriate engineering design and season of allowable road use. Specifically, transportation management would have the following purposes:

Road Suitability: The existing transportation system was inventoried to map the location of roads and to document their condition. A number of roads need reconstruction to sustain use for harvest activity or repair where motorized use is causing damage to the road's surface as well as soil and water resources. ***As mentioned on page 1, additional roads have been identified as needing reconstruction; there is a need for these additional roads to provide administrative access for harvest operations.***

The transportation system inventory also identified a need to create new road segments to facilitate harvest in areas that currently lack access. ***In some areas, the ID Team has identified concerns that the existing transportation system is located in areas that pose a risk to soil and water resources. There is a need to decommission these roads for resource protection. Removal of these roads in some areas necessitates creation of new road segments to provide administrative access in locations that can support management activities for this project, and into the future.*** In addition, there is a need to determine if ***unclassified*** roads[1] are suitable to be added to the managed road system or decommissioned due to unsuitability for long-term

[1] A road or trail that is not necessary for the protection, administration, and utilization of the NFS or the use and development of its resources; and is not included on the Forest's MVUM (36 CFR 212.1; Forest Plan, page Glossary-20).

use or illegal use is causing resource damage, which would adhere to Forest Plan direction (p. 2-4 ***[Goal 9, Objective d]***).

Road Density: There is a need to maintain the total system road density in the project area within the desired, Forest-scale ranges for MAs 2.1 and 6.2, as well as the open system road density within the Remote Habitat Area in accordance with Forest Plan Goals, Objectives and desired conditions (p. 2-9 ***[Goal 31, Objective b]; p.*** 2-12 ***[Goal 41]; and pp.*** 3-8 and 3-63). Additionally, there is a need to evaluate the need for adding new road construction to the transportation system within MA 6.2, the semi-primitive motorized area, given the desired condition for a more restricted road density and emphasis on constructing lower standard roads and requirements for longer skidding distances as outlined in the Forest Plan (pp. 3-63 and 3-66). Although there are no desired road densities for MA 8.1, managing the transportation system would help maintain other desired conditions for the WSR corridor (pp. 3-74 and 3-75).

1.5 Public Involvement

Public participation helps identify concerns and issues with the proposed action released during the scoping period (see Section 1.6). From these issues, alternatives to the proposed action were formulated for analysis of the potential effects of proposed activities. This information enables the Responsible Official to make decisions with an understanding of their environmental consequences. This process also allows the Forest Service to disclose the nature and potential consequences of the proposed activities on NFS lands.

Scoping Process

A scoping letter explaining the purpose and need for action, as well as the location and description of the initial set of proposed actions, was sent to more than 250 interested and affected parties in May 2011. The scoping documents were also posted on the Ottawa's internet web page and listed in the Forest's Schedule of Proposed Actions (e.g., the *Ottawa Quarterly)*, which is a Forest-published document used to inform the general public about proposed projects (see ***the*** project file ***for copies of these documents***). The *Ottawa Quarterly* is sent to approximately 130 individuals, groups and public agencies. A legal notice was published in the May 25, 2011, edition of the Ironwood Michigan's *Daily Globe* newspaper (see project file).

A separate public notice process is required for our proposal to create temporary openings resulting from clearcut harvest that exceed 40 acres (see Section 1.4, ***Timber Resources, Aspen/Paper Birch discussion)***. The Forest Plan allows an exemption to this restriction, but only on a case-by-case basis, after a 60-day public notice and review and subsequent authorization by the Regional Forester (p. 2-23). A legal notice announcing the 60-day public notice was published concurrently with scoping on May 25, 2011, in the Ironwood *Daily Globe* newspaper.

Fifteen replies were received as a result of the scoping process. All comments were given careful consideration (***see*** project file, ***Comment Matrix and associated ID Team Meeting Notes***). ***M***any comments were used in the development of the issues and alternatives presented in Chapter 2 (see Sections 1.6 and 2.2).

***Tribal Input*:** The Forest Service shares in the United States' legal responsibility and treaty obligations to work with federally-recognized Tribes on a government-to-government basis to

protect the Tribes' ceded territory rights on lands administered by the Forest Service. As such, the policies of the Forest Service toward federally recognized tribes are intended to strengthen relationships and further tribal sovereignty through fulfilling mandated responsibilities. The Ottawa outlines its policies and responsibilities on tribal relations in a 1999 Memorandum of Understanding, including tribal consultation on proposed Forest projects. The scoping documentation was sent to local tribal representatives, including members of the Lac Vieux Desert Band of Lake Superior Chippewa and Keweenaw Bay Indian Community, as well as the Great Lakes Indian Fish and Wildlife Commission (see project file).

Other Agencies: The scoping documentation was sent to local government agencies, including the Board of Commissioners for Gogebic County; Township Supervisors for Bessemer, Ironwood, Marenisco, Wakefield and Watersmeet, Michigan townships; as well as the Michigan Departments of Natural Resources and Environmental Quality. Notification of this project was sent to other government agencies via the *Ottawa Quarterly*.

May 2012 Environmental Assessment

The original EA was sent to over 90 interested parties and agencies. A legal notice was published in the Ironwood Daily Globe on May 9, 2012, which began the 30-day comment period. The EA document was posted on the Ottawa's internet web page and listed in the Ottawa Quarterly. Four comments were received as part of this public outreach. These comments were evaluated and addressed by the ID Team (see project file, Response to Comments documentation).

September 2012 Decision Notice and Finding of No Significant Impact (DN/FONSI)

The 2012 DN/FONSI was sent to over 80 interested parties and agencies. A legal notice was published in the Ironwood Daily Globe on December 21, 2012. The DN/FONSI was posted on the Ottawa's internet web page and listed in the Ottawa Quarterly. A letter stating the withdrawal of the DN/FONSI was sent to all parties that received the May 2012 EA.

1.6 Issues

All comments received during the scoping process were categorized as either an issue or concern. Issues are defined as a point of discussion, debate, or dispute. Issues serve to highlight effects or unintended consequences that may occur from the proposed action and alternatives, giving opportunities during the analysis to reduce adverse effects and compare trade-offs for the decision maker and public to understand (Forest Service Handbook 1909.15, Section 12.4). The Responsible Official identified four key issues, which were then used to create an alternative to the proposed action (e.g., Alternative 3 as described in Section 2.5). In summary, these issues address the effects of (1) aspen management; (2) timber harvest on the visual resource in the Wild and Scenic River corridor; (3) the amount of old growth classified; and (4) the effects of road construction. A list of indicator measures (IMs) was developed to compare the effects of different aspects of each issue (see Table 5). Indicator measures serve as tools to quantify the effects and to offer a basis for comparing the effects of management practices. ***See Sections 3.4 to 3.9 for the effects analyses specific to the four issues identified.***

Concerns or "non-issues" are defined as those comments that are not used to develop additional alternatives, but are discussed briefly in the EA. In some instances, comments can be addressed through implementation of Forest Plan direction, project design criteria or clarification of the project's intent. ***A summary of the remaining effects from implementing the proposed alternatives is located in Section 3.10.***

The following discussion outlines the rationale for issue development; more information is located in the project file ***(see Comment Matrix and associated ID Team meeting notes)***.

Issue 1 - Effects of Aspen Management

Comments received expressed concern about the effects of aspen management offered under the proposed action disclosed in the scoping documentation. Some commenters requested more regeneration of the aspen forest type, and others requested less. In addition, concerns were expressed about the conversion of northern hardwood forest types to aspen through implementation of silvicultural practices.

The proposed action disclosed in scoping offered the highest degree of aspen regeneration available due to risks of further losses from mortality caused by over-mature conditions and disease (e.g., white trunk rot). No additional stands can be proposed for treatment at this time as requested by some commenters ***due to areas being too young to harvest, or stands containing sensitive soil features*** (see Section 2.2)***. Therefore, we cannot create an alternative to address comments received that requested additional aspen forest in the project.***

To address public concerns for less aspen, the Responsible Official has evaluated the difference in effects for aspen regeneration based on the following sub-issues created to address the external concerns.

- Sub-Issue 1a: Proposed clearcut harvests would ***conflict with*** the visual quality of the area ***within MA 2.1.***
- Sub Issue 1b: Northern hardwood stands would be converted to aspen ***within MA 2.1***, and therefore limit future options for northern hardwood management in these areas.
- Sub Issue 1c: The National Forest Management Act requires an analysis to compare the effects of clearcut harvest, and resulting temporary openings, in areas that would exceed 40 acres in size to areas where management actions would be limited to 40 acres or less in size. The results of analyzing for this issue will provide information required by the Regional Forester's review and approval for a deviation to the Forest Plan's Standard for restricting the creation of temporary openings associated with even-aged silvicultural practices in excess of 40 acres.

Issue 2 - Intermediate Thinning and Structural Improvement Treatments within the WSR

Comments received expressed concern about effects of timber harvest on the visual resource in the Wild and Scenic River, specifically intermediate thinning harvest of long-lived conifer and northern hardwood structural improvement treatments. The intent of the proposed action disclosed in scoping would be to promote several characteristics outlined in the Forest Plan, including retention of long-lived tree species, enhancing visual variety, increasing species and structural diversity, as well as increasing habitat diversity and complexity (Forest Plan, p. 3-81.6). Given the concerns expressed, the Responsible Official has evaluated the difference in effects for implementation of intermediate thinning harvest and structural improvements in the WSR Corridor and the potential effects to the visual quality of the area.

Issue 3 – Old Growth Classification

Comments received expressed concern about the old growth proposal specifically that no new stands were identified for classification. The proposed action disclosed in scoping included retaining most stands, but declassifying some stands that do not possess characteristics outlined in the Forest Plan (pp. 2-23 to 2-25 and 3-8), ***such as the presence of mature trees within large blocks of land.***

The Forest Plan contains direction regarding the desired amount (percentage of acreage) that should be classified as old growth (***pp. 3-8 and 3-64***). The ID Team ***determined*** that the project area does not contain ***stand conditions that currently meet needs for old growth*** classification. In taking a Forestwide view of MA 2.1, there are areas ***outside of this project area that present future*** opportunities for classification of higher quality stands for old growth and potential old growth. To address public and internal concerns, the ID Team has evaluated the difference in effects based on additional old growth classification via Alternative 3, which includes proposed classification of stands in MA 8.1.

Issue 4 - Effects of System and Temporary Road Construction

Public comments received expressed concern about the effects of road construction spreading non-native invasive species and potential effects to other project area resources. The proposed action disclosed in scoping provides ***a transportation system designed to access the stands where treatment is proposed.*** A reduction in access would affect the ability to reach some stands proposed for treatment; however, the purpose and need for the project would still be met, although to a lesser degree. To address Issue 4, the Responsible Official has evaluated the difference in effects of road construction, including temporary construction, on project resources using the following sub-issues.

- Sub Issue 4a: Road construction would spread non-native invasive plant species into new areas.

- Sub Issue 4b: Road construction would result in impacts to project area ***soil and vegetation*** resources.

Chapter 2 - Alternatives

This chapter includes descriptions of the alternatives by resource area, as well as a summary of the alternatives considered, but eliminated from further analysis. In addition, information is presented to assist with comparing alternatives on the basis of proposed activities.

2.1 Range of Alternatives

Section 102(e) of NEPA states that; "all Federal agencies are required to study, develop, and describe appropriate alternatives to any proposal which involves unresolved conflicts". These unresolved conflicts are the four issues described in Chapter 1 (see Section 1.6).

Three alternatives were developed and analyzed in detail. A no action alternative (Alternative 1) serves as a baseline for alternative comparison and documents the existing condition. The action alternatives consist of a modified version of the original Proposed Action (Alternative 2) and one additional alternative (Alternative 3) that was developed to address the four issues identified.

2.2 Alternatives Considered, but Eliminated from Detailed Study

The following alternatives to the original proposed action were developed through project planning in ID Team meetings brought forth during the scoping period. For reasons explained below, the Responsible Official has deemed implementation of the following alternatives ***as not possible due to unacceptible environmental effects.*** Therefore, these alternatives have been eliminated from further detailed analysis.

Alternative including more timber harvest

During project planning, the ID Team reviewed each stand to determine what type of treatment would be most appropriate at this time to align the project area's existing conditions with Forest Plan desired conditions. A list of stands reviewed is located in the project file. Among the factors that led to stands being deferred from treatment are: a) lands that are not physically suited (as defined by the Forest Plan FEIS, Volume II, Appendix A, ***pp. A-13 to A15***) for management activities; ***and*** b) current stand densities have not yet achieved the desired stocking levels or the density is poorly distributed.

The project's Silviculturist recommended that these stands be excluded based on the factors outlined above. ***Harvesting in these areas would lead to unacceptible, environmental effects.*** Alternative 2, as analyzed in detail in this EA, represents an alternative that includes all stands scientifically appropriate and feasible for management.

Alternative retaining classified old growth in MA 2.1

As outlined in Section 2.***5***, both action alternatives include a proposal to retain ***511 of the 819*** acres of currently classified old growth in MA*s* 2.1 ***and 8.1. The remaining 308 acres of the 819 total acres (located in MA 2.1 only) are proposed for declassification because they*** do not possess old growth characteristics outlined in the Forest Plan (Table 2-2, p. 2-25).

A public comment received specifically requested reconsideration of proposed old growth declassification for stands in MA 2.1 adjacent to the WSR corridor boundary. As part of the ID Team's evaluation of existing conditions in the project area, no additional stands in MAs 2.1 or 6.2 were found that contain old growth characteristics as defined by the Forest Plan. After the close of the comment period, the ID Team re-examined a 5-acre stand in MA 2.1 (Compartment 177, Stand 37) proposed for declassification, which is located adjacent to the WSR corridor. This stand has a few characterisitics that could lend towards the ecological potential for a future old growth condition, however, it is an isolated, small stand that would not serve to provide or contribute to an effective block of old growth for purposes of habitat connectivity or other conditions as outlined in the Forest Plan (p. 2-24). In addition, there is no Forest Plan direction, or other regulation, law or policy, that requires additional management considerations adjacent to the WSR corridor. ***Therefore, the Responsible Official did not include this stand in the old growth classification proposal for either action alternative.***

Alternative offering additional public access to Heart Lake

Comments received during the scoping period requested additional public access to lakes as well as placement of boat launches on larger lakes, ***specifically*** Heart Lake. All lakes on the Ottawa are open to dispersed recreational opportunities (e.g., walk-in access). The recreation proposal discussed in Section 2.***5*** includes a proposal for establishing carry-in boat/canoe access for Hawk and Mishike Lakes on existing roads. ***Aside from this proposal,*** there are no other opportunities at this time to provide new motorized access to ***Heart Lake***. Although the Forest Service does have ownership of a portion of the western shore of Heart Lake, the shoreline area consists of extensive wetlands that prohibit motorized access to the lake. Therefore, site conditions cannot support development of a boat launch. ***In general, the project area's landscape characteristics, such as slopes and wetlands adjacent to other larger lakes would make public access difficult; creating access into these areas would not be cost-efficient.***

2.3 Best Available Information

The information presented in this EA is based on the best available information. It is important, however, to understand the exact location and amount of any activities, described in Section 2.5, could vary upon implementation. One example is our use of full stand acreages for timber harvest as displayed on proposed alternative maps (see Appendix ***3***). Project design criteria, such as buffers established to protect riparian areas and aquatic features, can (and often does) reduce the acreage that is actually harvested (see Appendix ***1***).

Field surveys by project specialists were crucial in calculating and analyzing the data used in resource evaluations. Calculations are based on skilled interpretations of aerial photos and maps; application of professional judgment from observations and evaluation of data; and information acquired from review of relevant, scientific literature. Although field surveys have been completed, subsequent intensive field reconnaissance often occurs prior to implementing an action on the ground. Findings provided by field reconnaissance could warrant changes in project implementation to better reflect actual conditions on the ground as variances in the location of features, such as soil types, stream boundaries, and the extent and density of vegetation in a given area, do occur. New information may also require implementation strategies to be altered. Approximating some numbers, such as acres of a harvest, or miles of road work, allows flexibility to adapt to the information collected from more intensive field reconnaissance.

If an action alternative is selected for implementation, possible changes to proposed actions before implementation could include, but are not limited to, changes to harvest prescription, harvest boundary or road location. However, the degree of change would be evaluated against the analyses performed for this EA to ensure that action(s) remain within the scope of the effects expected to occur as a result of management strategies analyzed in this EA. Direction contained in Forest Service Handbook 1909.15, Section 18 allows for the correction, supplementation, or revision of environmental documentation and/or the reconsideration of a decision to take action. In addition, this direction allows an opportunity to examine activities, typically five years from a decision date, to ensure that new information has not been realized (such as a change in management direction) that necessitates additional analysis to ensure implementation of activities remains consistent with new or change direction. Simple corrections, such as those to reflect mapping errors and/or changes to the amount and location of activities can be incorporated into the project file without additional analysis provided that the scope of a changed activity would not cause effects to exceed the anticipated effects disclosed in this analysis and supporting project file.

2.4 No Action Alternative

Alternative 1 was developed as required in 40 CFR 1502.14(d), and serves as the baseline for evaluating all other alternatives. Each resource discussion presented in Chapter 3 of this document includes an analysis based upon the environmental consequences of implementing Alternative 1. In summary, Alternative 1 does not propose any new ground disturbing activities or changes in management strategies in the project area. Therefore, no actions would be implemented on NFS lands to align the project area's existing conditions with the desired conditions outlined in the Forest Plan for MAs 2.1, 6.2 and 8.1 (pp. 3-6 to 3-10; 3-61 to 3-66; and 3-71 to 3-81.9). Alternative 1 would not meet the purpose and need of the Redboat Project.

2.5 Action Alternatives

To meet the purpose and need for this project, the following activities are proposed. All actions would be implemented in accordance with applicable Forest Plan standards and guidelines (pp. 2-12 to 2-37). Implementation of the following actions would bring the project area conditions closer to the desired conditions for MAs 2.1, 6.2 and 8.1 as outlined in the Forest Plan. ***A description of alternatives is presented in Table 3 and a summary of effects for these alternatives are shown in Table 4.*** All acreages and other figures are approximate and may vary due to existing conditions and design criteria implementation (see Section 2.3).

Alternative 2

The ID Team developed this alternative using information and data gathered from the project area, with direction from the Responsible Official, to specifically address the differences between current conditions in the project area and the Forest Plan's desired conditions. Alternative 2 is primarily based upon the proposed action released for review and comment during the scoping period. The Responsible Official modified Alternative 2 based upon new information gathered from further field review that occurred after release of the scoping document. ***A*** detailed summary of changes between the scoping document and Alternative 2 is located in the project file ***[see GIS analysis]. In addition, some actions disclosed as part of the proposed action in the scoping document have been excluded from Alternative 2. A list of these actions and rationale for excluding them from Alternative 2 is outlined in Table 7.***

Modifications to Alternative 2 include:

- ***A*** reduced amount of ***acreage proposed for*** clearcut, selection and salvage harvest ***in response to field verification of existing conditions. Some areas were dropped from the proposal entirely; and other changes occurred through modifications to the proposed silvicultural prescriptions as outlined in the following bullet***.
- A change in silvicultural prescriptions proposed from the scoping document based upon site capabilities verified during further field reconnaissance, specifically:
    - A change from aspen clearcut to selection harvest to manage conditions for northern hardwood forest types.
    - A change from salvage harvest to aspen clearcut to afford opportunities for aspen regeneration.
    - A change from selection harvest to shelterwood for paper birch regeneration efforts.
- A reduction in system and temporary construction in areas where a harvest proposal was dropped or other options were available (i.e., increased skidding).
- System road construction was replaced by temporary road construction where feasible to reduce the amount of new roads created.
- An increase in old growth classification in one stand (compartment 207/stand 28) where conditions meet several old growth characteristics outlined in the Forest Plan.
- The Responsible Official has determined that the following activities included in the scoping document maps are excluded from this project, but will require additional analysis under a separate NEPA process: exploration for gravel sources and Jackson Creek erosion control.
- Additional opportunities were found to seed wild rice in Mink Lake and increase the amount of large woody material in upland sites.
- Further field review showed that ***riparian area*** underplanting and non-commercial aspen regeneration opportunities were no longer feasible.
- A need for a snowmobile re-route was identified to ensure safety of area users during proposed implementation of timber harvest.

Alternative 3

This alternative was designed to address the issues raised, while striving to meet the purpose and need for the proposal. In summary, Alternative 3 includes less aspen regeneration harvest, no thinning harvest or stand structural improvement within the WSR, more old growth classification and less road construction than Alternative 2. It is important to note that some actions outlined below are different than Alternative 2; these changes are a direct consequence of alternative design (see project file). For example, the amount of northern hardwood treatment is less under Alternative 3 due to no road construction to access stands. See Table 3 for a list of actions proposed, in addition to Appendix ***1*** for a display of these actions.

Issue 1 – Effects of Aspen Regeneration: This alternative reduces the amount of aspen regeneration offered based on the following factors.

- ***Implementation of design criterion 10 would ensure aspen regeneration complexes are limited to areas less than 40 acres in size (Forest Plan, p. 2-23).***

- The amount of aspen regeneration harvest would be decreased based on a reduced amount of new and temporary road construction.

- Some proposed aspen harvest would be excluded to reduce the amount of northern hardwood stands converted to aspen; these stands would receive an improvement cut to manage for perpetuating the hardwood forest type.

- Some silvicultural prescriptions would be changed to salvage to remove dying trees in lieu of clearcut harvest to regenerate aspen. Vegetative composition in these areas is anticipated to convert to species other than aspen.

Issue 2 - Intermediate Thinning and Structural Improvement Treatments within the WSR: This alternative excludes these treatments within MA 8.1.

Issue 3 - Old Growth Classification: ***As no additional old growth areas have been identified in MAs 2.1 or 6.2, t***his alternative increases the amount of old growth proposed for classification within MA 8.1 ***to address commenter concerns.***

Issue 4 – Effects of System and Temporary Road Construction: Alternative 3 offers fewer miles of both new and temporary road construction in areas excluded from timber harvest through alternative design within MAs 2.1, 6.2 and 8.1.

Table 3. Action Alternative Comparison Based on Proposed Activity

Proposed Activity		Alternative 2	Alternative 3
Timber Resource	Selection harvest in northern hardwood forests to regenerate the existing forest type	***Total* - 7,338 acres** • 7,260 acres in MA 2.1 • 62 acres in MA 6.2 • 16 acres in MA 8.1	***Total* - 7,260 acres** • 7,244 acres in MA 2.1 • 0 acres in MA 6.2 • 16 acres in MA 8.1
	Thinning harvest in northern hardwood and mixed forest types to concentrate growth on healthiest stems	**Total - 417 acres** • 412 in MA 2.1 • 0 acres in MA 6.2 • 5 acres in MA 8.1	**Total - 412 acres** • 412 acres in MA 2.1 • 0 acres in MA 6.2 • 0 acres in MA 8.1
	Improvement cut in northern hardwood and mixed forest types to improve stand quality and species composition**. There is *an increase in this treatment within MA 2.1, under Alternative 3, in lieu of conversion to aspen to address Issue 1 (sub-issues 1a and 1b) (see Table 4).***	**Total - 347 acres** • 329 acres in MA 2.1 • 18 acres in MA 6.2 • 0 acres in MA 8.1	**Total - 491 acres** • 471 acres in MA 2.1 ***(of which 142 acres would not be converted to aspen – 10 out of the 11 stands)*** • 0 acres in MA 6.2 • 20 acres in MA 8.1
	Clearcut harvest in aspen forests to regenerate the existing forest type	**Total - 1,911 acres** • 1,402 acres in MA 2.1 • 229 acres in MA 6.2 • 280 acres in MA 8.1	**Total - 1,494 acres** • 1,355 acres in MA 2.1 • 0 acres in MA 6.2 • 139 acres in MA 8.1

Proposed Activity		Alternative 2	Alternative 3
Timber Resource	Conversion of other forest types to aspen through clearcut harvest. ***There is a difference between alternatives for conversion of northern hardwood to aspen in MA 2.1 due to Issue 1 (sub-issues 1a and 1b) (see Table 4).***	**Total - 697 acres** • 617 acres in MA 2.1 ***(of which 162 acres are currently a northern hardwood forest type)*** • 0 acres in MA 6.2 • 80 acres in MA 8.1	**Total - 413 acres** • 385 acres in MA 2.1 ***(of which 20 acres are currently a northern hardwood forest type; this 20 acres is part of the 162 acres shown under Alternative 2)*** • 0 acres in MA 6.2 • 28 acres in MA 8.1
	Thinning harvest in red pine forests to improve stand quality and composition. ***This activity is excluded from Alternative 3 within MA 8.1 to address Issue 2 (see Table 4).***	**Total - 401 acres** • 370 acres in MA 2.1 • 0 acres in MA 6.2 • 31 acres in MA 8.1	**Total - 370 acres** • 370 acres in MA 2.1 • 0 acres in MA 6.2 • 0 acres in MA 8.1
	Underplant white pine within stands of various forest types to increase tree species diversity and increase the long-lived conifer component	**Total - 186 acres** • 104 acres in MA 2.1 • 0 acres in MA 6.2 • 82 acres in MA 8.1	Same ***as Alternative 2***
	Salvage harvest various forest types to remove dying trees	**Total - 14 acres** • 14 acres in MA 2.1 • 0 acres in MA 6.2 • 0 acres in MA 8.1	**Total - 77 acres** • 77 acres in MA 2.1 • 0 acres in MA 6.2 • 0 acres in MA 8.1
	Overstory removal in northern hardwood forests to release understory trees	**Total - 70 acres** • 70 acres in MA 2.1 • 0 acres in MA 6.2 • 0 acres in MA 8.1	Same ***as Alternative 2***

Proposed Activity		Alternative 2	Alternative 3
Timber Resource	Shelterwood harvest in mixed forest types, where a paper birch component exists. A portion of the overstory would be retained to provide a future seed source; the portion of the overstory removed would reduce shading to encourage paper birch regeneration.	**Total - 38 acres** • 17 acres in MA 2.1 • 0 acres in MA 6.2 • 21 acres in MA 8.1	Same ***as Alternative 2***
Old Growth Resource	Retain currently classified old growth stands that contain a large tree component and other old growth characteristics[2]	**Total - 511 acres** • 250 acres in MA 2.1 • 0 acres in MA 6.2 • 261 acres in MA 8.1	Same ***as Alternative 2***
	Classification of additional acres identified to have old growth characteristics after release of the scoping document and/or positioned on the landscape in a manner that provides desired spatial arrangements as described in the Forest Plan (pages 2-23 and 2-24). ***The acreages between alternatives vary in MA 8.1 due to Issue 3 (see Table 4).***	**Total - 51 acres** • 0 acres in MA 2.1 • 0 acres in MA 6.2 • 51 acres in MA 8.1	**Total - 1,795 acres** • 0 acres in MA 2.1 • 0 acres in MA 6.2 • 1,795 acres in MA 8.1 (includes the 51 acres under Alternative 2)
	Declassification of ***currently classified*** old growth where conditions do not meet Forest Plan direction, especially for the desired spatial arrangement on the landscape.	**Total - 308 acres** • 282 acres in MA 2.1 • 0 acres in MA 6.2 • 26 acres in MA 8.1	Same ***as Alternative 2***

[2] The current acreage classified as old growth is 819 acres.

Proposed Activity		Alternative 2	Alternative 3
Wildlife Resource	Management for aspen regeneration complexes for wildlife habitat would include creation of temporary openings exceeding 40 acres in size from clearcut harvest. The acreage for temporary openings is accounted for in the above description of aspen regeneration through clearcut and conversion harvest. ***The exclusion of this activity for Alternative 3 is due to Issue 1c (see Table 4).***	Creation of up to 13 aspen regeneration complexes, ***which encompasses both clearcut and forest type conversion to aspen. Temporary openings would range from 41 to 122 acres in size.*** • 12 complexes in MA 2.1 • 1 complex in MA 6.2. • 0 complexes in MA 8.1	***Creation of 0 aspen regeneration complexes.***
	Treat northern hardwood and other forest types with stand structural improvements to promote understory regeneration, ***add coarse woody debris,*** develop additional canopy layers and provide improved wildlife habitat conditions. ***The exclusion of this activity in MA 8.1 is to address Issue 2 (see Table 4)***	**Total - 865 acres** • 12 acres in MA 2.1 • 0 acres in MA 6.2 • 853 acres in MA 8.1	**Total - 12 acres** • 12 acres in MA 2.1 • 0 acres in MA 6.2 • 0 acres in MA 8.1
	Treat long-lived conifer release to remove the northern hardwood overstory in some areas of identified stands to free overtopped long-lived conifers from competing hardwoods.	190 acres (all in MA 8.1)	***Same as Alternative 2***
	Treat over-mature paper birch to regenerate the forest type through the use of prescribed fire or mechanical means	14 acres (all in MA 8.1)	***Same as Alternative 2***
	Establish wild rice on Mink Lake	A minimum of one bed (ranging from 1 to 5 acres in size)	***Same as Alternative 2***

Proposed Activity		Alternative 2	Alternative 3
Aquatic Resources	***Fell*** (or haul in) ***up to 174*** lakeside trees to increase large woody material component.	Henry, Eel, Mishike, Plymouth, Mink, Blue Jay, Elbow, Redboat, Glen, Taps, and Thrush Lakes	***Same as Alternative 2***
	Fell up to 78 streamside trees to increase large woody material component	Along some portions of the South and West Branches Presque Isle WSR. This includes the Little Presque Isle River, where some streamside alder would be cut, bundled and placed in the river.	***Same as Alternative 2***
Aquatic Resources	***Fell*** 20 to 25 trees ***within about 5 acres of*** northern hardwood stands to increase large woody material in areas of steep slope.	Both Alternatives	
	Prevent erosion and, if needed, restore to original locations any stream/drainage channel diversions caused by historical road construction or other roads not being used for proposed harvest activities **(*2 sites = 1 acre of improved watershed per site*)**.	Both Alternatives	
	Prevent erosion from entering ***Mishike*** Lake (see Recreation section) by improving the road to proposed carry-in boat access site **(*1 site = 1 acre of improved watershed per site)*.**	Both Alternatives	

Proposed Activity		Alternative 2	Alternative 3
Recreation	Add designated access on 1.0 miles of road, open to all motorized vehicles, on the MVUM to provide dispersed recreation access after project implementation.	Both Alternatives	
	Remove designated access from the MVUM to ensure resource protection	***Total – 27.4 miles*** • ***Removed 8 miles of road designated for OHV use only*** • ***Removed 18.5 miles of road designated for all motorized use*** • ***Removed 0.9 miles of road from highway legal vehicle access*** ***The entirety, or portions of, the following roads would be temporarily removed from the MVUM until road conditions are improved to provide resource protection and a safe recreational experience: Forest Roads 8150 (and spurs F, H and M); 8151 and spur A; 8158; 8170-C; 8170-J; 8176 (and spurs C, C1, D, D1, D2, D4 and E), 8177, 8183 (and spurs B and B1) and 9718.***	
	Establish carry-in boat/canoe access for Hawk and Mishike lakes. To access these sites, designation of 0.6 miles of road would be open to all motorized vehicles.	Both Alternatives	
	To avoid conflicts between machinery used for timber harvest operations and snowmobile traffic, a temporary detour of Snowmobile Trail 11S would be provided.	Both Alternatives	
Transportation	Construct new system roads, which would include clearing trees, grubbing stumps, installing culverts, placement of gravel where needed for road stabilization, and ditching/shaping the road. ***The difference between alternatives is due to Issue 4 (sub-issues 4a and 4b) (see Table 4).***	3.2 miles ***(6.2 acres)***	2.5 miles ***(4.8 acres)***

Proposed Activity		Alternative 2	Alternative 3
Transportation	Construct temporary roads, to access stands proposed for harvest where a permanent road is not needed. Additional needs for temporary road may be identified during implementation. All temporary roads would be rehabilitated by natural re-vegetation and slash placed in areas, where needed, to deter unauthorized use. ***The difference between alternatives is due to Issue 4 (sub-issues 4a and 4b) (see Table 4).***	5.6 miles ***(10.7 acres)***	3.7 miles (no temporary roads constructed within MA 8.1) ***(7.2 acres)***
	Reconstruct roads, which would include clearing brush and widening existing clearing, placement of gravel where needed, installing and/or repairing culverts and crossings ***consistent with aquatic organism passage needs***, and ditching/shaping the road.	***27.6 miles (includes 1 additional mile to provide access for harvest operations as outlined on pages 1 and 11)***	***25.7 miles (includes 1 additional mile to provide access for harvest operations as outlined on pages 1 and 11)***
	Decommission 1.2 miles of Forest system roads and 54 miles of ***unclassified*** roads to remove unneeded routes and protect areas from on-going or future resource damage. This could include removing any present culverts and crossing structures, placement of berms or other closure devices to prohibit vehicle access, and allowing natural re-vegetation of the road bed.	Both Alternatives	

Proposed Activity		Alternative 2	Alternative 3
Transportation	Upgrade ***all of*** Forest Road 8170 from an objective maintenance level (OML) 2 road (e.g., suitable for high-clearance vehicles) to an OML 3 road (suitable for passenger vehicles), to provide dual use for highway vehicles and OHVs. Forest Road 8170 would be designated as open to all motorized access on the MVUM after needed road improvements are made to facilitate timber harvest.	Both Alternatives	
	Where needed, erect earthen berms or gates to prohibit vehicle access to 63 miles of closed Forest system roads.	Both Alternatives	

2.6 Comparison of Effects

Table 4. Summary of the Effects *Based on Issues Identified*

Resource Effects	**Alternative 1** **No Action**	**Alternative 2** **Proposed Action**	**Alternative 3** a) No 40+ Temporary Openings; b) Increased Old Growth **in MA 8.1** c) No Thinning or Structural Improvements ***MA 8.1*** d) Less Road Construction
Timber: specific to ***11*** northern hardwood stands converted to aspen ***in MA 2.1 under Alternative 2; and 1 stand only under Alternative 3 to address sub-issues 1a and 1b*** (see Section 3.4)	• ***Most*** progression toward the desired condition for northern hardwood ***in 162 acres as no aspen conversion would occur.*** • No progression toward maintaining the desired condition for aspen in ***the 162 acres*** No progression toward creating the 0-9 year age class of aspen ***in the 162 acres*** to assist in meeting Forest Plan Objective 27a. • The ***existing*** aspen component in ***162*** acres of northern hardwood stands would be lost through natural processes (eventual mortality of over-mature aspen trees), and replaced with northern hardwood species due to competition.	• Less progression toward the desired condition for northern hardwood**s as 162 acres *would be converted to aspen.*** • ***Most*** progression toward maintaining the desired condition for aspen in ***the 162 acres as all 11 stands would be converted to aspen.*** • Creation of the 0-9 year age class of aspen in *the* ***162*** acres of ***would*** assist in meeting Forest Plan Objective 27a. • The **existing** aspen component in ***162*** acres would be retained through clearcut harvest silvicultural prescription.	• Less progression toward the desired condition for northern hardwood ***as 20 acres (1 of the 11 stands) would be converted to aspen*** • Less progression toward maintaining the desired condition for aspen ***in 142 acres (10 of 11 stands) would be retained as northern hardwood to address sub-issues 1a and 1b*** • Creation of the 0-9 year age class of aspen in 20 acres of northern hardwood to assist in meeting Forest Plan Objective 27a. • The **existing** aspen component in 20 acres of northern hardwood stands would be retained through clearcut harvest silvicultural prescription. An improvement cut silvicultural prescription ***is proposed*** for the remaining ***142*** acres***, perpetuating the northern hardwood forest type.***

Resource Effects	Alternative 1	Alternative 2	Alternative 3
Old Growth ***specific to 12 stands (308 acres) declassified in MAs 2.1 and 8.1 and classification of 1,795 acres in MA 8.1 to address Issue 3*** (see Section 3.***5***)	• No declassification of stands in MA***s*** 2.1 ***and 8.1*** that do not possess old growth characteristics as outlined in the Forest Plan. • No opportunities to maintain***/increase the*** percentage ***of old growth*** in other areas of MA 2.1, where characteristics are found. • No gain ***in acres*** that possess the ecological potential to become old growth in MA 8.1 to provide late successional species habitat.	• Declassification of ***12*** stands in MA***s*** 2.1***, which*** do not possess old growth characteristics as outlined in the Forest Plan ***(282 acres of the total 308 acres in MA 2.1; 26 acres of the total 308 acres in MA 8.1).*** • Allows future opportunities for old growth **to be classified** in ***other parts of*** MA 2.1 ***outside of the project area*** to maintain***/increase*** the old growth percentage in areas that ***do*** possess old growth characteristics ***(282 acres in MA 2.1).*** • ***Classification of one stand identified as possessing old growth characteristics to provide late successional species habitat (51 acres in MA 8.1).***	• *Declassification of **12** stands in MA**s** 2.1**, which** do not possess old growth characteristics as outlined in the Forest Plan* ***(282 acres of the total 308 acres in MA 2.1; 26 acres of the total 308 acres in MA 8.1).*** • ***Allows future opportunities for old growth to be classified in other parts of MA 2.1 outside of the project area to maintain/increase the old growth percentage in areas that do possess old growth characteristics (282 acres in MA 2.1).*** • Classification of stands ***(1,795 acres total) identified*** as possessing ***old growth characteristics (51 acres as outlined under Alternative 2) as well as 1,744 acres that have*** the ecological potential to become old growth in MA 8.1 to provide late successional species habitat.

Resource Effects	Alternative 1	Alternative 2	Alternative 3
Wildlife: ***specific to acres managed for aspen (clearcut and conversion) in aspen regeneration complexes only (+40 acres) in MAs 2.1 and 6.2 to address sub-issue 1c*** (see Section 3.6)	• No aspen forest would be created and existing aspen would convert to other species ***within the aspen regeneration complexes.*** • ***No creation of temporary openings exceeding 40 acres in size from even-aged harvest techniques and a foregone opportunity to provide early successional wildlife habitat.***	• ***Design criterion 10 would not be implemented within the aspen regeneration complexes (approximated 867 acres). This acreage includes a gain of 90 acres resulting from the exclusion of design criterion 10*** • ***Creation of temporary openings exceeding 40 acres in size from even-aged harvest techniques would occur, resulting in more progression toward the Forest Plan's MA guideline for providing larger patches of aspen habitat in MAs 2.1 and 6.2 (pp. 3-10 and 3-65, respectively).***	***No aspen regeneration complexes would be managed Design criterion 10 would be implemented, which reduces the amount of early successional habitat by 90 acres. This reduction would occur through the establishment of a minimum of 10-acre, non-harvested stands, placed in a manner to maintain the temporary opening size from clearcut harvest to less than 40 acres in size. Therefore this alternative would result in about 777 acres of aspen forest type in the same geographical areas as Alternative 2, with no contiguous areas of aspen over 40 acres in size.*** • ***No creation of temporary openings exceeding 40 acres in size would lead to less progression toward desired conditions of Forest Plan in MAs 2.1 and 6.2.***

Resource Effects	Alternative 1	Alternative 2	Alternative 3
Wildlife: ***This section is also indirectly tied to sub-issue 1c*** (see Section 3.6)	• No progression toward creating ***early successional wildlife habitat in the*** 0-9 year age class of aspen ***in the aspen regeneration complexes within MAs 2.1 and 6.2.*** • ***No progression toward the desired condition of maintaining 12,000 acres of aspen in this age class at the Forestwide scale, which is outlined in Objective 27a of the Forest Plan (p. 2-8). Currently, there is no aspen habitat within the aspen regeneration complexes within the 0-9 year age class.***	• ***Creation*** of ***early successional wildlife habitat*** in the 0-9 year age class in ***the 867 acres encompassed within the aspen regeneration complexes for MAs 2.1 and 6.2.*** • ***An increase*** from 0% to 10% to assist in ***progressing toward the desired condition outlined in Objective 27a.***	• ***Creation*** of ***early successional wildlife habitat*** in the 0-9 year age class ***on 777 acres of within MAs 2.1 and 6.2.*** • ***An increase*** from 0% to 7% to assist in ***progressing toward the desired condition outlined in*** Objective 27a. • ***This alternative presents a foregone opportunity to realize 3% additional acreage for early successional wildlife habitat when compared to Alternative 2.***

Resource Effects	Alternative 1	Alternative 2	Alternative 3
Soils ***specific to system and temporary road construction; Alternative 3 includes less road construction to address sub-issue 4b*** (see Section 3.7)	• ***No miles of road construction; and therefore, no*** removal of land from productive forest for road construction. • No compaction, rutting, erosion or displacement of soil from temporary or system road construction.	• **Permanent** removal of ***6.2 acres of*** land from productive forest for **system** road construction ***(3.2 miles)***. ***Temporary removal of 10.7 acres of land from productive forest in areas of temporary road construction (5.6 miles).*** • Compaction, rutting, erosion or displacement of soil from temporary or system road construction ***(about 17 acres)***, which would be minimized through application of design criteria. • 23% of temporary road would be located on poorly suited soils resulting in an increased risk of soil erosion, rutting, sedimentation, and effects to soil productivity, which would be minimized through construction of winter standard roads on frozen ground.	• ***Permanent*** removal of ***4.8 acres of*** land from productive forest for ***system*** road construction ***(2.5 miles)***. ***Temporary removal of 7.2 acres of land from productive forest in areas of temporary road construction (3.7 miles).*** • Compaction, rutting, erosion or displacement of soil from temporary or system road construction ***(about 12 acres)***, which would be minimized through application of design criteria. • 9% of temporary road would be located on poorly suited soils resulting in an increased risk of soil erosion, rutting, sedimentation, and effects to soil productivity, which would be minimized through construction of winter standard roads on frozen ground.

Resource Effects	Alternative 1	Alternative 2	Alternative 3
Botany ***specific to system and temporary road construction; Alternative 3 includes less road construction to address sub-issue 4a*** (see Section 3.8)	• No potential risk of ***Non-native Invasive Plant (***NNIP***)*** spread from construction as no system or temporary roads would be created.	• More potential risk of NNIP spread **on *about 17 acres (or 8.8 miles)*** of system and temporary road construction • 30% more construction when compared to Alternative 3.	• Less potential risk of NNIP spread ***on about 12 acres (or 6.2 miles)*** of system and temporary roads construction.

Resource Effects	Alternative 1	Alternative 2	Alternative 3
Visuals ***specific to clearcut harvest and road construction in MAs 2.1 and 6.2 to address sub-issues 1a, and 4b; all MA 6.2 treatments and road construction are excluded from Alternative 3*** (see Section 3.9)	• No effects to the ***Maximum Modification,*** Modification or Partial Retention ***Visual Quality Objectives (VQOs)*** as there would be no clearcut harvest, creation of temporary openings, or road construction	• More short-term effects (5 years) would occur to the areas of Maximum Modification (MA 6.2) Modification (MAs 2.1 and 6.2) and/or Partial Retention (MA 2.1) Visual Quality Objectives (VQOs) from: • ***2508 total acres of*** aspen clearcut harvest due to the removal of vegetation and creation of temporary openings ***from this even-aged treatment***. • Openings ***across 17 acres*** of the forested canopy as a result of ***8.8 miles of*** road construction • Indirect effects would include areas of soil disturbance created by log landings and skid trails and residual slash. • Some effects would be mitigated by the application of design criteria	Less short-term effects (5 years) would occur to the areas of Modification and/or Partial Retention (MA 2.1) VQOs from: • ***1907 total acres of*** aspen clearcut harvest ***due to the removal of vegetation and creation of temporary openings from this even-aged treatment.*** • Openings ***across 12 acres of*** the forested canopy as a result of ***6.2 miles of*** road construction • Indirect effects would include areas of soil disturbance created by log landings and skid trails and residual slash. • Some effects would be mitigated by the application of design criteria • No effects to MA 6.2 would occur as there would be no clearcut harvest, creation of temporary openings, or road construction

Resource Effects	Alternative 1	Alternative 2	Alternative 3
Visuals ***specific to northern hardwood structural improvement and long-lived conifer thinning in MA 8.1 to address Issue 2*** (see Section 3.9)	• No effects to the Partial Retention VQO as there would be no thinning harvest or structural improvements within MA 8.1	• **More short-term effects (5 years) from temporary *o***penings in the forested canopy ***in MA 8.1*** as a result of ***31 acres of long-lived conifer*** thinning harvest and ***853 acres of*** structural improvements ***in northern hardwood stands.*** • Indirect effects would include areas of soil disturbance created by log landings and skid trails and residual slash. • Some effects would be mitigated by the application of design criteria	• No effects to the Partial Retention VQO as there would be no thinning harvest or structural improvements within MA 8.1. ***The effects would be equal to that of Alternative 1.***

Chapter 3 - Environmental Consequences

3.1 Introduction

The intent of this chapter is to describe the affected environment, and present the effects analyses for the resources within the project area, specific to the issues identified, that may be changed through implementation of proposed alternatives. This chapter also forms the scientific and analytic basis for comparison of the alternatives, including the No Action Alternative. Additional information is located in the project file***'s specialist information section as well as on the Ottawa's website:*** ***http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=35518.***

3.2 Affected Environment

The Redboat project area lies south of US Highway 2 and west of State Highway 64, near the town of Marenisco, Michigan. Features of the project area include: Congressionally-designated WSR segments, specifically the Scenic segment of the West Branch Presque Isle River, which includes the Presque Isle River Flowage, and portions of the Recreational segments of the main stem and South Branch Presque Isle Rivers.

The project area ***also*** encompasses several lakes, including Redboat, Henry, Eel, Elbow, Thrush, Heart, Hawk, Mink and Mishike***; a photo of Thrush Lake is shown in Figure 7***.

Numerous recreational opportunities exist within the project area including: camping at Henry Lake which also has an accessible fishing pier; hiking trails at Plymouth and Taps Lakes; and access via carry-in canoe and boat ramps to lakes and rivers.

Figure 6. Thrush Lake

The project area is nested within several larger landscape settings, one of which is Gogebic County, which is located in the Western Upper Peninsula of Michigan. ***The*** project area ***is*** approximately 30,484 acres, of which approximately 27,443 acres are managed under NFS ownership.

The project is located within the following legal description: Gogebic County, Michigan: Township (T) 45N, Range (R) 43W, Sections 5-7, 18 and 19; T45N, R44W, Sections 1-15 and 22-

24; T46N, R43W, Sections 16-21, 28-33 and 32-36; T46N, R44W, Sections 5-9 and 13-36; and T47N, R44W, Sections 31 and 32.

Existing Conditions

The Forest Plan describes the desired condition for vegetation composition within management areas by grouping the major forest types found on the Ottawa into four main categories: aspen/paper birch, long-lived softwoods, short-lived softwoods, and hardwoods.

MA 2.1

Aspen/Paper Birch: The average age of the aspen proposed for treatment within the project area is 57 years and two-thirds of the proposed acres are 50 years and older. Field evaluations of aspen stands noted many occurrences of aspen stands with high levels of white trunk rot (Phellinus tremulae). There is no direct control known for stopping the spread and volume loss associated with this disease. No aspen stands within the project area are within the 0 to 9 year age class, and therefore the project area is not contributing to Forest Plan Objective 27a for maintaining 12,000 acres in this age class across the Forest.

Paper birch forest types are a minor component of the project area. There are 38 acres of the paper birch type proposed for treatment and it is overmature at an average age of 70 years old. There are 964 acres of stands typed as paper birch/aspen/spruce, but typically birch is a very small component of these stands due to mortality. Mortality usually is driven by overmature stands succumbing to other insect and/or disease agents. One insect pest, the Bronze Birch Borer (Agrilus anxius) is evident in paper birch, which is related to poor stand vigor. This insect is attacking some of the over-mature paper birch resulting in an average of 50% mortality in some stands.

Long-Lived Conifer: These forest types are mostly red pine and white spruce, with red pine being the dominant forest type making up 68% of the long-lived conifers. Red pine stands currently occupy approximately 592 acres or 2% of the forested lands within the project area. All of the red pine stands under consideration for vegetative management are plantations established through artificial regeneration (e.g., planting) mostly in the 1940s. Some of these plantations have never been thinned, which has resulted in stands with small crowns, slow growth rates, and mortality. There is a mature aspen overstory in many portions of these plantations.

Most of the spruce types are plantations established primarily between 1930 and 1950. Many of these spruce plantations have never been thinned and are showing signs of mortality related to high densities, drought, and spruce budworm (Choristoneura fumiferana Clemens) defoliation. There are also signs of "Spruce Decline" that effect most trees and cause varying amounts of mortality. Though growth is high for spruce on these sites, tolerant hardwoods also grow well on these sites and are already established in the understory within most of these stands. The growth and development of this component is being accelerated due increased growing space that is provided by a declining canopy among white spruce.

There are 23 acres of hemlock forest types in the project area. Hemlock does occur as a minor component in many other forest types. The hemlock is mature at an average age of 100 years old.

***Short-Lived Conifer:** This forest type includes a diverse grouping of species, but the most common types found within the project area include: mixed swamp conifers, mixed balsam fir/spruce/aspen/paper birch, and wetland black spruce. Swamp conifers account for 93% of the conifer pulpwood group within the project area, all of which is classified as unsuitable for timber production.*

The mixed balsam fir, spruce, aspen, and paper birch (hereby referred to as spruce/fir) type occupy approximately 682 acres or 7% of the short-lived conifers within the project area. Spruce and fir are a mid-point in the successional stage within the project area, and aspen is considered as a suitable species option (Jordan, et al., 1987).

Spruce/fir stands are variable in terms of species composition. Some stands offer an opportunity to regenerate aspen, due to aspen being well-distributed in the stand, and other stands may lack aspen entirely due to mortality related to old age. Other species commonly found in these mixed stands include: white and black spruce, paper birch, white pine, hemlock, cedar, tamarack, and generally poor quality maples. Most stands are showing signs of fir mortality resulting from spruce budworm attacks. Paper birch, fir, and aspen mortality are also evident due to the over-maturity of these short-lived species.

Northern Hardwoods: This forest type is the dominant forest type in MA 2.1 both Forestwide (63%) and within the project area at (45%). Within project area hardwood stands sugar maple represents about 80% of the tree species present. Other species within hardwood stands include: red maple, yellow birch, aspen, paper birch, black cherry, white and black ash, and basswood. Conifers represent a minor component of hardwood stands and include: balsam fir, hemlock, cedar, and white pine.

Approximately 20-30 percent of the hardwood trees are rated as undesirable growing stock. Undesirable growing stock includes trees with disease problems, poor form, or weather related damage, which can limit a tree from achieving a quality sawlog product in the future. Common diseases found within the hardwood stands during field evaluations include: Eutypella Canker of maple (Eutypella parasitica), Black Knot of cherry (Apiosporina morbosa), and Canker-Rot of birch (Inonotus obliquus).

MA 6.2

Within the project area, there are approximately 710 acres of forested land within the MA 6.2. Of those acres, northern hardwood is the dominant species, followed by aspen and short-lived conifer. The aspen component has an average age of 72 years, experiencing mortality and is converting to shade tolerant hardwoods and conifers. The existing condition of short-lived conifer and northern hardwood is equivalent to the conditions described above for MA 2.1.

MA 8.1

Within the project area, the MA 8.1 landscape is dominated by short-lived conifer, followed by northern hardwood, aspen and long-lived conifer. There is no young age class of aspen in the river corridor. All aspen stands age range between 28 to 102 years old with the average being 63 years. The existing condition of northern hardwood and short-lived conifer is equivalent to the conditions described above for MA 2.1.

Red pine plantations make up 95% of the entire long-lived conifer representation within the WSR corridor. These plantations have never been thinned, which has led to poor vigor, slow growth, and small-crowned trees, which are susceptible to both insect and disease attacks. There are two stands, both 7 acres, typed as white spruce. Both stands exhibit signs of "Spruce Decline", with varying amounts of mortality and succeeding to more shade tolerant species. Spruce decline is attributed to a combination of factors, including, but not limited to: spruce budworm activity, needle cast fungi (Rhizosphaera), drought stress (e.g., decade-long low rainfall amounts), root rot (Armillaria) disease and subsequent bark beetle infestation.

3.3 Environmental Consequences

The following analyses disclose the direct, indirect and cumulative impacts (effects) of ***implementing the proposed action and alternatives, while emphasizing the issues identified. This chapter also summarizes effects analysis required by statute and policy.***

Analysis Framework

As part of the planning stage for this project, the ID Team developed a framework that outlines the elements used in each resource's effects analysis of proposed actions that are related to the identified issues. The elements include applicable Forest Plan direction; resource-specific ***analyses***; indicator measures (see Table 5); bounds of analysis (see Table 6); and other information as applicable. The analysis framework***, in addition to the information added as part of this revised EA,*** serves to provide the basis for the ***effects analysis and*** resource discussions presented in Section 3.3 of this EA.

Forest Plan Analysis

The Redboat Project's analysis is tiered to the ***analysis performed, and the information disclosed, for the*** Forest Plan; ***which includes*** its FEIS, Record of Decision ***and supporting documents located in the administrative planning record***. ***The Record of Decision states (p. 36):***

> ***"By tiering to the FEIS, the Ottawa will make use of this Forestwide analysis to streamline environmental analyses for project-level decisions. Revisiting landscape or forestwide scale issues and effects will not be necessary, because those effects have already been considered and disclosed in the FEIS."***

Of specific importance is the information disclosed in Chapter 3 of the FEIS ***that*** provides an analysis of the following resources on the Ottawa***; these analyses are*** incorporated by reference into this EA: Vegetation, pp. 3-37 to 3-73; Non-Native Invasive Species, pp. 3-86 to 3-97; Native Plants, pp. 3-97 to 3-105; Wildlife Resources, pp. 3-105 to 3-165; ***Old Growth, pp. 3-64, 3-65, and 3-72; Fire Management, pp. 3-164 to 3-169; Air Quality, pp. 3-26 to 3-28;*** Water Resources, pp. 3-7 to 3-26; Soils, pp. 3-2 to 3-7; Transportation, pp. 3-30 to 3-37; Recreation, pp. 3-185 to 3-198; ***Social, pp. 3-198 to 3-208;*** Heritage, pp. 3-182 to 3-185; Economics, pp. 3-208 to 3-224; and Appendix H, Management Indicator Species.

As many of the larger-scale effects have been addressed ***in the analyses for the Forest Plan as disclosed above; it*** allows us to narrow our EA focus to the site-specific effects of implementing the Redboat project. The purpose and need for this project ***was developed in consideration of the Forest Plan's analysis documentation, and therefore the Redboat Project's proposed***

actions would maintain or progress conditions towards the desired conditions of MAs 2.1, 6.2 and 8.1 (Forest Plan, pp. 3-6 to 3-10, 3-61 to 3-66, and 3-71 to 3-81.9; and CRMP, pp. 2-1 to 2-3, 2-20 to 2-24, 3-1 to 3-3, and 3-11 to 3-13) and the applicable Forestwide Goals and Objectives (Forest Plan, pp. 2-1 to 2-12). All ***applicable*** Forest Plan Standards and Guidelines would ***also*** be followed.

The Forest Plan's FEIS analyses predicted the effects of resource management for the estimated two-decade life of the Forest Plan, which began in June 2006 (Forest Plan, Appendix E, page E-1). The Record of Decision states (p. 36):

> ***"The FEIS for the 2006 Forest Plan considers and evaluates the total management program that likely would be necessary to implement the objectives of the 2006 Forest Plan as well as the potential effects of establishing the desired conditions envisioned for this Forest Plan. Therefore, in essence, the FEIS is a cumulative effects document, because it analyzed the total of activities that may be expected in the first decade (and longer term) and disclosed the Forestwide effects of those activities considered in total."***

The excerpt above points out a key statement regarding the effects of establishing the desired conditions at the forest's landscape scale. Given that the action alternatives were designed to maintain/progress conditions towards these desired conditions (specifically for MAs 2.1, 6.2 and 8.1 in the project area), the Redboat analysis does not reiterate all known effects of implementation. These analyses have already been undertaken, and that information is available in the associated documentation for the Forest Plan, as stated above. Instead, this revised EA focuses on the disclosure of effects based upon the issues identified and summarizes the site-specific effects for other proposed activities (categorized as 'non-issues' in Section 3.10).

This analysis is also tiered to the Ottawa National Forest Non-Native Invasive Plant Control Project (USDA Forest Service 2005b) and the Wild and Scenic River Comprehensive River Management Plan (CRMP; USDA Forest Service 2007). The CRMP provides management direction for the Main, South, and West Branches of the Presque Isle River (pp. 1-4, 2-20 to 2-24, 3-11 to 3-13, 3-17, 3-20, and 3-43) and is incorporated by reference into this EA.

Project *Resource Analyses*

The following general analysis assumptions apply to all resource discussions.

1. All proposed actions are designed to meet the purpose and need identified by the ID Team. Some actions proposed would satisfy more than one resource need identified and therefore, are anticipated to have more than one benefit (i.e., the benefits associated with road improvements also benefit future recreational access).

2. Analyses are based on review of field survey results; aerial photographs; topographic maps; Ottawa National Forest cover type mapping; ecological landtype phase mapping; Forest geographic information system data; other Forest databases as applicable; Ottawa Forest Plan direction; agency manual and handbook direction; ***findings published in Monitoring and Evaluation reports for the Forest Plan; professional judgment;*** relevant ***best available science (see Appendix 2 of this document and project file)***, ***and other reference materials***.

3. All contract clauses, best management practices, operating restrictions and design criteria would be implemented. ***Implementation of these factors would be expected to slightly decrease the acreage managed (such as the establishment of buffers to protect soil and water resources).*** All calculations used in the analysis are estimated and subject to change based upon implementation needs.

4. ***Using the anticipated and known effects of previously analyzed projects that are of similar nature to the Redboat Project, and located in similar areas (such as, forest types, plant and animal habitat, and soil characteristics), we are confident that the determination of effects from implementing this project would be comparable to the effects from past projects (see resource analyses in the project file for more information). Past projects similar in nature include the following vegetation management project decisions: Three Corners (USDA Forest Service 2005d and 2006c); Bluff Divide (USDA Forest Service 2005c and 2006b); Mud Lake (USDA Forest Service, 2007b), Rousseau East (USDA Forest Service, 2008c); Papa Bear (USDA Forest Service, 2007c); Ridge (USDA Forest Service, 2008b); Baraga (USDA Forest Service, 2011b); and Beaton (USDA Forest Service, 2011c).***

Direct and Indirect Effects

Both direct and indirect effects are changes that could occur to the existing condition if ***an*** alternative was implemented. A direct effect occurs at the same time and place where an action is implemented, while an indirect effect occurs at a later time or a distance from the site of implementation.

The effects of implementing proposed actions can be reduced, minimized or eliminated through the implementation of design criteria (see Appendix 1 for a project-specific list). These design criteria are a set of parameters, or instructions, for how the project is to be designed to ensure that actions are implemented in a manner that protects natural resources. Design criteria are developed in an interdisciplinary fashion, using professional judgment, which includes knowledge of the existing conditions; an understanding of the anticipated effects of the proposed actions; the Forest Plan's direction, especially those standards and guidelines designed to guide management practices for maintaining/progressing conditions towards those desired conditions outlined in the Forest Plan and CRMP; monitoring and evaluation data and findings; best available science and relevant literature; and the established parameters of best management practices as well as operating needs and restrictions.

To analyze and disclose the effects of alternative implementation, the following Indicator Measures (IM) were identified. Categorized by issue and sub-issue (as applicable), IMs provide a quantitative method for measuring the effects for each resource-specific analysis (see ***the project file's resource analyses for more information***).

Table 5. Indicator Measures by Resource Area

Resource Analyzed	Issue(s)	Indicator Measure (IM)
Timber Management	Issue 1, sub-issue 1b	IM-1: Acres of typed hardwood stands harvested and converted to an aspen type with the long term goal for aspen management.
Old Growth	Issue 3	IM-2: Loss of potential old growth habitat.

Resource Analyzed	Issue(s)	Indicator Measure (IM)
		IM-3: Gain of existing and potential old growth habitat.
Wildlife	Issue 1, sub-issue 1c	IM-4: Amount of habitat provided for early-successional plant and animal species. IM-5: Amount of new habitat contributed to the Forestwide ***O***bjective ***27a***.
Soils	Issue 4, sub-issue 4b	IM-6: Degree, duration, extent, and distribution of disturbance (i.e. compaction and rutting, erosion and displacement) associated with system and temporary road construction.
Botany	Issue 4, sub-issue 4a	IM-7: Increased extent of NNIP in the project area from system and temporary road construction.
Visuals	Issue 1, sub-issue 1a Issue 2 Issue 4, sub-issue 4b	IM-8: Increased number of temporary openings in management areas where they are visible from primary travel corridors and points of interest. IM-9: Effects of silvicultural prescriptions on maintaining/enhancing visual quality objectives (VQOs) due to gaps in the canopy in management areas where they are visible from primary travel corridors and points of interest, (i.e., shorelines of lakes and rivers). IM-10: Gaps in the canopy due to system and temporary road construction (<15 acres).

<u>Cumulative Effects</u>

A cumulative effect is defined as an impact on the affected environment that results from the accumulation of impacts from the direct and indirect effects of the proposed action(s) for this proposal in addition to, and that may overlap with, any resulting effects of past, present and reasonably foreseeable future actions. Cumulative effects are a result of the effects of combined activities, and can be the result of either a federal or non-federal action.

Table 6 outlines the cumulative effects boundaries and rationale for using these boundaries for the resource discussions presented to address the four issues. Additional information about the bounds of analysis for non-issues are presented in the project file's analysis framework documentation and resource analyses As described in the following resource discussions, there can be minor cumulative effects from implementation of any alternative.

Table 6. Spatial and Temporal Cumulative Effects Boundaries by Resource Area

Resource: Timber, Issue 1, sub-issue 1b (conversion of northern hardwood to aspen)			
Temporal Boundary	***Rationale***	***Spatial Boundary***	***Rationale***
Past/Present Effects: ***2013*** Future Effects: ***2014***-2040	Past/Present Effects are considered part of the existing condition. By looking at current conditions, we capture the residual effects of past human actions and natural events, regardless of which particular action or event contributed to those effects. Future effects are anticipated to last until 2040. Planning for potential timber sales, would be offered between 2013 and 2017. Given a typical contract period of 3 years, the effects (i.e., breakup of logging slash) within the last northern hardwood stand converted to aspen, are anticipated to diminish by 2040 (or about 15 years post-harvest). At this time, the stands would be re-vegetated to the degree where they would no longer be considered temporary openings (e.g., the stand would be a minimum of 20% of the height of adjacent stands, Forest Plan, page 2-23).	MA 2.1 within Project Area	As the number of northern hardwood acres converted to aspen is relatively small (162 acres), the extent, duration, and magnitude of effects would be diluted due to landscape area encompassed by MA 2.1 at the Forestwide scale. Therefore, the project area scale was chosen to provide context appropriate to the scope of the issue.[3]

[3] It is important to note that due to the manner in which the project area boundary is drawn on the MA 2.1 landscape, the northern hardwood vegetative composition percentage is slightly below the desired condition outlined in the Forest Plan. However, the percentage of this forest type is within the desired range at the Forestwide MA 2.1 scale.

Resource: Old Growth, Issue 3 (classification of additional old growth acreage)			
Temporal Boundary	**Rationale**	**Spatial Boundary**	**Rationale**
Past/Present Effects: ***2013*** Future Effects: ***2014***-2028	Past/Present Effects: See Timber Resource; in addition, this timeframe encompasses the events that removed old growth forests and produced the 2nd growth landscape we now manage. Future Effects extend to the planning and analysis for the next harvest entry when old growth stands (foregone for classification during this entry) would be re-evaluated for classification.	Project Area	Evaluation of effects from the proposed classification of old growth is limited to the boundaries of the project area. Forest Plan Guidelines state that old growth classification is based on landscape- scale percentages. This information is taken into account in the analysis through the project's contribution toward the desired percentages described in the Forest Plan (and disclosed in Monitoring and Evaluation Reports). ***It is assumed that*** managers of private lands are not managing for old growth objectives.
Wildlife Resource: Issue 1, sub-issue 1c (Effects of 40+ acre aspen regeneration complexes)			
Past/Present Effects: ***2013*** Future Effects: ***2014***-2030	Past/Present Effects: See Timber Resource; in addition, this timeframe encompasses Forestwide events that produced the aspen stands we now manage. Future Effects: The temporal bounds represents when the last regenerated aspen stand would grow out of the 0-9 year age class.	Project Area	Evaluation of effects from the proposed harvest of aspen is limited to the boundaries of the project area. Forest Plan Objective 27a is based upon providing ≥12,000 acres of aspen in the 0-9 year age class at the Forestwide scale. The specific measure for this project's analysis discloses the project's contribution toward this Objective, however trends at the Forestwide scale are addressed through information disclosed in Monitoring and Evaluation Reports.

Soil Resource: Issue 4, sub-issue 4b (effects of road construction on soils)			
Temporal Boundary	**Rationale**	**Spatial Boundary**	**Rationale**
Past/Present Effects: ***2013*** (System/Temp) Future Effects: (System Roads) Present to Year 2027 Future Effects: (Temporary Roads) ***2014*** - 2033	Past/Present Effects: See Timber Resource System Roads: After implementation, roads become designated use; roads would be re-evaluated during the planning and analysis for use in the next harvest entry; *Temporary Roads:* 20 years post-harvest, which correlates with approximate maximum recovery period for the soil resource.	System and Temporary Road Construction	Cumulative impacts to the soil are confined to the soil directly beneath where the disturbance factors (i.e. machinery operations) take place (up to 10.7 acres).
Non-Native Invasive Plants: Issue 4, sub-issue 4a (effects of road construction on NNIP spread)			
Past/Present Effects: ***2013*** Future Effects: ***2014***-2028	Past/Present Effects: See Timber Resource Future Effects represent the estimated timeframe for planning and analysis for actions associated with the next harvest entry. Effects expected to diminish due to shading as roads re-vegetate.	Project area plus ½ mile along routes connecting to road construction segments (FR 8190-A, 9122-C, 8128, 8122-H1 and 8031-A)	Extent within which new NNIP infestations are likely to be associated with project activities. The road segments listed are located in areas where the ½ mile extends out of the project area.
Visual Resource: Issue 1, sub-issue 1a (effects of road construction on visuals)			
Temporal Boundary	**Rationale**	**Spatial Boundary**	**Rationale**

Past/Present Effects: ***2013*** Future Effects: ***2014***-2040	Past/Present Effects: See Timber Resource Issue 1a: Future Effects represent the estimated timeframe for the effects to diminish from proposed actions (beginning 5 years post-harvest). Temporary openings created by even-aged management would eventually be filled with young trees, providing visual diversity and resemble natural openings created by natural processes. Temporary openings would be fully stocked by 2040 (see Timber Resource)	Project area, specific to aspen complexes	Visual effects from harvest are not anticipated to extend outside the project area.
Visual Resource: Issue 2 (effects of thinning and selection harvest on visuals in the WSR)			
Past/Present Effects: ***2013*** Future Effects: ***2014***-2033	Issue 2: Future Effects represent the estimated timeframe for the effects to diminish from proposed actions (beginning 5 years post-harvest). Temporary openings from uneven-aged harvest would eventually be filled with young trees, providing visual diversity, with visual effects diminishing about 15 years post-harvest.	Project area, specific to activities in MA 8.1	Visual effects from harvest are not anticipated to extend outside the stand boundaries within MA 8.1.
Visual Resource: Issue 4, sub-issue 4b (effects of road construction on visuals)			
Temporal Boundary	**Rationale**	**Spatial Boundary**	**Rationale**
Past/Present Effects: ***2013*** Future Effects: ***2014***-2033	Issue 4b: Future Effects for system road construction represent the estimated timeframe for the effects to diminish from openings created by road construction (beginning 5 years post-harvest). Visual effects are anticipated to diminish 20 years after system construction takes place, with lesser long-term effects for temporary construction segments.	Project area, specific to road segments constructed	Visual effects from harvest are not anticipated to extend outside the project area. The majority of roads would not be seen by the casual forest visitor as they are in remote areas; these segments would not be open to motorized access after they are built.

Past, Present and Reasonable Foreseeable Future Actions

In order to understand the contribution of past actions to the cumulative effects analysis for this project, the following analyses use the existing condition as a proxy for the impacts of past actions (Council on Environmental Quality Memo, 2005). ***Using forest conditions as an example, the statement above means that the actions implemented in the project area in the past, such as timber harvest, have led to the conditions that exist today. Our records show that the most recent timber harvest actions were implemented between 15 and 25 years ago in the project area (see the Vegetation Management resource analysis in the project file). These vegetative management treatments were located in only portions of the project area (the Dunham timber sale); and therefore the remainder of the project area's vegetation resource was treated prior to 1988. Thus, the current forest conditions, such as tree species diversity and current tree sizes and ages, are a result of these past actions, in combination with natural processes such as tree growth; insect and disease factors; and damage from weather-related events.***

The project area boundary for the Slate Vegetation Management Project overlaps with the northeastern portion of the project area for the Redboat Project. This area of overlap includes about 535 acres or 2% of the Redboat Project's landscape (see GIS information in the project file). Within this area, the June 2002 Decision for the Slate Project included old growth classification in eight areas; no other actions were authorized in this area of overlap. This included retaining the previous old growth classification for seven stands, and adding one new stand of old growth. As part of the old growth evaluation process, the Redboat ID Team reviewed all currently classified old growth within the project area, which included these eight areas. The ID Team concurred with the findings of the Slate Decision; these eight areas would be retained as old growth under all alternatives. Since the amount of old growth in the project area was identified as an issue, these designations were analyzed in detail.

Public comments raised concern that the Redboat project area is larger than past project areas. The project area encompasses about 30,484 acres, of which 27,443 acres are under NFS management. The maximum harvest proposal (Alternative 2) under the Redboat Project is about 45% of these NFS acres; this percentage represents the estimated amount of land that would be harvested. It is important to state that this percentage is based upon whole stand acres and that the implementation of design criteria most often decreases the acreage actually managed (see Section 2.3). Past projects authorized under the 2006 Forest Plan's direction have ranged in size from 9,400 NFS acres to 24,200 NFS acres, with a range of 21% to 57% of vegetative treatment on these acres (see comparison of project areas documentation in the project file). Although the Redboat Project area is larger than recently approved projects, it does not present the largest percentage of harvest across one project landscape level.

A cumulative effect results from the accumulation of impacts from the direct and indirect effects of the proposed action(s) for this proposal in addition to and that overlap with the resulting effects of past, present and reasonably foreseeable future actions. This overlap, or bounds of analysis, is defined both temporally (in time) and spatially (by location). Therefore, the size of a project area, and the acreage of resource management within a given project area, does not automatically mean that cumulative effects will occur, or that those effects that are anticipated to occur would be significant or greater than those anticipated in the Forest Plan's FEIS. In fact, the scope of activities within this project area is, in part, responsive to the findings in the 2011 Monitoring and Evaluation Report, which shows that the quantity

of timber sold on an annual basis, is less than half of what was projected in the Forest Plan's analysis (USDA Forest Service, 2012, p. 6). Implementation of an action alternative would allow timber management actions to occur for several years as only portions of the project area would be made available for harvest operations at any one time, and typical operations in a given area can last 5 to 7 years pending weather conditions and markets.

Although 55% of the Redboat project area is not proposed for harvest, the project boundary was established as shown in Appendix 3 to include other features, such as the Wild and Scenic River corridor, to allow consideration of other resource needs. The Responsible Official also recognized other needs within the vicinity, such as the opportunities within MA 6.2 (see Section 2.5), and therefore, extended the project boundary to encompass this area south of the West Branch Presque Isle WSR.

Actions outlined in Table 7 are anticipated to occur within the cumulative effects spatial and temporal boundaries and therefore have been taken into consideration for the cumulative effects analyses. These actions are independent from the Redboat proposed action and will occur regardless of implementation of the Redboat Project. Authorization of these activities will occur through separate project decisions and processes; the potential manner of implementation is disclosed

These actions were identified during field review and preparation of the Redboat Project. Effects of these activities would not result in cumulative effects when considering the incremental impacts of the project, because the implementation of these reasonably foreseeable activities are not likely to lead to adverse effects that could be meaningfully evaluated. The projects may have some beneficial effects (such as reduced erosion and improved watershed conditions) that would be incremental to the related beneficial activities in the proposed action. These activities are listed here for reference and are addressed where relevant to specific resource analyses in Section 3.10.

Table 7. Reasonably Foreseeable Activities Identified within the Project Area*, but Not Included in the Alternative Actions*

Activity	*Amount/Location*	*Potential Categorical Exclusion/Other Information*
Road maintenance	*28.5 miles*	*36 CFR 220.6(d)(4) Repair and maintenance of roads, trails and landline boundaries*
Improve boat landings	*Elbow, Redboat, and Henry Lakes*	*36 CFR 220.6(d)(4) Repair and maintenance of roads, trails and landline boundaries*
Repair accessible pier, fishing dock and re-stabilize bank	*Henry Lake*	*36 CFR 220.6(d)(5) Repair and maintenance of recreation sites and facilities*
Repair signing, stabilize bank and trail at canoe landings	*West and South Branch Presque Isle River at Teal, Merganser, and Mallard canoe landings*	*36 CFR 220.6(d)(5) Repair and maintenance of recreation sites and facilities*

Activity	*Amount/Location*	*Potential Categorical Exclusion/Other Information*
Improve vegetative screening through tree planting	***Henry Lake campground***	***36 CFR 220.6(d)(5) Repair and maintenance of recreation sites and facilities***
Wildlife opening maintenance	***Existing upland openings on the landscape***	***Maintain existing conditions; no further analysis required***
Place duck boxes	***Based on existing habitat conditions for wetlands and lakes in project area***	***Placement based on existing condition needs; no further analysis required***
Treat non-native invasive plant species	***As deemed necessary***	***2005(b) DN/FONSI for the Non-native Invasive Plant Control EA***

3.4 Timber Resources: Issue 1, Sub-issue 1b – Aspen Management

Analysis Framework

As outlined in Table 5, this section addresses sub-issue 1b as follows.

- IM-1: Acres of typed hardwood stands harvested and converted to an aspen type with the long-term goal for aspen management.

Additionally, the analysis framework for this section includes the following, resource-specific assumptions.

1. Analysis in the Forest Plan determined that it would be necessary to regenerate 20% of the suitable aspen acres every decade to maintain the desired age-class distribution (Forest Plan, FEIS, Volume I, p. 3-60).

2. Stands receiving clearcut harvest would undergo post-harvest site preparation to encourage successful aspen establishment.

3. Stands with regeneration treatments (i.e., clearcut harvest) would undergo first and third year stocking surveys and stand certifications. This would assure that stands are adequately stocked with desirable tree species in meeting the National Forest Management Act requirements [Sec 219.27 (c) (3)].

4. This project level analysis includes the individual stands and associated ecological landtype phases (ELTPs) upon which they occur. These ELTP level interpretations provide predicted vegetation responses to management, site potential and successional trends.

5. The effects analysis for sub-issue 1***b*** is limited to MA 2.1. Therefore, this analysis focuses on the 162 acres of northern hardwood conversion within MA 2.1, and not the total 214 acres of ***conversion (see the project file's Vegetation resource analysis for more information).*** No northern hardwood conversion to regenerate the aspen forest type would occur in MA 6.2. Vegetative management within MA 8.1 is not for the production of timber; it is proposed to meet the purpose and need for other resources as outlined in Section 1.4.

Direct and Indirect Effects

Alternative 1: Under the No Action Alternative, no timber harvest or site preparation activities would take place in northern hardwood forested stands. Therefore, natural processes such as windthrow, insect- and disease-related mortality, and continued aging of stands would lead to eventual mortality of the aspen component within the northern hardwood stands. As individual aspen trees die, gaps in the stands' canopy would occur. Due to northern hardwood competition, it is unlikely that the aspen component would continue to exist in these stands. Therefore, it is anticipated that implementation of Alternative 1 would eventually lead to the development of multi-storied/multi-aged northern hardwood stands. Development of these future conditions, such as the in-growth of young trees into larger size classes after large aspen trees die, in addition to transitioning between successional stages, would be a gradual process spanning many decades.

The opportunity to increase the aspen forest type would not be available under Alternative 1; and therefore, this alternative would not respond as well to Forest Plan goals for the aspen resource when compared to the action alternatives. However, Alternative 1 would address sub-issue 1b.

The effects of not harvesting these stands would be the maintenance of the vegetative composition percentage of northern hardwood within the project area (see Table 4). Development of quality hardwood stands is partially related to stand density. Quality conditions, such as the sawtimber and veneer, can develop in unmanaged, higher density stands. However, it can take decades to achieve these conditions. There would be a higher incidence of decay, typically averaging 25 percent in unmanaged stands. The abundance of these low vigor host trees would increase the likelihood of insect and disease. In addition, Alternative 1 would also not meet the purpose and need for supporting the local economy through providing products for the forest products industry.

Alternative 2: There are 11 hardwood stands in the MA 2.1 portion of the project area that possess a component of aspen, of adequate abundance and distribution, to effectively regenerate aspen through clearcut harvest. Alternative 2 would not address sub-issue 1b.

The direct effects of this action would be a reduction in the northern hardwood forest type, within the project area, by approximately 162 acres. As discussed in the Wildlife Resources section, regeneration of the aspen forest type would increase the 0-9 year age-class to respond to Objective 27a of the Forest Plan (p. 2-8), which calls for maintaining 12,000 acres of the 0-9 year age-class on the Forest's landscape. This aspen management proposal is consistent with the Forest Plan, which calls for regeneration of mature and over-mature aspen within the next 10 to 20 years. If this schedule is not maintained, a loss of the aspen forest type would occur (Forest Plan, pp. 2-6 and 3-15). The regeneration of existing aspen types would not change the current percent of this forest type, but would alter the age-class distribution. The regeneration of aspen in these 11 stands would contribute to an increase in the 0-9 year age-class from 0 % to 54% within the MA 2.1 portion of the project area when added to the aspen regeneration proposal described in Section 2.5. The creation of a young age-class of aspen is consistent with Forest Plan direction, which calls for maintaining at least 12,000 acres of 0-9 year age aspen/paper birch regeneration well distributed on lands suited for timber production (Forest Plan, p. 2-8).

Post-harvest, the indirect effects would include ***a remnant northern hardwood component in these stands, which would result in*** a lower than ***desired*** aspen distribution and/or abundance

of regeneration ***in the short-term when compared to those aspen forest types that are retained as aspen through similar actions***. However, post-harvest site preparation activities ***would remove the majority of this component in order*** to encourage aspen ***regeneration***. ***Northern hardwood representation in these stands could remain however, given the competitive nature of this forest type. Alternative 2 would still maintain the northern hardwood forest type on about 8,000 acres when taking into account the selection harvest, thinning harvest and improvement cut actions proposed for northern hardwood stands in MA 2.1 (see Table 3). In addition, northern hardwoods would still persist on those acres not receiving treatment (about 55% of the project area [see the cumulative effects discussion under Section 3.3]).***

Alternative 3: There would be only 20 acres (one stand) that would be converted from hardwood to the aspen forest type under Alternative 3 ***and therefore the effects for this area would be the same as disclosed in Alternative 2***. Table 8 illustrates the differences between both alternatives with respect to hardwood conversion to aspen. For this individual stand, the direct and indirect effects are similar to what is disclosed in Alternative 2.

The remaining 142 acres (10 stands) discussed under Alternative 2 would receive an improvement cut as discussed in Section 2.5 and displayed on Map 2. The effects of retaining these stands in the northern hardwood forest type would include maintenance of the vegetative composition percentage in the project area that currently exists (see Table 4).

Effects to the aspen component in these stands are similar to Alternative 1, though forest product would be recovered by harvesting most aspen within an improvement cut prescription. Foregoing aspen regeneration in these 10 stands would result in less than one percent increase of the aspen forest type (in the 0 to 9 year age-class) in the project area. Alternative 3 would address sub-issue 1b, although to a slightly lesser extent than Alternative 1, due to the conversion of the 20 acre stand.

Table 8. Aspen and Northern Hardwood Management by Alternative in MA 2.1

Activity	Alternative 1[1]	Alternative 2	Alternative 3
Hardwood Stands Converted to Aspen (Acres)	0	162	20
Acres of Aspen	2,900	3,062	2,920
Acres of Northern Hardwoods	10,200	10,038	10,180

[1]The acres of aspen and northern hardwoods represent the amount currently existing; there would be no treatment of these forest types under Alternative 1.

Cumulative Effects

Past Effects: *Any previously harvested northern hardwood stands in the project area, which have reached an average basal area of 100 square feet (sq. ft^2) per acre or more, would begin to lose the positive effects on growth rates from thinning.* ***These past actions occurred between 15 and 25 years ago; and therefore the effects of harvest on the residual stands have diminished. The resulting stand conditions and growth since that time has led to the existing condition of northern hardwood forest in these 11 stands as discussed in the vegetation specialist report (see project file). The purpose and need discussion and Tables 1 and 2 in***

Section 1.4 also describe the current conditions for the northern hardwood resource in MA 2.1.

Present Effects: *There are no other vegetative management actions occurring within the 11 northern hardwood stands at this time.*

The 160 acres of industrial land has no current timber sale activity at this time. Harvest on non-industrial owned property is primarily for firewood and some wood products. However, only about 25% of this non-industrial land has suitable upland sites that would support forest management, or about 2% of the project area.

Future Effects: *There are no other planned vegetative management actions within the 11 northern hardwood stands within the temporal bounds of analysis.*

Summary: Alternative 1 would lead to a deferral of treatment for regenerating aspen in the 11 northern hardwood stands in the MA 2.1 portion of the project area, and would result in a likely loss of the aspen component by the next re-entry at year 2040. This would result in no creation of 162 acres of aspen stands in the 0-9 year age class, which would not contribute to the Forest Plan's desired condition for aspen in MA 2.1.

Alternative 2 would result in the conversion of the northern hardwood forest type and would represent an increase of the aspen component in the project area portion by 5%. This would increase the overall representation of the aspen/paper birch type from about the current 15% to about 16% in the project area. Although progress would be made toward the Forestwide desired conditions, the aspen/paper birch forest type would still remain below the desired condition at the MA 2.1 scale.

The continued regeneration of aspen stands combined with past and potential future regeneration harvests on both private and NFS lands would improve age-class distributions of this forest type across the landscape. Alternative 2 would produce the best results due to the allowance for harvest areas greater than 40 acres in size leading to better habitat conditions for species such as ruffed grouse as specified for MA 2.1 (Forest Plan, p. 3-10). Clearcutting of aspen inclusions would improve heterogeneity across the landscape. The resulting habitat niches would improve biodiversity and contribute to previously discussed Forest Plan Goals and Objectives.

Among the total acres receiving vegetative management under the Redboat Project are ***7,338*** acres of selection harvest to develop and restore structural complexity and species diversity similar to native conditions within MAs 2.1 and 6.2. Conversion of the northern hardwood forest type in the 162 acres would reduce the hardwood composition from 45% to 44% within the MA 2.1 portion of the project area and therefore the effects are not discernible at the scale of the project area. Although the vegetative composition for this forest type is slightly below the desired range at the project area scale; this alternative is not anticipated to effect the percentage of northern hardwood at the MA 2.1 scale, which is at the higher end of the desired range Forestwide (see Table 1).

Alternative 3 differs from Alternative 2 in that the amount of 0-9 year age-class created and the acreage of forest types converted to aspen would be reduced. In MA 2.1 in the project area, aspen forest types would increase about 1%. There would be less movement under Alternative 3 towards meeting the desired condition of the aspen/paper birch forest type, which would remain below the minimum desired percentage at the Forestwide scale.

Although 214 acres of northern hardwood are proposed to be converted to aspen under Alternative 2, the northern hardwood percentages would continue to progress toward Forest Plan desired conditions for MA 2.1 within the project area. ***This is because aspen may not regenerate on all 214 acres due to operability limitations established by design criteria.*** There are various reasons for excluding areas for treatment, usually to protect riparian features. ***Areas excluded from harvest*** would experience further decline in the aspen component ***that is currently present and would*** accelerate the ***progression towards stands comprising northern*** hardwoods and conifer species. ***It is also important to note that there are several areas where northern hardwood forest exists that are not proposed for treatment. Therefore, these areas would also contribute to the retention of northern hardwood composition in the MA 2.1 portion of the project area.***

3.5Old Growth: Issue 3 – Old Growth Classification

Analysis *Framework*

- As outlined in Table 5, this section addresses Issue 3 as follows.
- IM-2: Loss of potential old growth habitat.
- IM-3: Gain of existing and potential old growth habitat.

Additionally, the analysis framework for this section includes the following, resource-specific assumptions.

1. The Ottawa is largely a second-growth forested landscape; the old growth characteristics started developing after the early logging era (about 1910). This landscape is aging and conditions are becoming more structurally complex (FEIS Appendix 1, page 3-51). Most stands containing all or numerous old growth characteristics are deemed 'existing' old growth, as outlined in the Forest Plan (pp. 2-24 and 2-25). These characteristics occur primarily in wilderness areas due to the age and current forested conditions of the Ottawa. Therefore, a large percentage of classified old growth stands on the Ottawa do not meet all of the old growth characteristics identified in the Forest Plan. These stands are classified as potential old growth classification ***because they currently possess some of the characteristics required for old growth classification while exhibiting the potential to eventually develop*** the ecological characteristics of old growth. The proposed action includes classification of stands based primarily on potential old growth conditions (areas possessing some old growth characteristics defined by the Forest Plan [p. 2-24]), and in a minority of instances, existing old growth conditions (areas possessing most or all old growth characteristics). Classification of existing and potential old growth is allowable under Forest Plan guidelines (p. 2-24).

2. About half of the Ottawa (***Forest Plan Record of Decision, page 8)***, ***or about*** 488,***000*** acres, is ***identified as suitable*** for timber production. The ***remaining forested lands*** were deemed ***unavailable because they were physically unsuited, not appropriate for timber production, or where there is inadequate information (FEIS, Volume II, Appendix A, pp. A-13 to A-19). Appendix A,*** Table A-8 of the FEIS contains a list of the lands ***identified as not appropriate for*** timber production***, including*** factors such as classified old growth, wetland soils, certain MAs (e.g. MA 8.1), and some areas containing certain forest types (e.g., hemlock and upland cedar groves). The FEIS analysis assumed that these acres would succeed toward old growth conditions through natural ecological processes. Natural processes can also slow

succession on occasion in the case of natural disturbances (e.g. wind, fire, disease). The Forest Plan also contains direction for the protection and enhancement of ***outstandingly remarkable values***, where some habitat would remain managed for early-successional (e.g., young) habitat (CRMP, p. 4-3).

3. Stands that are deemed part of the suitable base are managed to retain many key habitat features typically found in older stands per Forest Plan direction (Objectives 1c, 1d, 2a, 2b, 2c, 15a, and 17). The Redboat project contains design criteria to maintain snags, wildlife trees and large woody debris, and to reserve hemlock, cedar, and white pine to retain and enhance certain key elements of structural diversity in managed stands. Designing the Redboat Project using these criteria is consistent with Forest Plan direction for managing stands in the suitable timber base for structural complexity to provide additional elements that are common to classified old growth stands into the general forest matrix (p. 2-24).

4. Structural diversity harvests in MAs 2.1 and 8.1 would result in a higher amount of residual trees post-harvest than a typical northern hardwood management prescription, as well as an emphasis for retaining larger diameter trees and long-lived species. These treatments would serve to accelerate development of characteristics ***found in old growth stands*** within the treated stands, when compared to natural successional processes. ***This would be consistent with Forest Plan guidelines for managing suited timber land for structural complexity to provide additional elements common to classified old growth (p. 2-24)***.

5. Long-lived conifer release would serve to maintain and increase the proportion of long-lived conifers such as hemlock, cedar and white pine and therefore hasten the development of old growth characteristics in these stands.

Direct and Indirect Effects for IM-2 and IM-3

Alternative 1: The No Action alternative would perpetuate classification of the current 819 acres of old growth within the project area. No new old growth would be classified. There would be no direct effects. Indirect effects would be limited to the continued classification of 308 acres that have been identified for declassification in this project's purpose and need because they do not possess characteristics outlined in the Forest Plan (p. 2-25, Table 2-2). These stands were incorrectly classified; they lack structural development, and some are situated in less desirable positions on the landscape, such as isolated and/or small patches (see project file). There are acres elsewhere that would better meet Forest Plan guidance to contribute towards desired conditions. The indirect consequence of not declassifying the 308 acres of old growth in this project area is that the 308 acres could not be reallocated elsewhere in MA 2.1 where stand conditions do provide characteristics outlined in the Forest Plan.

Direct and Indirect Effects for IM-2 *(Loss of potential old growth)*

Alternatives 2 and 3: Declassification of ***approximately 308*** previously classified acres would occur. Table 9 lists the stands being proposed for declassification, and proposed treatments, if applicable, for both action alternatives. The amount of old growth in the project area would be reduced to 562 ***(e.g., 250 acres in MA 2.1 and 312 acres in MA 8.1)*** acres.

Direct effects of declassifying these stands are minimal, since these stands do not currently possess old growth characteristics. The current conditions of the stands are similar to other stands proposed for treatment to achieve the purpose and need for this project. The indirect effects for the declassified stands not proposed for treatment (about ***122*** acres) is that they

would naturally succeed toward older forest conditions, with the pace of the transition being the same as described under Alternative 1. The ***122*** acres not proposed for treatment are in areas unsuitable or infeasible for similar reasons described in Section 2.2; these stands would not meet the purpose and need for timber management. For the stands displayed in Table 9, especially for the areas proposed for clearcut harvest, the development of old growth characteristics would be delayed for several decades.

Table 9. Stands Proposed for Declassification and Timber Harvest by Forest Type

Forest Type (FT)	Acres	Proposed Harvest
Aspen-white spruce/balsam fir	43	Clearcut
Balsam fir-aspen/paper birch	6	Clearcut
Black ash-American elm/red maple	17	None
Mixed swamp conifer	50	None
Mixed upland hardwoods	26	None
Mixed upland hardwoods	***79***	Selection
Northern hardwoods-hemlock	23	None
Northern hardwoods-hemlock	***17***	Improvement Cut
Quaking aspen	6	None
Quaking aspen	13	Clearcut
Sugar maple-basswood	15	Improvement Cut
White spruce-balsam fir	13	Group Select with Planting
Total	***308***	****Note: Acres have been rounded up***

Direct and Indirect Effects for IM-3 *(Gain of existing and potential old growth habitat)*

Alternatives 2 and 3: Under both action alternatives, Compartment 207, Stand 28, would be classified as old growth, within MA 8.1. This stand was found after the scoping period during a field review. This 51-acre stand was found to currently possess old growth characteristics outlined in the Forest Plan (p. 2-25, Table 2-2), including large, old hemlock, cedar, and yellow birch. Areas retained as old growth (about 511 acres), under both alternatives, are those stands that contribute ecologically to old growth habitat values.

Alternative 3 proposes about 1,***795*** additional acres of old growth in MA 8.1 in response to public comments ***(see Map 5)***. Currently, about 11.2% of MA 8.1 is classified as old growth. If this alternative is selected, the result would be about 14.4% of MA 8.1 classified as old growth. Proposed stands currently have some old growth characteristics consistent with Forest Plan direction (p. 2-25). Management Area 8.1 does not contain a limit on the acreage that can be

classified as old growth. The analysis performed for the Forest Plan and the CRMP assumed that some conditions within MA 8.1 would succeed toward old growth conditions through natural ecological processes. Table 10 lists the acres of various forest types included in the proposal.

Table 10. Old Growth Proposal under Alternative 3

Forest Types	Estimated Acres
Aspen-white spruce/balsam fir	169
Balsam fir-aspen/paper birch	74
Mixed swamp conifer	981
Mixed upland hardwoods	124
Quaking aspen	85
Sugar maple	***288***
Sugar maple/basswood	***45***
Sugar maple/yellow birch	***29***
Total Acreage ***(acres are rounded)***	***1795***

The proposed classification of a variety of forest types is consistent with Forest Plan direction (p. 2-24). No old growth is proposed for classification in MA 6.2 within the project area. See the project file for a description of the criteria used to select these additional stands ***(ID Team Meeting Notes)***.

No other management actions are proposed for these stands under either action alternative. Though classifying 1,800 acres of additional potential old growth would not have any immediate effect on-the-ground, the indirect effects would be long-term accrual of more old forest habitat in coming decades. The additional stands are mostly second-growth now, which possess limited degrees of old growth characteristics at this time. Stand conditions would require decades to become ecologically functioning old growth. Assuming no major disturbance events set back succession in these stands, they could contribute a substantial amount of old forest habitat values in time. Well-positioned in the landscape along the major rivers in the project area, these acres would provide dispersal corridors for those species needing old forest to move across the larger landscape. Also, the large-acreage patches would be of size to meet the needs of area-sensitive species, such as the red-shouldered hawk, which requires old forest habitat types.

Cumulative Effects for IM-2 and IM-3 *(Loss and gain of potential old growth)*

Past Effects: The Ottawa is an aging second-growth Forest, dominated by forests that grew back following early 20th century timber harvest activities, which included old growth removal

and resultant wildfires. The Ottawa now manages a forested landscape that is 70-90 years old today, and becoming older every day. In many locations, forest communities are transitioning away from the pioneer tree species (e.g., aspen, paper birch, balsam fir) that grew back on many sites. Forest succession is interrupted by natural- or human-caused disturbance events. These successional set-backs are the exception and not the rule, such that most of the landscape is transitioning according to natural successional patterns.

Previous efforts to classify stands (that remain classified under Alternatives 2 and 3) have resulted in the spatial pattern of old growth existing today. These stands contribute to the 7.4% of land classified as old growth on the MA 2.1 landscape Forestwide. The desired condition for MA 2.1 is near attainment of the 8 to 10% desired range of old growth acreage.

Present Effects: Alternative 1 would have no cumulative effects because it does not propose any changes to the existing condition. No other old growth classification is currently being analyzed in MAs 2.1, 6.2 or 8.1 in the Redboat project area.

Future Effects: No reasonably foreseeable actions to classify old growth would be undertaken in the project within the bounds of analysis. Future planned projects encompassing the project area would assess the needs for change in the old growth classified. Alternatives 2 and 3 would have the same cumulative effects, as they share the same past, present, and future proposed projects and activities. However, Alternative 3 would have a slightly more positive cumulative effect because there would be more acres of old growth classified in MA 8.1. Alternative 3 would contribute to a larger, long-term effort by the Ottawa to create older forest conditions, characterized by long-lived tree species in our Wild and Scenic River Corridors, which would be a positive cumulative effect.

3.6 Wildlife Resources: Issue 1, Sub-issue 1c, Aspen Management

- As outlined in Table 5, this section addresses sub-issue 1c as follows.
- IM-4: Amount of habitat provided for early-successional plant and animal species.
- IM-5: Amount of new habitat contributed to the Forestwide objective.

Additionally, the analysis framework for this section includes the following, resource-specific assumptions.

1. Analysis in the Forest Plan determined that it would be necessary to regenerate 20% of the suitable aspen acres every decade to maintain the desired age-class distribution (Forest Plan, FEIS, Volume I, p. 3-60).

2. Aspen and mixed aspen stands would naturally succeed to either northern hardwoods or spruce/fir unless regenerated via clearcutting or catastrophic natural disturbances.

3. Across the entire Forest, the 0 to 9 year age-class of aspen/paper birch occurs on about 4.1% of lands suited for timber production. There are no acres of aspen in the 0 to 9 year age-class in the project area. In addition, the percentage of aspen on the landscape is below the desired range within MA 2.1 and at the lower end of the desired range for MA 6.2. The 2009 Monitoring and Evaluation Report (p. 22) states that the number of aspen acres in the 0-9 year age-class was about 6,400 acres, or about one-half of the desired 12,000 acres at the Forest scale as outlined in Objective 27a of the Forest Plan (***USDA Forest***

Service, 2010a, p. 2-8). Objective 27a is tied to providing habitat for wildlife species dependent upon early-successional conditions.

4. Due to the age of most second-growth stands, early-successional forest types are decreasing at a rapid rate in the project area. These aspen/fir/paper birch forests live about 50 years before becoming overmature and at risk for loss of forest type at the stand level. Many of the oldest aspen/fir/birch stands have already transitioned to northern hardwood forests, or toward spruce/fir stands on wetter/cooler soils. At the stand scale, ***a*** change in forest community occurs when early-successional stands are not regenerated before this occurs. This cumulative effect has been occurring across the Forest (regardless of ownership) for the last 50 years or more and would continue to occur, absent some catastrophic disturbance events (FEIS, pp. 3-70 to 71).

Direct and Indirect Effects for IM-4 and IM-5 ***(Amount of early successional habitat provided and amount of new habitat contributed to the Forest wide objective)***

Alternative 1: The No Action alternative would not create any new 0-9 year-old aspen forest via clearcut harvest; and therefore, no direct effects to the identified areas are expected. Therefore, this alternative would not progress towards the Forestwide percentage of aspen in this age-class.

Indirect effects are anticipated, however, as a consequence of allowing natural successional processes to occur (e.g., not regenerating ***aging*** aspen, aspen/conifer, conifer/aspen mixed stands, or northern hardwood stands with an aspen component), which account for about 25% of the project area. Within 10-15 years most of these stands would lose their trembling aspen/big-tooth aspen and paper birch components. These stands would transition to other, presently common forest types, such as northern hardwood and to a lesser extent, spruce/fir.

Alternative 1 would lead to less diversity in forest ages and forest types, reduced forest resilience, and gradual divergence from desired conditions (Forest Plan, ***pp. 3-8 and 3-63***). In addition, these forest types have less value to many wildlife species such as ruffed grouse, white-tailed deer, and many other species that depend on early-successional habitat. The project file contains analysis of the consequences of allowing key forest types to transition to the next successional stage in their successional pathway (***see the Wildlife MIS Report and Silviculture Report).***

Alternative 2: This alternative responds to the concern of the aspen composition being below the desired range at both the Forestwide and MA level scales (see Tables 4 and 5). The direct effect of Alternative 2 would be the creation of a 0-9 year age-class on about ***2,508*** acres (includes the anticipated application of design criterion ***10***), which would continue to progress conditions towards the desired conditions outlined in the Forest Plan (pp. 2-8, 3-8 and 3-63). The project area percentage of the 0-9 year age class would increase from 0% to about 10%.

Alternative 2 offers the most harvest of the aspen forest type, including the incorporation of larger harvest areas, or aspen regeneration complexes, which would exceed 40 acres in size. Implementation of these proposed complexes in MAs 2.1 and 6.2 would assure the maximum, practical amount of aspen forest type maintained in the project area before natural succession results in the loss of the aspen component, leading to conditions described under Alternative 1. No complex would exceed 40 acres in size within MA 8.1.

Given the overall acreage proposed, including the 13 aspen regeneration complexes, the indirect effects of Alternative 2 include the creation of about 38% more acres of wildlife habitat for those species dependent upon young forest conditions, when compared to Alternative 3. As such, additional indirect effects of implementing this alternative would be less stand conversion to other species, such as northern hardwoods and spruce/fir as described under Alternative 1 (see the Timber Resources section for more information).

Conversion of other stand types (northern hardwood and conifer forest types) to aspen would contribute to the Forestwide desired condition for aspen. Species benefitting from these other stand types would continue to find sufficient habitat nearby since the project area is about 35% northern hardwood types and about 34% conifer forest types. Conversion to aspen would also increase diversity within the project area (diversity of forest ages and forest types).

Alternative 3: This alternative also responds to the concern of aspen composition being below the desired range at both the Forestwide and MA level scales, however to a lesser degree than Alternative 2. The direct effect of Alternative 3 is the creation of a 0-9 year age-class on about ***1,907*** acres (includes the anticipated application of design criterion ***10***). The project area percentage of the 0-9 year age class would increase from 0% to 7%.

This alternative reduces clearcut harvest, in part, to address sub-issue 1c, which meets agency requirements for an alternative to maintain temporary openings created via clearcut harvest to 40 acres or less in size. This acre restriction would be implemented through the application of Wildlife design criterion ***10*** to establish a minimum of 10 acre ***stands that would not receive*** harvest throughout the aspen complexes ***(see Appendix 1).*** These ***stands would*** ensure that the clearcut acreage remains below 40 acres, as outlined in Appendix ***1*** of this document, and are consistent with Forest Plan direction (p. 2-23). The reduction in road construction to address Issue 4 also contributed to a loss of some aspen regeneration opportunities in this alternative.

Alternative 3 is estimated to result in a reduction of about 38%, or ***701***acres, of clearcutting overall, when compared to Alternative 2 (see Table 4). Only about 90 acres of the ***701*** acre reduction would be due to imposing the 10-acre ***non-harvested stands*** among the aspen regeneration complexes to prevent a clearcut from exceeding 40 acres in size (see project file).

Action Alternative Summary: Differences in amounts of wildlife habitat for young forest residents would be proportional to the clearcut acreage differences between alternatives. Thus, Alternative 2, which would result in about 38% more acres of early-successional forest, would provide more habitat than would Alternative 3, to the benefit of plants and animals using young forest. As described in the Management Indicator Species (MIS) Report (see project file), the more young forest created, the more grouse habitat would be available, and potentially, more individual grouse supported. The “species : area” relationship is defined as the relationship between the spatial size of a habitat area and the number of individuals and number of different species supported (Arrhenius 1921). Recent research (Kallimanis et al, 2008) has shown that habitat diversity (heterogeneity) has a large role in the “species : area” relationship, as do life history traits of different species. Additionally, for species that are “area-sensitive” like the golden-winged warbler, the larger patch sizes of young forest (e.g., aspen regeneration complexes) created under Alternative 2 would contribute an important habitat element in the project area’s landscape.

Alternative 2 would best meet the purpose and need as stated in Section 1.4 as it includes more treatment for regenerating aspen, and therefore would result in more progress toward Objective 27a in the Forest Plan to maintain habitat in the 0-9 year age-class (p. 2-8).

Alternative 2 would be more beneficial for species dependent upon young forest due to 38% more acres recruited into the 0-9 year age-class.

Cumulative Effects

Past and Present Actions: As outlined in Section 3.3, conditions within the project area for aspen are a proxy for the impacts of past actions. Consequences to plant and animal species have been commensurate with the changes in forest communities, generally. When early-successional forests transition to late-successional forests, species needing young forested conditions gradually get displaced by plants and animals seeking older forest communities. These successional changes favor species such as the American marten and cut-leaf toothwort (both MIS) and other species reliant upon late-successional forests (see project file).

At the time of this writing, no timber harvesting is occurring on federal or private lands in the Redboat project area, therefore, no commercial aspen regeneration is occurring in the project area.

Reasonably Foreseeable Future Actions: At this time, the Forest Service is not aware of any private landowner planning to do commercial aspen regeneration within the Redboat project area.

Under the No Action alternative there would be no cumulative effects as no aspen regeneration would occur on federal lands in the project area. Future aspen regeneration activities elsewhere on the Ottawa would not be included as cumulative effects of this project because they would not occur in the Redboat project area (no overlap in space or time). If an action alternative is chosen for the Redboat project, aspen regeneration implemented under the Decision would create 0-9 year old aspen stands which are currently lacking in the project area. Furthermore, any and all 0-9 year aspen stands created in the Redboat project area would contribute acres toward Forest-wide Objective 27a.

3.7 Soils: Issue 4, Sub-issue 4b – Road Construction

Analysis Framework

As outlined in Table 5, this section addresses sub-issue 4b as follows.

- IM-6: Degree, duration, extent, and distribution of disturbance (i.e. compaction and rutting, erosion and displacement) associated with road construction actions.

Additionally, the analysis framework for this section includes the following, resource-specific assumptions.

1. System roads and trails within or adjacent to an activity area are dedicated land uses and not considered detrimental soil conditions (Forest Service Handbook Manual 2509.18, 2 2550-2012-1).

2. Based on past projects with similar landtype associations (LTAs), similar proposed actions, and similar design criteria, road construction activities are expected to have minimal or negligible direct, indirect, or cumulative effects. ***This is due to the implementation of design criteria, which minimizes effects; and that a minor amount of road construction is***

typically necessary since the majority of actions can take place using the existing transportation system (see project file's sale administration monitoring notes for similar activities).

3. Ratings for haul road suitability are based on soil properties and qualities that affect the development of haul roads for management activities. A rating of slight/well-suited indicates that few restrictions are necessary for construction activities. A rating of moderate/moderately-suited indicates that one or more restrictions may cause some difficulty in construction of haul roads, and that seasonal restrictions would be more limiting. A rating of severe/poorly-suited indicates that one or more limitations make the construction of haul roads very difficult or costly unless major considerations are made (Soil Survey Geographic Database for Gogebic County, MI).

Direct Effects and Indirect Effects

Alternative 1: No soil compaction or rutting would occur from any activities as no road construction is proposed in Alternative 1. Natural soil formation processes would continue, and historical compaction, if any, would remain and continue to be naturally mitigated. Existing ruts due to unauthorized use would persist. Alternative 1 would have no direct or indirect effects on the soil resource from compaction or rutting.

The potential for soil erosion and displacement is very low as no ground disturbing activities are proposed in this alternative. Existing erosion occurrences would persist.

The potential for site productivity impacts is very low since no activities are proposed in Alternative 1. Natural soil formation processes, including biomass accumulation or other natural inputs, would continue as normal. There would be no direct or indirect effect to the soil productivity as a result of Alternative 1.

Alternatives 2 and 3: The action alternatives each have the potential to negatively impact the soil resource through road construction activities. Areas of new road construction would no longer contribute to productive forest growth. Such areas would become part of the permanent transportation system. New temporary roads would remove the resource from the productive forest base for the short term. After their useful life, these temporary roads would be restored to become part of the productive land base once again. Areas along temporary roads may see more vigorous tree regeneration because of reduced competition for resources (Grigal D. F., 2000, p. 171).

No new system or temporary road would be available for public motorized use. As outlined in Appendix ***1***, there would be periodic monitoring of roads that would be decommissioned or closed to public use, to prevent illegal use.

Road construction is proposed for 3.2 and 2.5 miles in Alternatives 2 and 3, respectively. Of the proposed road construction mileage, the majority of the road miles proposed in Alternatives 2 and 3 would be constructed on soil that is moderately suited (see Table 11). Road construction is expected to compact the soil resource. It would change the resource from supporting a productive forest to becoming part of the permanent transportation system on the Ottawa. Road construction would improve upon the current condition of the road system available for accessing stands identified for timber harvest. Permanent roads and trails are considered a designated use; they are not considered part of the productive land base and are not considered disturbed.

Temporary road construction is proposed for 5.6 and 3.7 miles in Alternatives 2 and 3, respectively. Of the proposed temporary road construction mileage, the majority of the road miles proposed in Alternatives 2 and 3 would be constructed on soil that is moderately suited or better (see Table 12). Alternatives 2 and 3 propose 23% and 9% of the temporary road construction miles, respectively, that would be located on soils that are poorly suited. Construction in these areas poses an increased risk of soil erosion, rutting, sedimentation, and effects to soil productivity. ***Though avoidance of wetland and stream crossings is the best option, if avoidance is not feasible, minimizing and mitigating impacts to those resources becomes important. Though there are many options for crossing such features temporarily (Blinn, 1998). I***n these poorly suited locations, temporary construction of winter standard roads on frozen ground would provide a less disruptive alternative to construction of system roads (Grigal D. F., 2000, p. 171). Any temporary roads created would be decommissioned ***using project design criteria*** **and applicable timber sale contract provisions** when no longer being used for the proposed project and returned to productive forest land. Natural soil processes such as swelling and shrinking due to moisture changes and movement of soil particles by freezing and thawing (including frost heave) and biological activity (i.e., worms) tend to restore soil physical properties to pre-disturbance conditions (National Council for Air and Stream Improvement, Inc., 2004, p. 38).

Tables 11 and 12 summarize the potential soil disturbance ratings for the proposed road construction activities in the Redboat project area. The ratings noted in the tables are based on the most limiting condition of the soil in question. These risk ratings do not factor in the requirements and guidelines put in place to protect the soil resource.

Table 11. Haul Road Suitability for System Road Construction (miles)

Risk to the Soil Resource	Alternative 2	Alternative 3
Slight (well-suited)	0.00 (0%)	0.00 (0%)
Moderate (moderately-suited)	2.44 (81%)	2.16 (89%)
Severe (poorly-suited)	0.56 (19%)	0.27 (11%)

Table 12. Haul Road Suitability for Temporary Road Construction (miles)

Risk to the Soil Resource	Alternative 2	Alternative 3
Slight (well-suited)	0.63 (11%)	0.63 (17%)
Moderate (moderately-suited)	3.63 (65%)	2.74 (74%)
Severe (poorly-suited)	1.30 (23%)	0.32 (9%)

Rutting and short-term detrimental compaction would likely occur on temporary roads. However, site-specific operational requirements ***(e.g., best management practices contained in timber sale contract provisions)*** and soil protection guidelines would minimize the extent, degree, distribution, and duration of compaction and rutting, as observed in the Ottawa's soil

quality monitoring results (USDA Forest Service, 2004, p. 57; USDA Forest Service, 2005a, pp. 69-70; USDA Forest Service, 2007***a***, pp. 23-24). Long-term soil productivity within the project area would not be detrimentally impaired due to compaction or rutting.

The potential for erosion is increased in all new road construction due to the areas of bare soil, both on and along the road grade. Surface erosion associated with roads decreases rapidly following construction (Grigal D. F., 2000, p. 171). Modern road construction activities incorporate best management practices, which consider the soil resource. Design criteria specify seeding large exposed areas of bare soil with approved seed mixtures to help facilitate re-vegetation ***in areas deemed necessary to*** keep erosion to a minimum (see Appendix ***1***). Design criteria for roads and water diversion structures would minimize the effects of the road system to the soil resource. Existing roadbeds are used whenever possible.

Implementation of sale administration practices, adherence to site-specific direction found in the design criteria, and Forest Plan direction would minimize the potential for erosion and displacement from ground disturbing activities. The soils within the Redboat project area would not be detrimentally disturbed from the effects of soil erosion due to project implementation. Short-term detrimental effects from soil displacement may occur in areas where stumps, rocks, and other debris are cleared from temporary roads. No long-term impairment to the soil resource from soil erosion or displacement effects would occur as the result of the implementation of either of the action alternatives. Additionally, long-term impairment to soil productivity resulting from the implementation of either of the action alternatives would be negligible.

Cumulative Effects

The period of time for natural recovery from compaction varies with soil physical characteristics, chemical characteristics, climate, and the severity of compaction. Recovery may be faster where soils are subjected to freezing-thawing or wetting-drying cycles (National Council for Air and Stream Improvement, Inc., 2004, p. 62). Studies from colder climates (e.g., Lake States) illustrate more rapid rates of recovery, particularly for surface soils (National Council for Air and Stream Improvement, Inc., 2004, p. 42). Investigations for estimated time for recovery of soil bulk density in surface horizons have ranged from approximately 1 to 18 years (National Council for Air and Stream Improvement, Inc., 2004, pp. 40, 42).

Alternative 1: As a result of the implementation of Alternative 1, there would be no change to the existing condition of the project area. Natural processes would continue, and historical impacts, if any, would remain.

Alternatives 2 and 3 **(Past Actions):** Historic roads***, skid trails, and areas of ground disturbance*** are affected by naturally occurring mitigation processes such as freeze/thaw cycles, soil fauna activity, and rapid vegetative regeneration. As a result, many historical effects have been greatly reduced. Compaction has been released, erosion has slowed or stopped, and trees have grown in on old roadbeds. Some effects from historic logging roads, such as ruts on old roads and in the woods, and erosion and sedimentation at stream crossings, remain.

The Slate project included considerations for the soil resource through site-specific design criteria and mitigation measures. This project area slightly overlaps with the Slate project area. However, no timber sales from the Slate project were located within the overlap area. No other activities on NFS land overlap in the bounds of analysis.

Activities on the Forest have been designed to minimize detrimental impacts to soil, water quality, and other resource values through the application of site-specific design criteria and other applicable guides. Monitoring of final timber harvests has shown that harvest lands have adequately restocked (USDA Forest Service, 2007, pp. 10-11; USDA Forest Service, 2008, pp. 8-9; USDA Forest Service, 2009, pp. 11-12; USDA Forest Service, 2010, p. 20; USDA Forest Service, 2011, p. 12). On-going soil quality monitoring on the Ottawa has confirmed the effectiveness of project design criteria in protecting soil quality (USDA Forest Service, 2004, p. 57; USDA Forest Service, 2005, pp. 69-70; USDA Forest Service, 2008, pp. 23-24).

Present Actions:

Present day activities that are likely occurring on private land within the project area include timber harvest, road building and use, recreational motorized access, dispersed camping, or land clearing or conversion. The Redboat project area is not experiencing a rapid rate of development at this time, and private land associated activities are not likely to be appreciably different in content and scale from what is occurring at present.

Present day activities proposed in the project area are greatly improved over past actions. Forest Plan direction, Michigan Best Management Practices, and design criteria specific to each project area are effective in preventing and minimizing detrimental effects to the soil resource. Therefore, little to no cumulative soil resource damage is expected to occur.

Reasonably Foreseeable Future Actions: At this time, there are no planned activities in the cumulative effects area of the Redboat project area. Should any future activity occur within the area, resource protection measures would continue to be implemented and would be improved upon with new research and information. Temporary roads would be recovered, and system roads constructed would be re-evaluated during any future analysis in the project area. Private land associated activities are expected to continue.

Conclusions: The road work activities proposed in the action alternatives would have negligible long-term or short-term effects on the soil resource within the project area. Adherence to Forest Plan direction and to site-specific resource protection measures would minimize potential adverse impacts to the soil. The difference between Alternatives 2 and 3 is slight, and implementing one alternative over the other would have negligible effects. ***As stated in the effects for the action alternatives, areas of road construction would remove the soil from areas that contribute to productive forest growth, however, the amount of road construction is minimal and application of design criteria and best management practices included in timber sale contract provisions would minimize impacts. Therefore, the direct*** and indirect effects to the soil as a result of compaction and rutting, erosion and displacement, or changes in productivity would be minimal. Implementing Alternative 2 or 3 would not impair the long-term productivity of the soils in or around the project area.

3.8 Non-native Invasive Plants: Issue 4, Sub-issue 4a, Road Construction

Analysis Framework

As outlined in Table 5, this section addresses sub-issue 4a as follows.

- IM-7: Increased extent of NNIP in the project area from system and temporary road construction.

Additionally, the analysis framework for this section includes the following, resource-specific assumptions.

1. Treatment of priority infestations may occur through concurrent/future processes through previously authorized actions under the 2005b NNIP Control Project.

2. Degree of invasiveness and other life cycle information is not fully documented for all non-native invasive plants in the North Woods; analysis is based on available information and professional judgment.

Direct Effects and Indirect Effects

Alternative 1: No road construction would occur under Alternative 1, therefore there would be no NNIP spread from system or temporary road construction. Therefore, no direct or indirect effects are anticipated.

Alternatives 2 and 3: There are about 3.2 miles of system road construction and approximately 5.6 miles of temporary road construction under Alternative 2 that could result in the potential spread of NNIP (see Maps 1 and 2 in Appendix ***1***). Road construction can have this effect because existing plant communities, which tend to repel NNIP, are replaced by bare soil, available for plant colonization by native and non-native plants. Design criteria and contract clauses requiring equipment cleaning help prevent some NNIP seed introductions, but seed can also be spread by wind, water, and animals, and Forest visitors' vehicles (including OHVs), which do not have to be cleaned. Japanese barberry, the NNIP of greatest concern in the project area, is primarily spread by birds.

Indirect effects would include new infestations, such as on frequently-used new roads, where NNIP likely would only occur on the road shoulders. Some temporary, less frequently-used, roads could also have invasive vegetation across the full road width or in the middle between the two tracks. Temporary roads are often narrower, with more shade, which helps to repel many of the priority NNIP (but not barberry or exotic honeysuckle). Design criteria for seeding areas prone to ***erosion or*** NNIP colonization (i.e., bare soil) would assist to encourage revegetation and minimize the introduction of NNIPs. Since all new road construction would be closed to the public, new infestations are not anticipated from motorized use by Forest visitors.

Gravel used in road work can also carry NNIP seeds. Any gravel needed for road work is expected to come from the Bluejay Pit within the project area. A NNIP survey in Bluejay Pit on 6/20/2002 found the Ottawa medium priority invasives spotted knapweed and orange hawkweed, and some low priority invasives including oxeye daisy and tall hawkweed. The active gravel face was not vegetated at that time. The plant communities may have spread or changed since the 2002 survey, however, moving gravel from this pit to road work areas is not expected to move seed of any species not already present along some roadsides in the project area. Gravel transport and use could result in increased knapweed infestations from seed in the gravel (orange hawkweed is less likely to establish on roads).

Alternative 3 is expected to have similar effects on NNIP potential spread due to road construction as Alternative 2, but to a lesser degree, since there would be about 30% less road construction. Disturbed sites would continue to be potential sources for NNIP. Use of gravel for road work could have similar effects as under Alternative 2.

Cumulative Effects

Past Actions: Road construction in the past has resulted in the road network present today, with roadside weed infestations in some areas, and robust native plant communities along other stretches. Seeding for erosion control was a common past practice along roadsides, and previously-used seed mixes sometimes included NNIP seed intentionally as well as accidentally. Road equipment may not have been cleaned of NNIP seeds between work sites, and thus may have been a dispersal mechanism for NNIP. Gravel spread from infested pits may have carried seed to new locations.

Present Actions: Road construction is a routine activity on the Ottawa; however, there is more awareness of NNIP, and best management practices are used frequently to prevent the spread of NNIP. For example, timber sale contract ***provisions*** now include language directing cleaning of off-road equipment to slow the spread of NNIP. Seed mixes do not include priority NNIP. Some NNIP treatment occurs on roadsides, such as herbicide application. Some roadside mowing is also timed to prevent spreading seeds.

Reasonably Foreseeable Future Actions: Non-native invasive plant management direction in the 2006 Forest Plan would be followed. This includes treating priority NNIP infestations with a focus on areas and species with high potential for establishment and spread or for serious environmental effects. New infestations, if any, arising from road construction sites in Redboat likely would be treated if they were high priority species. Road construction best management practices would likely continue to evolve to be more effective.

Partners such as the county road commission may start incorporating similar best management practices. No road construction is expected in the effects area within the analysis timeframe other than that proposed under Redboat.

Conclusion: Design criteria are used to limit the potential for increased NNIP spread from project road construction. However, some new infestations are possible, such as from windblown and animal-carried seed, seed brought in on equipment that does not have to be cleaned, or seed picked up in the project area after equipment is cleaned. Roadside weeds would persist and likely spread under all alternatives. There are slight cumulative effects on NNIP spread from many activities that occur on the Forest, and the efforts to contain NNIP would never be fully successful in eradication of all NNIP.

The implementation of Alternative 1 would not result in any cumulative effects to NNIP as this alternative does not change the existing condition. For the action alternatives, all the direct and indirect effects of the Redboat project are consistent with the actions considered in the Forest Plan FEIS. There is nothing new in the project area or proposal that would add to the cumulative impacts already disclosed in the Forest Plan FEIS for NNIP (pp. 3-86 to 3-97).

3.9 Visuals Resources: Issue 1, Sub-issue 1a (Aspen Management), Issue 2 (Treatments within MA 8.1) and Issue 4, Sub-issue 4b (Road Construction)

Analysis Framework

As outlined in Table 5, this section addresses sub-issue 1a, Issue 2 and Issue 4b (respectively) as follows.

- IM-8: Increased number of temporary openings in management areas where they are visible from primary travel corridors and points of interest.

- IM-9: Effects of silvicultural prescriptions on maintaining/enhancing Visual Quality Objectives (VQOs) due to gaps in the canopy in management areas where they are visible from primary travel corridors and points of interest, (i.e., shorelines of lakes and rivers).

- IM-10: Gaps in the canopy due to system and temporary road construction (<15 acres).

Additionally, the analysis framework for this section includes the following, resource-specific assumption.

- The project is designed to be consistent with the management of visual quality objectives outlined in the Forest Plan (pp. 3-9, 3-64 and Appendix G). These VQOs would be maintained through implementation of design criteria, and resulting conditions would provide visual variety, including a diversity of vegetative types, all within the desired condition for each management area (Appendix G, p. G-3).

Direct and Indirect Effects

Alternative 1: The direct and indirect effects of Alternative 1 discussed below are the same for IM-8, IM-9, and IM-10.

There would be no direct effects to the VQOs for Alternative 1. Long term, indirect effects could occur as a result of the following: (1) stands with a high density of trees would not provide visual depth, age-class diversity, or presence of openings or gaps in the canopy, which are characteristics of scenic value; (2) due to the lack of vegetation treatment, few seedling-size, sapling-size or shrub-layer elements would develop, resulting in a less diverse understory layer; (3) areas damaged by previous wind or insect events would remain untreated, therefore the dead or damaged trees would continue to contrast visually with the surrounding landscape; and (4) declining vigor and health of stands could result in pockets of dead and dying trees, which could alter the landscape character over time and consequently cause stands to remain susceptible to disease or pests.

***Alternative 2 (IM-8 – Increased number of temporary openings)*:** Approximately two-thirds of aspen regeneration treatment areas are assigned a Modification VQO (e.g., a landscape character that appears slightly altered); the remaining one-third of the treatment areas are assigned a Partial Retention VQO (e.g., a landscape character that appears intact), in addition to a minor portion of Maximum Modification within MA 6.2. All proposed clearcut harvest for the regeneration of aspen would temporarily affect the visual quality of the project area through the removal of vegetation and creation of temporary openings. In some cases in MAs 2.1 and 6.2, these openings would exceed 40 acres in size within the aspen regeneration complexes (see project file). Temporary openings would not exceed 40 acres in size in MA 8.1.

The indirect effects of clearcut harvest would include evidence of soil disturbance created by log landings and skid trails, and evidence of dead vegetation (e.g., slash and brown leaves scattered on the ground). Within 5 years, the new growth of seedlings and other herbaceous cover within the temporary openings would diminish these short-term visual effects of the management treatments with a more natural appearing landscape character and more favorable visual quality. When design criteria are applied, the resulting conditions within the treatment areas would meet the VQOs within the degree of alteration allowed by the Forest Plan.

Alternative 3 (IM-8): This alternative would have the same direct and indirect effects as Alternative 2, although to a lesser extent because fewer acres of aspen regeneration are proposed. As part of the acreage reduction, all temporary openings would be restricted to 40 acres or less, through retention of 10 acres (or more) of un-harvested area between areas of aspen regeneration clearcut harvest.

Alternative 2 (IM-9 – Effects of silvicultural prescriptions): For the Wild and Scenic River (WSR) corridor treatments, all stands are in a Partial Retention or VQO. Implementation of intermediate thinning harvest and structural improvements in the WSR corridor would temporarily affect the visual quality of the area under Alternative 2. Intermediate thinning would occur in the Recreational ***and Scenic*** segment***s*** of the Presque Isle WSR ***(South and West Branches)*** and structural improvements are located in both the Recreational and Scenic segments of the Presque Isle WSR (West Branch and main stem). Short-term direct effects to the visual quality in the WSR corridor would be openings in the stands' canopy through removal of individual trees to removal of rows of trees. Indirect effects would include evidence of soil disturbance created by log landings and skid trails, and residual slash.

For the Scenic segment, one of the outstandingly remarkable values is Scenery, and as such management practices must adhere to the Partial Retention VQO. Deviations to the visual character, such as vegetative manipulation associated with the structural improvement treatment, may occur, but the resulting vegetative conditions must repeat the form, line, color, texture and pattern common to the existing landscape character so completely and at such scale that they are not evident. Harvest***ing*** in stand***s*** within the Scenic segment would not be seen in the foreground of the river, and is not accessible by any system road; therefore, the harvest is not anticipated to impact visual quality as seen by the casual Forest visitor.

As described under IM-8, visual effects would begin to diminish within 5 years. The location of the treatments, for the most part, would not be seen from the river as the majority of activities take place at a minimum of a quarter to a half mile from the edge of the river. Additionally, most of the proposed treatments are in remote areas and would not be seen by the casual forest visitor. Design criteria in Appendix ***1***, when implemented, would ensure that the visual effects of treatment remain within the established parameters for the Partial Retention VQO.

Alternative 3 (IM-9): To address Issue 2, Alternative 3 excludes all stand structural improvement and thinning harvest within the WSR, and therefore would result in effects similar to Alternative 1. There would be no visual effects to the VQOs in these stands.

Alternative 2 (IM-10 – Gaps in canopy due to road construction): System and temporary road construction would result in minor impacts to the visual quality of the project area. Short-term direct effects may be openings in the canopy from removal of trees for road construction activities. Indirect effects would include the evidence of residual slash from tree removal and soil disturbance.

As described under IM-8, visual effects of the openings would begin to diminish within 5 years. No newly constructed road would be available for public motorized access after they are built, and therefore visual effects would continue to diminish over time. The majority of proposed system and temporary access roads would not be seen by the casual forest visitor as they are in remote areas. When design criteria are applied, the resulting conditions within the treatment areas would meet the VQOs within the degree of alteration allowed by the Forest Plan for Mas 2.1, 6.2 and 8.1.

Alternative 3 (IM-10): Some system and temporary road construction would occur, and for those areas, the direct and indirect effects would be the same as disclosed under Alternative 2.

To address sub-issue 4a, the mileage of total construction has been reduced from 8.8 miles to 6.2 miles, and therefore direct effects to visual resources would occur to a lesser extent. Without construction, there would be no access to some stands to facilitate timber harvest. Therefore, the indirect effect to visuals would be similar to Alternative 1 in these areas. There would be no effect to the VQOs in these stands (compare Maps 1 and 2 in Appendix ***1***).

Cumulative Effects for IM-8, IM-9 and IM-10

Past and Present Actions: Historical visual effects on the project area include those associated with timber harvest and other management treatments on public land and the smaller tracts of privately held timber. The current forested condition on NFS land does not show any evidence that past harvesting or management activities (that in the early 1990s), have left lingering, unacceptable negative effects.

There are no on-going actions on NFS or privately-owned lands that would affect the visual quality resource.

Reasonably Foreseeable Future Actions: Any planned projects in the reasonably foreseeable future would include design criteria to ensure that visual quality objectives are met. There are no reasonably foreseeable actions on NFS lands in the bounds of analysis.

Much of the private timber land is managed with the goal of sustainable harvest; it is unlikely that private harvesting would negatively affect the landscape at the project level that is being considered or in the future. Future actions on private land would likely be limited to the industrial forest corporation land (about 5% of the project area), where management is expected to perpetuate the northern hardwood forest type. The visual resource would be temporarily and minimally affected by these types of treatments.

If an action alternative is selected, proposed management would result in movement towards forest composition and age-class distribution objectives. The project area would continue to maintain a mosaic of forest types, including temporary openings. Given the affected environment conditions, resulting from past timber harvest, in addition to the proposed actions and application of design criteria, the cumulative effect would be a landscape with a strong visual forested character.

3.10 Summary of Effects Not Related to Issues

The ID Team performed brief analyses for the following resources to identify any potential beneficial and adverse impacts from the alternatives. A detailed analysis is not included for these resources because either they were not raised as potential issues during public scoping or the impacts are expected to be discountable, inconsequential, or non-existent. In many cases, design criteria were used to minimize potential effects of the action alternatives (see Section 2.3). The bounds of analysis for non-issues are confined to the project area as effects are anticipated to be localized to the areas where actions would be implemented. No direct, indirect or cumulative effects are anticipated to occur outside the bounds of the project area given the scope of the proposed actions.

In summary, the resource analyses have concluded that implementation of the proposed actions considered in this section would result in a range of effects from no effect to minor,

negative and/or positive cumulative effects. These effects are anticipated to be short-term, primarily addressed through the implementation of design criteria. This section does not reiterate effects addressed through the issue-based analyses. The effects of implementing the reasonably foreseeable activities outlined in Table 7 are also addressed per resource. More detailed information for the resource analyses can be found in the project file.

The following analyses are specific to all actions outlined in Table 3 that were not addressed as part of the four issues analyzed in detail. Additional information is located in the project file's analysis framework documentation.

<u>Alternative 1</u>

The No Action alternative would perpetuate the existing condition described in Sections 1.4, 2.4, and 3.3 to 3.10 and the resource analyses in the project file. This alternative would result in a failure to meet the purpose and need for the project as outlined in Section 1.4, and would not progress conditions in a manner consistent with Forest Plan goals, objectives and desired conditions. For example, there would be some effects related to ongoing impacts such as the unneeded roads identified in the project area could continue to be a source of sedimentation for streams.

Given that there would be no vegetation treatments, there would be no effects to other resources resulting from timber harvest activities. In summary, under Alternative 1, there would be no impacts related to disturbance and activities in the stands; however, the benefit the actions were intended to produce for project area resources would not be realized. The lack of vegetation treatment would result in perpetuating the current stand conditions, leading to a decline in tree species diversity; a decrease in timber quality from insect and disease factors as well as slower tree growth; loss of forest type representation (e.g., aspen); and a decline in different age classes, especially early-successional habitat and suppressed understory communities that would lose the ability to persist (see the Vegetative Management resource analysis in the project file).

<u>Alternatives 2 and 3</u>

<u>Timber Resources</u>: All timber harvest activities in Alternatives 2 and 3 would meet the purpose and need given that these alternatives were designed to maintain or progress conditions towards the desired conditions through restoring structural and species diversity (see Sections 1.6 and 3.4). Required reforestation activities (using mechanical means or prescribed fire) would be implemented post-harvest based upon monitoring. In addition to the implementation of design criteria, operating restrictions, and best management practices would ensure these harvest activities are implemented in a manner that protects natural resources (see Section 3.3).

Trees felled on steep slopes are proposed on approximately 5 acres of northern hardwood. Of the trees felled, some would have high vigor, and therefore, a minor negative effect is expected from the loss of the potential seed source offered by these trees. However, at a localized stand scale, the activities would increase large woody material, which is an important stand component since these felled trees would provide a seed bed for some species, such as hemlock and yellow birch, resulting in improved conditions, especially stand species diversity. The amount of trees felled would be minor (about 20 to 25 trees per acre), and therefore would result in a minimal negative impact to stand development, and in some cases, improve overall stand conditions.

Refinements to the transportation system would result in positive and negative effects. Road construction and reconstruction would necessitate tree removal, which subsequently removes a minor amount of area from timber production in the short-term. However, these actions have positive effects upon other resources as it provides for more efficient and economical motorized access increasing opportunities for resource management.

The effects of implementing reasonably foreseeable activities would range from no effect to minimal impacts to the vegetation resource. Given the limited scope and extent of these actions; no cumulative effects are anticipated.

<u>Non-native Invasive Plants (NNIPs)</u>: Forest Service Manual 2620 and 2900 require that the Forest Service prepare a Management Indicator Species (MIS report) and a NNIP report for projects. These required reports are located in the project file. In addition, Issue 4 is, in part, discussed in terms of NNIP spread and road construction. These analyses show that this project would be consistent with these requirements. Other MIS are discussed under the Wildlife and Aquatic sections.

Alternative 2 and 3 timber harvest proposals, OHV open road/trail miles, and road work may affect the abundance and distribution of non-native invasive plants (see NNIP resource analysis in the project file). As Alternative 2 proposes more ground disturbing work, it would be expected to have slightly more risk in terms of NNIP spread. Design criteria and best management practices are recommended to limit effects, but still under all alternatives, some NNIP spread is possible, particularly in disturbed areas such as roads and trails.

Timber harvest may spread NNIP by creating soil disturbance for germination of NNIP seeds in the seed bank; creation of favorable establishment sites with reduced competition; creation of canopy openings allowing for more light penetration and better growing conditions for NNIP; and transport of NNIP seeds on equipment. Design criteria such as equipment cleaning, limited canopy openings in non-clearcut harvests, dense aspen regeneration in clearcut stands, and winter harvest operations can help lower risk of new infestations.

Proposed OHV designations may influence the spread of NNIP by moving seeds from place to place when they are caught on the undercarriage, tires, and other parts of the ATV (Rooney 2005, Rew and Pollnac 2010). OHV travel results in keeping the trails in an open, disturbed state that is conducive to NNIP establishment. Decommissioning of roads could reduce the spread of NNIP within the project area as less area would be open to OHV travel.

The reasonably foreseeable activities are not expected to affect NNIP distribution and abundance, given the limited ground disturbance. Although these projects would not create any effects in terms of NNIPs, ongoing activities and natural processes would continue to spread NNIP, and therefore there would be slight cumulative effects (as disclosed in the Forest Plan FEIS, pp. 3-92, 3-95 and 3-96).

<u>Rare Plants</u>: A Biological Evaluation (BE), which is a detailed analysis of the indirect, direct and cumulative effects from all alternatives on Sensitive species has been prepared and is available in the project file (Note: There are no Federally Threatened and Endangered Plants on the Ottawa National Forest). The BE determined that the proposed action alternatives may impact individuals, but are not likely to cause a trend to federal listing or a loss of viability for the following RFSS: herbs (western moonwort, Mingan's moonwort, pale moonwort, goblin fern, blunt-lobed grapefern, ternate graperfern, little grapefern, large toothwort, greater yellow ladyslipper, white trout-lily, American ginseng, broad beech fern,

strict blue-eye grass, heart-leaved foam flower and meadow zizia); lichens (black-foam lichen and yellow ribbion lichen); moss species (Orthotrichum moss and Plyaisiadelpha moss) and tree species (butternut).

<u>Plant Management Indicator Species (MIS)</u>: The MIS Report provides analysis for the cutleaf toothwort; a representative for species dependent upon northern hardwood habitat. As discussed in the MIS Plant Specialist Report (see project file), the hardwood stands in the project area support some cutleaf toothwort populations and provide expansion habitat. Timber harvest treatments proposed under Alternatives 2 and 3 in these hardwoods may cause loss of individual plants, with Alternative 2 producing more effects since it proposes more harvest in northern hardwood areas. However, toothwort and potential habitat are expected to persist in the area under either action alternative. Recent analysis of monitoring data from 2006 through 2011 found no difference in abundance of cutleaf toothwort in stands treated with timber harvests versus untreated stands (Fox et al. 2012).

<u>Wildlife Resources</u>: The BE resulted in a finding of No Effect to the federally listed Canada lynx and Kirtland's warbler; both species are not documented in the project area. Determinations for Regional Forester sensitive animals found that the proposed alternatives may impact Individuals but are not likely to cause a trend to federal listing or a loss of viability for the following species: mammals (gray wolf [federally delisted and classified as RFSS after analysis, see BE for details], tri-colored bat [eastern pipistrelle], northern myotis bat [N. long-eared bat], and little brown myotis); birds (red-shouldered hawk, trumpeter swan, spruce grouse, common loon, bald eagle, Connecticut warbler, black-backed woodpecker); herptiles (wood turtle, four-toed salamander); and insects (tawny crescent butterfly and West Virginia white butterfly). The project would have no impact on RFSS species with no habitat in the project area (including black tern and peregrine falcon).

<u>Wildlife MIS</u>: The MIS Report provides analysis for the ruffed grouse and the American marten. They are representative species for early-successional habitat and interior mature forest habitat. Effects for early-successional treatments and old growth retention are described in Issues 1c and 3 (see Section 1.6). Generally, ruffed grouse would benefit from proposed activities that create or maintain openings and early successional habitat. Meanwhile, American marten would benefit from proposed activities that retain and increase old growth characteristics and long lived conifers.

<u>Other wildlife</u>: Effects to non-designated wildlife are not analyzed in detail because they are typically more common throughout the project area and forest. The effects to the range of TES species and MIS, and their habitat, are expected to apply more generally to other wildlife species with similar habitat requirements.

<u>All wildlife (TES, MIS, other):</u> Overall, adverse cumulative effects would not be expected to any wildlife species or their habitat. The reasonably foreseeable activities might cause minor disturbances to individual animals present during implementation, though none would adversely affect wildlife populations or their habitat; some of these projects would also have slight positive effects as habitat quality in those areas would be improved for wildlife.

In summary, the proposed actions would have both positive and negative indirect effects as habitat conditions change after harvest activity. Adverse effects would generally be minor and might disturb individuals; though not likely affect a population of any wildlife species. Actions proposed would change the distribution of habitat types and age classes across the

project area, which is not expected to have any adverse impact on availability of wildlife habitat because of the implementation of design criteria (including buffers, seasonal restrictions); timing of harvest and other actions; habitat enhancement proposals (see the Wildlife Resource purpose and need in Section 1.4); the mobility of terrestrial wildlife; and the availability of habitat outside of specific treatment areas, as well as outside the bounds of the project area.

Aquatic/Fisheries/Riparian Resources: The action alternatives are expected to have no, minimal or negligible direct, indirect, and cumulative effects to aquatic resources. Impacts to aquatic resources from proposed timber management activities and road construction are avoided altogether or mitigated through design criteria such as riparian buffers and management described in the riparian table (see Appendix 1), and a 400 foot clearcut harvest buffer for aspen stands near trout streams. The creation of openings from aspen management activities would not result in altered water flow. These openings are considered temporary in nature, and there are no other past, present, or reasonably foreseeable actions that would cumulatively contribute to the amount of openings in the project area. The open area threshold would not be exceeded under either action alternative (FEIS, p. 3-15).

Although timber harvest and road construction activities may create slight, negative effects on the fisheries resource indirectly through increased erosion and flow of sediment into water bodies, implementation of design criteria and the use of best management practices would limit these effects.

Some other proposed activities would have minor, localized effects on the aquatic resources (prescribed fire/mechanical treatment for paper birch, walk-in boat access to Hawk and Mishike Lakes, road construction and temporary road construction), although effects are expected to be small (see project file aquatics resource analyses). In addition, felling trees on steep slopes adjacent to riparian areas, large woody material in streams and rivers, road reconstruction, road decommissioning, berms/gates, and eliminating access on some roads would benefit the aquatic and fisheries resources. These positive effects would include reduced erosion, improved aquatic habitat and old growth classification in riparian areas.

The reasonably foreseeable activities in the area would lead to a reduction in sedimentation and improved water quality as well as fish habitat.

Aquatic RFSS: The BE determined that the proposed action alternatives may impact individuals, but are not likely to cause a trend to federal listing or a loss of viability for the following RFSS invertebrate species: creek heelsplitter mussel, rapids clubtail dragonfly, pygmy snaketail dragonfly, and forcipate emerald dragonfly (see project file).

Aquatic MIS: The MIS Report provides analysis for the mayfly-stonefly-caddisfly suite of aquatic insects used to evaluate water quality. Although no monitoring of EPT has occurred in the project area, they have been sampled downstream and likely occur within the project area. A number of projects proposed would benefit these species, especially actions to add LWM to rivers and riparian areas and measures to address roads causing erosion and those actions aimed at restoring natural hydrologic function.

In summary, the action alternatives would result in a minor incremental benefit to water quality and fisheries; the adverse impacts are minimal when taken with the beneficial effects in the project area and implementation of design criteria.

***Soils**: Alternatives 2 and 3 would introduce additional ground disturbing activities into the area and may cause additional limited and isolated areas of soil disturbance. The timber harvest , road work activities, and other proposed activities would have negligible short-term or long-term effects (as identified by the bounds of analysis) on the soil resource. Overall, Alternative 3 would produce less effects to the soil resource given that it proposes less ground disturbing activity. Regardless, adherence to Forest Plan direction, site specific design criteria, and contract provisions would minimize or eliminate any adverse impacts due to compaction, rutting, erosion, displacement, or nutrient removal.*

Minor negative effects to the soil resource may include the proposed burn area for paper birch regeneration as this stand contains steep slopes. Conducting a low intensity burn would not substantially heat the soil and would therefore avoid effects accelerating erosion (water repellency), maintaining the rapid percolation of water through the soil. These fires do not heat the soil substantially, and the changes in most soil properties are only minor and are of short duration (USDA Forest Service 2005e, p. 51). Previous soil temperature monitoring of prescribed burning in the Baraga Sand Plains validates that low intensity burns can be successfully conducted in this area (USDA Forest Service, 2009). In addition, several proposed activities would reduce sedimentation and improve the soil resource, such as transportation system refinements and actions focused on correcting erosion problems. Given the effects in the past, present and reasonably foreseeable future activities, in addition to the impacts associated with implementing Alternatives 2 or 3, there would be minor, negative effects to the soil resource.

***Recreation**: From a recreational perspective, the aspen and paper birch regeneration activities, as well as improvement of wildlife habitat conditions in the WSR, would result in positive effects through improvements to wildlife-based recreation, such as hunting and wildlife watching. The remainder of the proposed timber management actions would not have an effect on the recreational resource. Albeit there would be minor disruptions to dispersed recreation that would be temporary in nature due to general timber harvesting practices; however the majority of harvest operations would be restricted to the winter season.*

Angling opportunities and other water-related recreational pursuits would be enhanced through the actions to increase LWM in lakes and streams for aquatic organism and fish habitat, in addition to measures to prevent erosion on system and unclassified roads to improve water quality. Specifically, the addition of LWM to the West Branch of the Presque Isle WSR would enhance the Recreation outstandingly remarkable value in terms of fishing opportunities (CRMP, p. 2-23). The establishment of new carry-in boat and canoe access for Hawk and Mishike lakes would increase dispersed recreation opportunities (see the National Visitor Use Monitoring Report [page 20] in the project file, USDA Forest Service, 2007d).

Refinements to roads and trails would result in positive effects by improving the condition and increasing the amount of dispersed recreational opportunities as outlined in the purpose and need for this project and the Forest Plan (p. 2-14). For the WSR, the proposal to remove the majority of all lower standard roads from within the South and West Branches of the Presque Isle WSR corridor would lead to positive effects for dispersed recreation. This action is consistent with the Recreation outstandingly remarkable value for providing remoteness and solitude (CRMP, p. 2-23), as well as the Forest Plan standard for retaining a semi-primitive motorized recreational experience (p. 3-81.4). Finally, the associated activity to relocate the

snowmobile trail would positively affect the recreational resource by ensuring safe, dual-use conditions during winter harvest operations.

Given the scope of the reasonably foreseeable future activities, the effects would anticipated to be slightly positive as the actions would enhance the experience for those participating in dispersed recreational activities. Taken together with the benefits provided by the action alternatives as described above, cumulative effects are expected to also be slightly positive.

<u>Visual Resources</u>: The potential effects of implementing this project would result in primarily positive minor, cumulative effects to the visual resource. Similar to the analysis presented for the issues specific to clearcut and thinning harvests, structural improvement treatments, and road construction, the visual resource would be negatively impacted in the short-term (about 1 to 5 years) from the other proposed activities that would change the visual appearance of the area. For example, these short-term negative impacts would be expected in areas receiving selection harvest as well as other activities outlined in Table 3; however effects from harvest activities would be addressed through the application of slash disposal design criteria (see Appendix 2). Alternative 2 includes about 1,460 acres more area proposed for timber harvest; therefore it is anticipated to result in an increased amount of short-term effects to the visual resource. However, positive effects that also occur under either action alternative through the creation of natural appearing openings gives a visual relief to large scale monotony of a densely vegetated landscape. This is due to the fact that the majority of vegetation management activities take place outside the travel corridor foreground's viewshed. Both alternatives include the implementation of design criteria would ensure management activities, such as timber harvest and transportation system refinements would minimally impact the visual resource.

Heritage: An inventory for cultural resource sites has been completed in all areas containing proposed actions. This inventory combines background research, historic records search, historic aerial photographs, and field survey under the direction of a qualified archaeologist. Fifty-eight cultural resource sites have been documented within the project area; all are archaeological (e.g., no standing structures). These sites include two historic logging towns, historic logging camps, the location of an historic portage, and prehistoric arrowhead findings. These sites would be avoided and protected as outlined in the design criteria listed in Appendix 1.

3.11 Analysis Required by Laws, Regulation and Policy

The following topics were not identified as issues which required detailed analysis. The following information offers a basis for the public to comment and assist the Responsible Official to make a decision and findings required by laws, regulations and policy.

<u>Endangered Species Act</u>
The Endangered Species Act requires site specific evaluation of a project's potential impact on Federally-listed Threatened and Endangered Species. Where projects may affect these species, consultation with the Fish and Wildlife Service is required. The Endangered Species Act requires a biological assessment when there is a federally listed endangered or threatened species on the Forest. This project incorporated both the biological assessment and biological evaluation into one document to address the potential effects to proposed, threatened or endangered species (see project file). Evaluations resulted in a finding of No Effect for both Canada lynx and Kirtland's warbler. Canada lynx may occur on the Ottawa, but have not been documented in the western Upper Peninsula for over 30 years. Kirtland's

warbler is known to occur on the Ottawa (many miles from this project area), but there is no suitable habitat (young stands of jack pine) in the project area.

<u>Cultural Resources – National Historic Preservation Act</u>

The National Historic Preservation Act (NHPA) requires federal agencies to take into account the effect of a project on any district, site, building, structure, or object that is included in, or potentially eligible for inclusion in the National Register of Historic Places. As stated, in Section 3.10, the project cultural resources found are archaeological in nature (no structures). The project complies with the agreement in the MOU and impacts to cultural resource sites can be avoided, therefore, there would be no effect to cultural resources. Consultation with the State Historic Preservation Office (SHPO) will be initiated to comply with the National Historic Preservation Act. Appendix 1 includes design criteria to protect and avoid historic and cultural resource sites. As such, this project would meet the requirements of NHPA.

<u>Wild and Scenic Rivers Act</u>

As stated previously, the project area encompasses portions of the main stem and South Branch Presque Isle River, and the entirety of the West Branch Presque Isle River. All proposed actions are consistent with the Forest Plan and CRMP. The proposed actions are not anticipated to negatively impact, and are expected to enhance, protect or maintain the free-flowing conditions, water quality, and outstandingly remarkable values of the Presque Isle River system within the project area.

In accordance with Section 7a of the Wild and Scenic Rivers Act, an evaluation was undertaken by the ID Team to determine whether the actions to fell trees to increase the large woody material component in the South and West Branches of the Presque Isle WSR would "invade the area or unreasonably diminish" the values present in the area at the time of the rivers' designation. The resulting determination of this analysis is that the project would not have a direct or adverse effect to these values (e.g., free flow, water quality or outstandingly remarkable values). This project would meet the requirement of the Wild and Scenic Rivers Act.

<u>Watersheds and Soil Resources – Clean Water Act, and Executive Orders 11990 and 11988</u>

The Clean Water Act and State Water Quality Standards provide direction for protection of water quality. As described in Appendix 1, design criteria that have been developed to protect water quality. Additionally, as stated in section 3.12, the anticipated effects of the proposed actions are not expected to negatively affect water quality when design criteria are applied. Water quality is currently within State parameters. Therefore, the integrity of the project area's water and riparian features would be maintained and water quality would remain in good to excellent condition.

Executive Orders 11990 and 11988 provide specific language for the protection of wetlands and floodplains, respectively. The proposed design criteria for soil and water resources have been developed to negate or minimize any impacts to wetlands (section 2.6). Sedimentation is also mitigated through specific stipulations, and therefore, wetlands would not be degraded and effects to floodplains would be minimal. There would be no change from the existing wetland and floodplain functions.

National Forest Management Act

The National Forest Management Act and its implementing regulations (36 CFR 219) require that projects are consistent with Forest Plan standards and guidelines. As discussed in more detail in section 1.4 in this document, this revised EA has been designed based upon the Forest Plan direction; and therefore is consistent with the requirements of this Act.

The Forest Plan has a wide variety of goals and objectives to achieve a balance of use across the Ottawa. The proposed actions were developed to comply with the direction of the Forest Plan. The Forest Plan was amended in July 2007 to incorporate direction contained in the Wild and Scenic Rivers CRMP. This direction was integral in developing the purpose and need for the Redboat Project, and therefore, the selected actions are consistent with both the Forest Plan and CRMP. The alternatives include project design criteria to reduce or eliminate environmental effects and resolve concerns (see Appendix 2). Material in the Forest Plan is incorporated into this document by reference as permitted by NEPA. Since the Forest Plan can be amended, alternatives may be considered which are not currently consistent with the Forest Plan [36 CFR 219.8]. However, all of the action alternatives discussed in this EA is consistent with the Forest Plan, and therefore no amendment is necessary.

The Act also requires findings for the impacts to sensitive species at the project level. As disclosed in Section 3.10, there is a may impact individuals finding (but not likely to cause a trend towards federal listing or loss of viability) for 15 plants, two moss species, two lichen species, one tree species, four mammals, eight bird species, two herptiles; and four insects and one mussel species under Alternatives 2 and 3.

Travel Management Rule

The Travel Management Rule (70 Federal Register 68264), dated November 9, 2005 (36 CFR Parts 212, 261 and 295) revised regulations regarding travel management on NFS lands to clarify policy related to motor vehicle use. The Rule requires the Forest Service to designate a system of roads and trails and/or specific areas open for motorized use and prohibit the use of motor vehicles off the designated system, except for over-the-snow vehicles. The action alternatives both include changes to motorized access in areas that can sustain such use; and removes access in areas where necessary to provide for resource protection.

Executive Order 12898

This Order requires consideration of whether projects would disproportionately impact minority or low-income populations. Public involvement occurred for this project; the results did not identify any adversely impacted local minority or low-income populations. This project would be consistent with the intent of this Order.

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Appendix 1. Design Criteria and Monitoring

Design Criteria

Silviculture

1. ***Stands*** proposed for a clearcut harvest treatment ***(except those identified in design criteria 72, 73 and 74)*** and aspen inclusions in other forest types would receive site preparation for natural regeneration of aspen if needed. Site prep must occur before the second growing season. Site prep would fell all hardwood stems 2.0 to 4.9 inches in size (Forest Plan, p. 2-17). Site prep should maintain small clumps of young (sapling-sized) balsam fir; hemlock or other conifer species to provide cover for snowshoe hare and other prey species. Conifers (primarily fir) not identified as trees to be retained or those needed for foraging habitat can be felled if they are surplus to the needs for wildlife cover (Forest Plan, pp. 2-9 and 2-29).

2. Cutting units with an aspen objective should have a dormant season operating period. Dormant season logging typically results in more vigorous and numerous sprouts and therefore responds well to certain Forest Plan guidelines (Forest Plan, p. 2-31). This desired condition can also be obtained conducting summer and fall harvest, but would require suitable site conditions in addition to an adequate abundance and distribution of aspen; indicating a viable parent root system that would produce sprouts.

3. Within cutting units with an objective to regenerate aspen (including aspen inclusions within non-clearcut units), retain existing white pine, hemlock, cedar, oak, elm and black cherry that are 5.0 inches or larger, with the total basal area retained not exceeding 10 ft2/ac. These species can be cut to facilitate timber harvest operations where necessary. The objective for retaining these species is to add species and structural diversity to the stand while not interfering with successful aspen regeneration and future productivity (Forest Plan, p. 2-2).

4. Within all non-clearcut harvest units, favor hemlock, white pine, cedar, elm and oak by retaining and crown releasing these species as directed by stand silvicultural prescription. These species may be cut to facilitate harvest operations where necessary, or to improve growing space and vigor among the same species that may occur within inclusions. The objective for retaining these species is to improve and/or maintain structural and compositional diversity (Forest Plan, p. 2-2).

5. Within selection harvest units, create and encourage regeneration of hemlock, white pine, and mid-tolerant hardwoods by installing canopy gaps (typically between 30 to 66 feet in diameter). The amount and size of gaps would depend on composition of tolerant- and mid-tolerant species (e.g. yellow birch, oak, elm, black cherry) and other stand conditions. In hardwood stands treated by selection harvest, some canopy gaps would be placed adjacent to mid-tolerant hardwood seed sources and inclusions of hemlock and white pine. Locate canopy gaps to release advanced regeneration for hemlock or white, where feasible. Evaluate gaps preferably during first year stocking surveys for potential site preparation for natural regeneration. Site prep could include hand scalping for scarification and felling of submerchantable-sized stems of undesirable trees. The objective is to create and develop a new cohort within second-growth stands to improve uneven-aged structure, and increase within-stand tree species diversity (Forest Plan, pp. 2-19 and 2-20).

6. Within the red pine and spruce plantation cutting units, the following operating requirements ***will*** be put into the timber sale contract: "Within the sale area, decked pine and other conifer material cut must be removed from the sale area within 30 days of cutting. This requirement ***will*** be in effect from 5/1 to 9/30. Winter-harvested material ***shall*** be removed before warm spring weather occurs." The purpose of this requirement is to minimize the potential breeding sites for bark beetles (***USDA Forest Service,*** Gilmore and Palik, 2006***a***, pp. 34-36).

7. Paper birch is a species that is declining in representation across the Ottawa and has specific, hard to create regeneration requirements due to its small seed size and seed bed requirements. The Forest Plan directs management to regenerate existing paper birch stands or convert other types to paper birch using the two-cut shelterwood method (Forest Plan, p. 2-21). Two stands have been identified as having a major component of paper birch (Compartment 213, Stand 4 and Compartment 204, Stand 16) and would receive a shelterwood preparation cut and then a prescribed fire or a mechanical treatment to attempt regeneration of paper birch to expose mineral soil and provide an optimal seed bed. This shelterwood cut would leave a portion of the overstory to provide seed sources and shading until a new stand has regenerated. These stands have fair to good representation of paper birch in the overstory, which would be left as part of the shelterwood to provide seed.

Wildlife

8. Any even-aged stands adjacent to classified old-growth should maintain a component of long- lived tree species. Stands being managed for aspen regeneration that are adjacent to classified old growth should retain 10 to 20 square feet of Basal Area per acre of white pine, red pine, hemlock, cedar, yellow birch, oak, basswood and elm within a 100 foot corridor adjacent to the old growth stand(s). Depending on available species and opportunity, retain trees as singly or in clumps evenly throughout this area. The objective is to maintain a component of long-lived species adjacent to old growth (Forest Plan, p. 2-23).

9. Retain 2 to 3 wildlife trees/acre of harvest in ***all selection, thinning or improvement treatments in*** northern hardwood ***types or aspen types converted to hardwood***. Preferably, these would be live cavity trees, with large healthy crowns, and species that provide wildlife foods as well (e.g. oaks, yellow birch, black cherry, conifers), if they exist in the stand.

10. For Alternative 3, temporary openings resulting from clearcut harvest ***in aspen regeneration complexes*** (see project file) would be separated by a minimum of 10 acre***, un-harvested stands,*** so that harvest areas do not exceed 40 acres. Design non-harvest areas to occur where retained long-lived species are concentrated, if possible.

11. For Alternative 3, temporary openings resulting from clearcut harvest ***in aspen regeneration complexes*** (see project file) would be separated by a minimum of 10 acre***, un-harvested stands,*** so that harvest areas do not exceed 40 acres. Design non-harvest areas to occur where retained long-lived species are concentrated, if possible.

12. Retain 2 to 3 wildlife trees/acre of harvest in ***all selection, thinning or improvement treatments in*** northern hardwood ***types or aspen types converted to hardwood***. Preferably, these would be live cavity trees, with large healthy crowns, and species that provide wildlife foods as well (e.g. oaks, yellow birch, black cherry, conifers), if they exist in the stand. For Alternative 3, temporary openings resulting from clearcut harvest ***in aspen regeneration***

complexes (see project file) would be separated by a minimum of 10 acre***, un-harvested stands,*** so that harvest areas do not exceed 40 acres. Design non-harvest areas to occur where retained long-lived species are concentrated, if possible.

13. In ***stands proposed for*** commercial clearcut***,*** create one large brush pile on average per ten acres of clearcut. ***These piles provide multiple uses including*** denning/escape cover for numerous wildlife species ***including black bear, hare, and other mammals, as well as a cool, moist refugia for snakes, voles and other small meadow wildlife species***. ***Locations of brush piles would be decide by wildlife staff based on site conditions***

14. Retain existing snags in ***in all harvest units***, where removal is not necessary for safe operations. Snags felled should not be removed for biomass or other reasons, generally. [this would include all dead or unstable live trees sufficiently tall to reach landings and roads the purchaser would be using, including temporary roads and new construction; BT2.32 of the contract and should be marked ***by the Forest Service*** prior to felling.

15. ***A no harvest zone of 300' radius around any active red-shouldered hawk nest or northern goshawk nest would be established at any time of year. An active pair is defined as the pair present in the current year or immediately previous year.***

16. ***A 30-acre nest protection area where no disturbance-causing activities would be allowed between March 15 and August 1 for northern goshawks and March 15 to September 1 for red-shouldered hawks. Disturbance-causing activities including marking, layout, road work, logging, hauling, opening maintenance, tree planting and timber stand improvement efforts. Nests would be verified as active by a wildlife biologist or wildlife technician. If a known nesting area has been inactive for at least two years prior to treatment, then the Responsible Official and wildlife biologist, may remove or modify some or all of the buffers. Modifications or additional protection measures could be made for both species on a case-by-case basis by the Responsible Official and wildlife biologist, including evaluation of existing road/trail use within the area.***

17. In treatment stands in Wild and Scenic River corridors, ***retain coarse woody debris for wildlife use*** at least 100 linear feet per acre of coarse woody debris on the ground***, which may be made up of multiple shorter pieces of coarse woody debris observed through the acres. Coarse woody debris must be a minimum 8" in diameter. In many instances, this would require felling of live trees and*** leaving them on-site.

18. In stands receiving structural improvement in Wild and Scenic River Corridors, timber harvest is designed to restore big tree character and increase biological and structural complexity, while retaining biological and structural legacies. Residual stocking levels would generally be higher than stocking guides recommend, yet be open enough to accommodate logging equipment that is typically used in these types of stands to conduct treatments. Variable density is the desired outcome to resemble a mature, unmanaged stand condition, and would have higher density objectives than those stands receiving commercial harvest.

19. ***Any observations, potential sightings or signs suggesting potential use by a Threatened, Endangered or Regional Forester's Sensitive plant and animals during any activities associated with the proposed treatments must be reported to the project biologist/botanist. Protection needs would then be handled on a site-by-site and species-by-species basis. Protection measures would be collaboratively developed by project's botanist and/or biologist and the Responsible Official, incorporating conservation***

strategies contained in approved recovery plans, conservation approaches, as well as the 2006 Forest Plan, and professional judgment.

20. Do not remove crown material (<4"top) or, larger material from stands within MA 8.1 (Wild and Scenic River Corridor).

21. To the extent possible, retain existing large woody debris. Tops and limbs used to stabilize soil, typically on roads or skid trails, should be left in place following harvest operations. Consider augmenting LWD, if the site does not have adequate LWD.

22. For brush piles (wildlife habitat): Retain existing brush and log piles.

23. ***If biomass harvesting is used, r***etain 1/3 to 1/6 of fine woody debris from harvested trees ***except in cases of insect and disease outbreaks or risk of hazardous fuel accumulation (see project file reference)***. Residues should be dispersed rather than accumulated***. Fine woody debris is defined as woody material, living or dead, less than 4 inches diameter inside bark at the large end; including small branches, twigs, cones, and other portions of shrubs and trees. Leaving fine woody debris post-harvest addresses the need to provide nutrient sources back to soil for site productivity (USDA Forest Service, 2010b).***

Aquatics

24. Site-specific riparian area protection would be applied to all managed stands. Riparian design criteria described ***in Table 14 of this appendix*** would be utilized for all activities within riparian corridors and riparian areas. These measures are to ensure that vegetation manipulation within the riparian corridors and riparian areas maintains or enhances riparian function.

25. All streams within the Sale Area possessing a defined bed and bank would be designated as a protected stream course in the timber sale contract.

26. Where the risk of erosion exists on low-use OML 1 and 2 roads, or on decommissioned roads, within the project area, including roads not used by timber sales, seeding may also be done. Seed would be a Forest Service approved local, native plant mix, whenever feasible and available. If unavailable, a non-invasive seed mix approved by a Forest botanist would be used.

27. Wetlands would be crossed for timber management only after all reasonable alternative routes have been considered, and after design criteria are implemented. These criteria may include: (1) crossing at the narrowest point of the wetland and as close to right angles as feasible; (2) maintaining cross drainage at all times, during, and after the project is completed; (3) place easily removable materials such as mats, small pipe bundles, corduroy (log stringers), or other similar cross drainage structures to minimize damage due to fill removal (Blinn, et al, 1998, pp. 21-29); and (4) where there are no road improvements to permit dry season operation, specify "winter only" use with specific timber sale contract provisions regarding when use is and is not appropriate.

28. For access into Compartment 174 Stand 7, the following is required: ***crossing should be held to the minimum feasible width; cut stumps flush with the ground; no grubbing of stumps; sufficient frost depth or adequate snow cover must be present before freezing of the roadbed can start; road must be frozen before use. If needed, incorporate measures to allow for water flow during spring thaw.***

29. Small wetlands or drainways identified during sale preparation activities ***may*** be excluded from the sale area by paint (larger areas) or no trees would be marked in these areas to protect sensitive soils. The method used would be at the discretion of sale preparation personnel. This measure is to protect soil quality/productivity and water quality.

30. Trees selected for habitat improvement along lake shorelines would be live, green trees (except for live cull or cavity trees, which would not be cut), with a minimum diameter at breast height of 12". No hemlock, white pine, or cedar would be used for this purpose. ***Felling trees would be performed in a manner to remain visually subordinate to the lakeshore to be consistent with the Partial Retention visual quality objective. Trees would be selected far enough from the shoreline to obscure evidence of cut stumps from the lakes. No trees would be cut within 100 feet of developed public use areas.*** Also, if trees are cut***, outside of the 100 foot limit,*** near developed sites, they would be felled in a manner to not interfere with boat launching, swimming, or other recreational uses of the shoreline. If trees are hauled in for placement, this activity would be conducted during frozen ground conditions where resource protection is necessary (i.e., heritage sites or other purposes).

31. Road decommissioning activities could incorporate blocking the entrance with berms and stabilization through slash placement. Slash, debris, and stumps to be of a size and placed so it is a solid mat across the road and not easily removed from the size, for a depth of 2-3 feet and length of 150 feet. Road closure may also include the use of a tree spade for transplanting trees and shrubs from nearby or adjacent sites into the road surface area. Roads that are currently overgrown with vegetation and are impassable would not need the entrance blocked.

32. Temporary roads used during a timber sale would be blocked with slash to a depth of 2 to 3 feet, for a distance of 150 feet following harvest completion in such a manner as to inhibit all forms of motorized use. The remaining roadbed would be returned to the original landscape contour and all crossing structures would be removed. Drainage structures across streams and wetlands and all fills associated with drainages and wetlands would be removed to permit normal maximum water flows which would include some floodplain area and normal wetland function.

Soils

33. Design features are applicable to ground disturbing activities such as commercial timber harvest and non-commercial vegetation treatments.

34. Where applicable to a timber sale contract, the following design features are in addition to timber sale contract provisions for protection of soil and water quality. Procedures include “Sustainable Soil and Water Quality Practices on Forest Land” issued by the Michigan Department of Natural Resources and the Michigan Department of Environmental Quality (MDNR, MDEQ, 2009).

35. Generally, sale area layout activities would exclude all mapped slopes greater than 35%.

36. Equipment operations would be prohibited on all slopes greater than 35% except in special situations where equipment operations on a very short slope would greatly facilitate timber sale operations and/or reduce impacts to soils in other areas. These skid trails would be

approved by sale administration personnel or in consultation with a soil scientist on a case by case basis.

37. Equipment operations on slopes between 18% - 35% will be evaluated on a case by case basis by Forest Service personnel. If necessary, sale area layout may exclude these slopes within cutting units or areas would not be marked to avoid soil resource damage.

38. When possible, locate landings on well to moderately-well drained uplands. Landings would be placed in areas where slope would direct sediment away from water bodies.

39. Freshly disturbed soil areas, such as landings and unsurfaced road beds may be left to revegetate naturally, if non-native invasive plant colonization potential and erosion potential are low. If erosion potential is high, or the area is prone to colonization by non-native species, seed the area to encourage revegetation. Seed would be a local native seed mix, or a non-native, non-persistent seed mix appropriate to the site, and approved by a Forest botanist.

40. For timber harvest, the season of operation would follow Soil Scientist guidelines for the ELTP being operated on (see project file). Typically these guidelines would be used to develop operating restrictions, rather than referring to normal operating seasons. Operation outside of these periods must be agreed to under the provisions of the contract.

41. For soil productivity within stands that are on sandy upland sites within the project area (ELTPs 306B, 322B, 322C, 322D, 324D, 324E), there would not be any whole tree harvesting or pile burning. Slash would remain at the stump or be evenly redistributed across the stand.

42. Do not harvest fine woody debris on shallow soils where bedrock is within 20 inches of the surface.

43. Logging debris (chips, bark, etc.) at landings would be reduced to a thickness that would not severely restrict vegetative growth on the area as determined by the sale administration personnel.

44. Five Ecological Classification System study plot center points are located in the project area in:

- Compartment 135 Stand 8 (nothing proposed as of 8/2011);
- Compartment 169 Stand 10 (proposed thinning w/aspen regeneration);
- Compartment 174 Stand 8 (nothing proposed as of 8/2011);
- Compartment 204 Stand 17 (proposed group select w/planting); and
- Compartment 203 Stand 43 (proposed clearcut w/reserve).

Protection measures include prohibiting all harvest and machinery travel within a 50 foot radius of the ***study*** plot center ***points*** and protecting the three bearing trees.

45. Conifer bundles for fish habitat improvement would be moved to the shoreline in winter under snow covered and frozen conditions to prevent damaging soils within riparian areas.

Fisheries

46. Do not regenerate aspen within 400 feet of either the bankfull width or water inundated area of the Little Presque Isle River ***in order to protect coldwater fish habitat (see Aquatic Analysis in project file)***. Exception would be made for Comp. 169, stand 22, adjacent to the Little Presque Isle Flowage.

47. All permanent road crossing structures proposed for installation (new or replacement) on fish bearing streams within the project area shall be designed for aquatic organism passage.

Botany and NNIP

48. Do not remove stumps, roots, or other below-ground biomass. No removal of litter unless needed for site objectives.

49. Avoid re-entry for harvesting biomass. Re-entry is not allowed if tree regeneration has begun, or the site has been planted.

50. Survey stream locations prior to large wood placement. If RFSS or state-listed aquatic plants are located, revise, relocate, or cancel the woody material placement activities as needed to protect the populations.

51. On and around large boulders and rock outcrops, eight feet (approximately) in diameter and larger, implement a 75 foot no-cut zone during sale layout or marking.

52. For areas of exposed (forest floor) rock larger than approximately 20 feet in diameter, implement a 75-foot (one tree length) no-cut zone from the perimeter during sale layout or marking.

53. Provide protective, no-activity buffers around documented special plant populations in the project area as shown in Table 13.

54. For any ground-disturbing activities, such as road maintenance, reconstruction and construction, paper birch regeneration scarification or prescribed fire, and boat access work, take reasonable measures to make equipment and vehicles free of soil, seeds, vegetative matter , and other debris that could contain or hold non-native invasive plant seeds, prior to entry into the project area.

Table 13. Proposed Buffers for Special Plant Populations

Taxon	Common Name	Comp(s)	Buffer Information	Purpose
Juglans cinerea	Butternut	214	½ circle back from road edge, enclosing sapling, up to 200 foot radius as determined when flagging buffer in field (about 1.5 acres)	Prevent direct damage to tree; prevent change in light regime and/or microclimate.

Taxon	Common Name	Comp(s)	Buffer Information	Purpose
Cypripedium reginae, C. parviflorum var. pubescens	Showy and yellow ladyslippers (co-located)	202	Oval enclosing 3 plant location points, more or less in a line, formed by encircling the 2 farthest-apart plants with ~200 foot radius circles, and connecting the circles' outer edges to make an oval, as determined when flagging buffer in field (about 7 acres)	Prevent direct damage to orchids; prevent change in light regime and/or microclimate. Much of this buffer area may be excluded from treatment already due to riparian matrix.
Dryopteris expansa	Spreading woodfern	170, 172	Circle around each population point, up to 200 foot radius as determined when flagging buffer in field (about 2.9 acres in two locations)	Prevent direct damage to ferns; prevent change in light regime and/or microclimate.
Tiarella cordifolia	***Heart-leaved foamflower***	***175/18***	***Circle around population point, up to 250-foot radius as determined when flagging buffer in field but circle truncated by FR 8300 (about 3.4 acres)***	***Prevent direct damage to plants; prevent change in light regime and/or microclimate***

55. To protect the butternut sapling, place carsonite poles or other markers to protect from brush disposal and road work the stretch of road and ditch adjacent to the sapling, for about 50 feet in each direction.

56. ***Retain native vegetation in and around project activity to the maximum extent possible consistent with project objectives.***

57. ***Minimize soil disturbance to the extent practical, consistent with project objectives.***

58. ***If fill or mulch is needed, use materials that are free of weed seeds (Ottawa high, new invader, and medium priority species).***

Transportation

59. Selection of a road closure device and closure procedures would follow the road access management guidelines for local roads on the Ottawa (see project file). Berms or gates may be used for road closures.

60. Wherever practical, a closure device should be placed at the entrance of a network of roads rather than closing each individual segment.

61. Where possible, log landings would be located a minimum of 100 feet from collector roads, unless specified otherwise to meet visual quality objectives.

62. There is currently a weight-limited (51 Ton) bridge on Forest Road 8100 at the South Branch of the Presque Isle River that is not planned for reconstruction in the short-term. This bridge exceeds 100 feet in length and would not allow for weight distribution of a fully loaded log truck (which can legally go up to 80 Tons in Michigan). Allow log trucks to cross the bridge empty from Highway M-64 to shorten trucking distances since any timber sales planned west of this bridge will have to haul loaded to the north on Forest Roads 8100, 8170, or 8300. Also, allow purchasers to haul partial loads (not to exceed weight limit) over this bridge from the west upon request and coordination for safety of haul with other timber sales in progress and other Forest users.

Recreation

63. Ensure that closed OHV roads and trails that had been previously open in the Wild and Scenic River corridor, are signed for a period of at least two years to inform the public.

64. Where practical, closure devices should have a setback to allow for dispersed camping sites or parking areas. The closure device (berm or gate) should be placed so as to allow room for dispersed camping sites and/or parking off of collector roads. Additional site hardening may occur if needed at these sites.

65. Ensure that adequate barriers are in place to deter full-sized vehicles from launching boats and canoes at designated carry-down access sites to help prevent erosion and the spread of NNIPs.

66. When harvest operations are restricted to winter harvest only due to soil or other resource conditions, Snowmobile Trail #11S may need to be temporarily rerouted or closed if a suitable temporary route cannot be developed. The TMA will notify District Recreation personnel of the proposed harvest schedule at least 1 winter season prior to planned timber harvest activities for any timber sale that will require winter hauling on roads used by Snowmobile #11S. Recreation personnel will work with the local snowmobile club to identify possible temporary routes. If it is not possible to identify a temporary reroute, Snowmobile Trail #11S will be closed those years when winter hauling is necessary along the trail's current route.

67. In order to prevent damage to the trail system between Plymouth, Taps, and Mishike Lakes, only allow skidding across trails at designated locations, perpendicular to the trail (see project file). No skidding or forwarding would be permitted on the length of the trail unless agreed to by the Forest Service.

68. Dispersed river and lake access sites are to remain natural and undeveloped with no site improvements, unless necessary to prevent stream or bank erosion, such as gravel hardening.

69. Large woody material placement shall not be placed within 150 feet upstream or downstream of a designated access site to improve user safety.

Visuals

A list of affected stands for each design criterion, as applicable, is located in the project file.

70. Wild and Scenic River Corridors - To meet the Visual Quality Objective (VQO) of Partial Retention in the South and West Braches of the Presque Isle WSR corridor, management activities would be designed to maintain and protect the existing river scenery as viewed first from the river, and second from the river corridor (Forest Plan, p. G-2; WSR CRMP, p. 3-17).

71. Forest Roads in the WSR Corridor ***(MA 8.1)***

    a. In areas identified with a VQO Partial Retention, special road and landing designs would be followed. When possible, this includes locating landings at least 400 feet from the road. When this is not possible, access roads to the landings should be angled or curved to screen the landing from view unless safety concerns dictate otherwise.

    b. ***Remove slash for 50*** feet along the forested edge of M-64 and Forest Roads (8100, 8105, 8120, 812***0***E, ***8131-D,*** 8135, 8143, 8146, 8153, ***8300 and 8338***). ***Beyond this, for an additional 25 foot zone,*** lop and scatter slash to lie within ***36*** inches of the ground. This is to reduce the risk of impacts to aesthetics.

    c. In Partial Retention areas, where the treatments include aspen inclusions, visible openings would be no more than ½-acre in size.

    d. Roadside openings would not be wider than 200' in length. Distance between the openings would be at least 1,000' where feasible. In those areas between openings, a strip of vegetation at least 20' deep starting at the forested edge of the road, would be maintained.

    e. All clearcuts greater than five acres in size, adjacent to the above roads, would be shaped and/or "feathered". Openings would not be in geometric shapes, but would blend with the landscape. The intent is to reduce the appearance of sharp lines.

    f. Any log landings would be screened from viewing from M-64 using an angled road or vegetative screen. When possible, landings should be located at least 400 feet from the road.

72. ***Partial Retention Areas Adjacent to State Highway M-64***

    a. Visible openings (as viewed from M-64) would be no more than five acres in size in all aspen clearcut areas. Openings would not be in geometric shapes, but would blend with the landscape. The intent is to reduce the appearance of sharp lines. Due to the narrow depth of some stands, necessary inclusions can be placed along the edge of the road, with roadside openings of up to 400' in length between inclusions. Remove slash from a 50 foot zone measured from the forested edge of the roadway; lop and scatter slash to within 36 inches for an additional 25 foot zone.

    b. Where the treatment is thinning harvest, remove slash from a 50 foot zone measured from the forested edge of the roadway; lop and scatter slash to within 36 inches for an additional 25 foot zone due to the narrow depth of stand 14 of compartment 202.

73. ***All applicable stands visible from Forest Roads 8100, 8120, 8190 and 8300 in MA 2.1:***

a. In Partial Retention areas where treatment is clearcut, visible openings should be no more than ½-acre in size. Remove slash from a 50-foot zone measured from the forested edge of the roadway, and lop slash to within 36 inches of the ground and scatter for an additional 25-foot zone.

b. In Partial Retention areas where treatment is not clearcut harvest, remove slash from a 50-foot zone measured from the forested edge of the roadway, and lop slash to within 36 inches of the ground and scatter for an additional 25-foot zone.

c. In Modification areas, where the treatment is clearcut harvest, openings up to 25 acres in size may be visible from the roadway. Due to the narrow depth of some stands, necessary inclusions can be placed along the edge of the road, with roadside openings of up to 400' in length between inclusions. Remove slash from a 25 foot zone measured from the forested edge of the roadway; lop and scatter slash to within 36 inches for an additional 25 foot zone.

d. In Modification areas, where treatment is not clearcut harvest, remove slash from a 25 foot zone measured from the forested edge of the roadway; lop and scatter slash to within 36 inches of the ground for an additional 25 foot zone.

74. ***In those stands that are adjacent to Heart Lake Road, a county-owned ROW, no special residue management is needed, as the ROW provides a sufficient visual buffer.***

Cultural Resources

75. All archaeological and historic sites within the area of potential effect would be identified on the ground.

76. Site location information would be provided to the project leader to disseminate on a need to know basis. The project leader will ensure that the information is used only by authorized staff.

77. All archaeological and historic sites would have a buffer area marked with flagging. The flagged areas would be marked pre-sale. Sites located near the project but outside a payment unit ***may*** need to be identified somehow so that they are not used as landings, parking, etc.

78. If any new ***cultural*** resources are discovered then activity must cease ***around the site*** and a Forest Service Archaeologist notified.

79. Any changes in the project (location, methods, etc.) must be reported to a Forest Service Archaeologist so that the affects to cultural resources can be re-determined.

Monitoring

The application of all Forest Plan standards would be monitored. In addition, the following project specific activities would also be monitored.

- A Silviculturist would ensure that harvest prescriptions are in compliance with direction from this EA. We will also monitor stocking in stands harvested by individual selection or clearcut prescriptions to determine regeneration success (e.g., first and third year surveys). ***This monitoring would evaluate stands to ensure they are adequately stocked with***

desirable tree species in order to meet the requirements of the National Forest Management Act [Section 219.27 (c) (3)].

- As specified in the monitoring section (Appendix ***1***), areas proposed for clearcut harvest would be monitored to evaluate whether the adequate regeneration is occurring. If not, we would assist regeneration through hand felling of sub-merchantable sized stems and scarifying the ground by hand scalping.
- Periodic monitoring of roads that would be closed to OHV use that are presently open to ensure unauthorized use is not occurring. Additional monitoring would also take place on roads that would be decommissioned or closed to public use, to prevent illegal use.
- Wild rice would be monitored after planting for several years to ensure it gets established. Re-seeding may occur periodically, as needed.
- If Alternative 2 is selected, structural diversity enhancement stands in river corridors would be checked after commercial logging operations have ceased to ensure that there is the desired amount of downed logs and snags remaining in the treated acres. If desired quantities are not present post-harvest, wildlife staff would fell and girdle trees as needed.
- Additionally, a certified Silviculturist would determine if long-lived conifers had been adequately released by the commercial logging. If not, remaining trees that are crowding the desired trees would be felled or girdled, as needed.

Riparian Design Criteria

The purpose of these design criteria are to protect aquatic resources from sedimentation that adversely impacts water quality, aquatic species and their habitats; protect soil resources within the riparian areas where the risks of soil displacement can result in aquatic sedimentation and where soils may be more vulnerable to compaction and rutting; protect riparian plant communities; protect wildlife species and their habitats and provide for connected corridors across the landscape.

Table 14. Riparian Design Criteria

Ecological Landtype Phase (ELTP)/ Aquatic Feature	Riparian Area Wetlands; areas nearest to the edges of stream/lake/pond/wetland.	Riparian Corridor Area from edge of riparian area to outer edge of corridor.
Prescriptions for management within Riparian Areas and Riparian Corridors These Design Criteria, unless otherwise noted, are specific to timber harvest and harvest associated activities. *Continued below:*	No commercial timber harvest or harvest associated equipment operation within riparian area. Avoid crossing streams where possible. When crossing is unavoidable, designated stream crossings would be coordinated with MI-DNR for permanently flowing (perennial) streams. For seasonally flowing (intermittent) streams, designated crossings would utilize mitigation measures such as pipe bundles, or any other appropriate method. Remove bundles or crossing structures upon completion, when crossing is no longer necessary.	Maintain 75% crown canopy closure within all perennial stream and forest seasonal pond riparian corridors (excluding the riparian area) – except where noted. Maintain 50% crown canopy closure within all intermittent stream, lake and pond, and wetland (sedge-meadow floodplain, forest linear, bogs, swamps, and other poorly drained units) riparian corridors (excluding the riparian area) – except where noted. ***NOTE*** *– Aspen clearcut management would occur closer to some aquatic features in some locations in order to promote beaver for WSR outstandingly remarkable value. These sites were carefully chosen, incorporating slope and soil properties into the recommendation. Riparian corridors in stands scheduled for clear cut management would be partly clearcut (not thinned as previously described in the 50/75% language) by creating an undulating boundary within the riparian corridor. The clearcut line would not enter the riparian area. This would allow riparian function to be met, allow for diversity, avoid a straight edged abrupt buffer, and provide for the uncertainties of knowing exactly where the "line in the sand" is located for riparian area and riparian function vs. strictly upland.*

ELTP/ Aquatic Feature	Riparian Area Wetlands; areas nearest to the edges of stream/lake/pond/wetland.	Riparian Corridor Area from edge of riparian area to outer edge of corridor.
Continued from above: The following vegetative management activities are permitted within riparian areas and corridors since they do not include harvest equipment removing trees from the riparian areas: • Selective tree releases for wildlife habitat enhancement • tree felling for riparian area and/or fish habitat enhancement • wildlife opening maintenance *although a ½ tree length no-cutting buffer would be maintained adjacent to aquatic feature edge and chainsaws and/or brush-saws may be utilized*	Avoid crossing wetlands where possible. When crossing is unavoidable, designated crossings would utilize mitigation measures such as corduroy (log stringers) or crossing under frozen conditions, or any other appropriate method. Remove corduroy or crossing structures upon completion, when crossing is no longer necessary. Seasonal ponds would not become disposal area for slash No equipment would be permitted within seasonal ponds Do not harvest trees within ½ tree length from the edge of seasonal ponds. ***NOTE*** *– Aspen clearcut management would occur closer to some aquatic features in some locations in order to promote beaver for WSR outstandingly remarkable value. These sites were carefully chosen, incorporating slope and soil properties into the recommendation.*	Discourage removal of limbs and other logging debris from riparian corridors where possible. Retain existing cull trees and snags in riparian corridors where possible. Avoid new road/landing construction within riparian corridors where possible. Designated skid trails would direct activities outside of riparian corridors as quickly as possible, would minimize the number of skid trails within riparian corridors, and would avoid steep slopes (D) and greater) within the riparian corridors where possible. Landings located near seasonal ponds would be located, designed, and managed such that they do not contribute sediment to the ponds. No landings would be permitted within 150 feet of seasonal ponds Retain existing super-canopy trees within lake and pond riparian corridors where possible.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[4]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Large Permanently Flowing Streams – South and West Branch Presque Isle Rivers Large permanently flowing streams have wider riparian areas and riparian corridors than other aquatic features in the project area to better facilitate their use as wildlife corridors. The width for this project area was determined by the project wildlife biologist.	Compartment (Comp) 173/Stands 20, 21 and 44; Comp 174/Stand 13; Comp 175/Stands 11, 21, 25, 29, 39, 43 and 44; Comp 76/Stand 25; Comp 177/Stands 19, 34 and 55; Comp 202/Stands 1, 2, 16, 17, 18, and 19; and Comp 203/Stands 1 and 4	Riparian area includes 1 tree lengths from the edge of the floodplain ELTP or from bankfull stage when floodplain ELTPs are not present. When the river is nested within a wide wetland that is greater than 3 tree lengths from bankfull stage wide, go to the edge of the wetland plus ½ tree lengths. When adjacent slopes are D,E,F or LTA 20 go to the top of the slope plus 1 tree length	Riparian corridor includes 3 tree lengths from the edge of the floodplain ELTP OR 3 tree lengths from bankfull stage when floodplain ELTPs are not present. When the river is nested within a wide wetland that is greater than 3tree lengths from bankfull stage in width, go to the edge of the wetland and add 1 tree lengths. When adjacent slopes are D, E, F or LTA 20 go to the top of the slope plus 2 tree lengths OR 3 tree lengths from bankfull stage, whichever is greater.

[4] The list of potentially affected compartments/stands is not all inclusive. Direction for riparian areas and corridors would be applied to all stands with proposed management activities and would be applied to aquatic features as they occur on the landscape (i.e. streams evident on the landscape that don't exist on maps or wetlands that appear to lie adjacent to a stand but ground-truthing during implementation indicates the riparian corridor does not enter the stand, etc.) A tree length is considered approximately 75 feet.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Large Permanently Flowing Streams – South and West Branch Presque Isle Rivers Large permanently flowing streams have wider riparian areas and riparian corridors than other aquatic features in the project area to better facilitate their use as wildlife corridors. The width for this project area was determined by the project wildlife biologist	Comp 205/Stands 3, 11, 31, 32, 34 and 42; Comp 206/Stand 1 and 44; Comp 207/Stand 27; Comp 210/Stands 6 and 41; Comp 214/Stands 4, 11 and 34; Comp 215/Stand 22; and Comp 217/Stands 11 and 32	Same as above	Same as above

[5] The list of potentially affected compartments/stands is not all inclusive. Direction for riparian areas and corridors would be applied to all stands with proposed management activities and would be applied to aquatic features as they occur on the landscape (i.e. streams evident on the landscape that don't exist on maps or wetlands that appear to lie adjacent to a stand but ground-truthing during implementation indicates the riparian corridor does not enter the stand, etc.) A tree length is considered approximately 75 feet.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Special Management for WSR outstandingly remarkable value associated with beaver to encourage beaver utilization (Forest Plan, pp. 3-81.2, 3-81.7). Stands with these prescriptions were closely reviewed by the project soil scientist, hydrologist, wildlife biologist and Silviculturist to determine the closest management possible for the WSR while avoiding sedimentation that would adversely impact the water quality river value.	Comp 174/Stand 12	Riparian area for ELTP 302B associated with the stand includes 1 tree lengths from the edge of the floodplain 303 ELTP or from bankfull stage when floodplain ELTPs are not present. When ELTP 303 floodplain is wider than 1 tree length and the adjacent slopes are 302B, the riparian area is the floodplain ELTP only. Riparian area for ELTP 323D slopes associated with the stand includes to the top of the slope plus ½ a tree length after the top of the slope.	Riparian corridor for ELTP 302B includes 100 feet from the edge of the floodplain ELTP or from bankfull stage when floodplain ELTPs aren't present. Riparian corridor for ELTP 323D includes the top of the slope plus 2 tree lengths. Clearcut boundary would be undulated within the riparian corridor between the riparian area and the outer edge of the riparian corridor.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Continued from above Special Management for WSR outstandingly remarkable value associated with beaver to encourage beaver utilization (Forest Plan, pp. 3-81.2, 3-81.7). Stands with these prescriptions were closely reviewed by the project soil scientist, hydrologist, wildlife biologist and Silviculturist to determine the closest management possible for the WSR while avoiding sedimentation that would adversely impact the water quality river value.	Comp 174/Stand 12	The beaver riparian prescription does not apply for the following ELTPs since they are not situated in the landscape such that they are associated with the WSR outstandingly remarkable value: Wetland ELTP 315 or 307 – the riparian area includes the wetland ELTP plus 1 tree length. When adjacent slopes are D, go to the top of the slope plus 1 tree length. Forested Linear Wetland ELTP 314A – the riparian area includes the wetland ELTP plus ½ tree length.	The beaver riparian corridor prescription does not apply for the following ELTPs since they are not situated in the landscape such that they are associated with the WSR outstandingly remarkable value: 2 tree lengths from the edge of ELTP 315 or 307 wetlands. OR Entire315 or 307 ELTP plus area to the top of adjacent slope plus 1 tree length, whichever is greater. When ELTP 315 or 307 are adjacent to D slopes go to the top of the slope plus 2 tree lengths. ELTP 314A is edge of forested linear wetland ELTP plus 1 tree length. Clearcut boundary would be undulated within the riparian corridor between the riparian area and the outer edge of the riparian corridor.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Special Management for WSR outstandingly remarkable value associated with beaver to encourage beaver utilization (Forest Plan, pp. 3-81.2, 3-81.7). Stands with these prescriptions were closely reviewed by the project soil scientist, hydrologist, wildlife biologist and Silviculturist to determine the closest management possible for the WSR while avoiding sedimentation that would adversely impact the water quality river value.	Comp 203/Stand 2	Riparian area includes ½ tree length buffer along ELTP 303. Remaining riparian area includes a 1 tree length buffer from the river's bankfull stage	Riparian corridor includes 100 feet from the edge of the floodplain ELTP 303 or river's bankfull stage. Clearcut boundary would be undulated within the riparian corridor between the riparian area and the outer edge of the riparian corridor.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Special Management for WSR outstandingly remarkable value associated with beaver to encourage beaver utilization (Forest Plan, pp. 3-81.2, 3-81.7). Stands with these prescriptions were closely reviewed by the project soil scientist, hydrologist, wildlife biologist and Silviculturist to determine the closest management possible for the WSR while avoiding sedimentation that would adversely impact the water quality river value.	Comp 204/Stand 38	Riparian area adjacent to ELTP 303 includes the floodplain ELTP plus 1tree length. Riparian area adjacent to wetland ELTP 307 riparian area includes the wetland ELTP plus 1 tree length	Riparian corridor includes the floodplain ELTP 303 plus 2 tree length. Riparian corridor adjacent to wetland ELTP 307 2 tree lengths from the edge of the ELTP defined wetland. Clearcut boundary would be undulated within the riparian corridor between the riparian area and the outer edge of the riparian corridor.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Special Management for WSR Forest Plan desired condition for diverse, dynamic and complex native vegetation types and large long-lived riparian trees. Forest health is maintained to minimize threats to outstandingly remarkable values dependent upon forest vegetation (Forest Plan, pp. 3-74 to 3-75, 3-81.6). These stands are dense red pine with balsam fir-spruce understory. The intent is to improve the vigor of the red pine to avoid beetle infestation and improve vigor of fir and spruce by opening up the crown.	Comp 205/Stand 12, 39 Red Pine Stands Adjacent to one another	Riparian area includes ½ tree length from the edge of the very steep drop to the river.	Riparian corridor includes 3 tree lengths from the edge of the floodplain ELTP 303 Silvicultural prescription throughout the corridor would be done in such a way as to move the stand away from a plantation appearance to a more natural appearance for WSR desired condition.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Special Management for WSR outstandingly remarkable value associated with beaver to encourage beaver utilization (Forest Plan, pp. 3-81.2, 3-81.7). Stands with these prescriptions were closely reviewed by the project soil scientist, hydrologist, wildlife biologist and Silviculturist to determine the closest management possible for the WSR while avoiding sedimentation that would adversely impact the water quality river value.	Comp 205/Stand 41	Riparian area adjacent to ELTP 303 includes the floodplain ELTP plus 1tree length. Riparian area adjacent to wetland ELTP 315 riparian area includes the wetland ELTP plus 1 tree length	Riparian corridor includes the floodplain ELTP 303 plus 2 tree length. Riparian corridor adjacent to wetland ELTP 315 includes 2 tree lengths from the edge of the ELTP defined wetland. Clearcut boundary would be undulated within the riparian corridor between the riparian area and the outer edge of the riparian corridor.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Special Management for WSR outstandingly remarkable value associated with beaver to encourage beaver utilization (Forest Plan, pp. 3-81.2, 3-81.7). Stands with these prescriptions were closely reviewed by the project soil scientist, hydrologist, wildlife biologist and Silviculturist to determine the closest management possible for the WSR while avoiding sedimentation that would adversely impact the water quality river value.	Comp 207/Stand 31	Riparian area along ELTP C slopes includes the floodplain ELTP 309 plus 1 tree length. The beaver riparian prescription does not apply for the following ELTPs since they are not situated in the landscape such that they are associated with the WSR outstandingly remarkable value: Wetland ELTP 309 not associated with the WSR and wetland ELTP 41, the riparian area includes the wetland ELTP plus 1 tree length.	Riparian corridor includes the floodplain ELTP plus 2 tree lengths. Clearcut boundary would be undulated within the riparian corridor between the riparian area and the outer edge of the riparian corridor. The beaver riparian corridor prescription does not apply for the following ELTPs since they are not situated in the landscape such that they are associated with the WSR outstandingly remarkable value: Wetland ELTP 309 not associated with the WSR and wetland ELTP 41, the riparian corridor includes 2 tree lengths from the edge of the ELTP defined wetland. OR Entire ELTP plus area to top of adjacent slope plus 1 tree length, whichever is greater.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Special Management for WSR outstandingly remarkable value associated with beaver to encourage beaver utilization (Forest Plan, pp. 3-81.2, 3-81.7). Stands with these prescriptions were closely reviewed by the project soil scientist, hydrologist, wildlife biologist and Silviculturist to determine the closest management possible for the WSR while avoiding sedimentation that would adversely impact the water quality river value.	Comp 210/Stand 43	Riparian area includes ½ tree length buffer along ELTP 303. Remaining riparian area includes a 1 tree length buffer from the river's bankfull stage The beaver riparian prescription does not apply for the following ELTPs since they are not situated in the landscape such that they are associated with the WSR outstandingly remarkable value: Wetland ELTP 309 and 315 not associated with the WSR, the riparian area includes the wetland ELTP plus 1 tree length.	Riparian corridor includes 100 feet from the edge of the floodplain ELTP 303. Remaining riparian corridor includes 3 tree lengths from the edge of the bankfull stage. Clearcut boundary would be undulated within the riparian corridor between the riparian area and the outer edge of the riparian corridor. The beaver riparian corridor prescription does not apply for the following ELTPs since they are not situated in the landscape such that they are associated with the WSR outstandingly remarkable value: Wetland ELTP 309 not associated with the WSR and wetland ELTP 41, the riparian corridor includes 2 tree lengths from the edge of the ELTP defined wetland. OR Entire ELTP plus area to top of adjacent slope plus 1 tree length, whichever is greater.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Special Management for WSR outstandingly remarkable value associated with beaver to encourage beaver utilization (Forest Plan, pp. 3-81.2, 3-81.7). Stands with these prescriptions were closely reviewed by the project soil scientist, hydrologist, wildlife biologist and Silviculturist to determine the closest management possible for the WSR while avoiding sedimentation that would adversely impact the water quality river value.	Comp 214/Stand 18	Riparian area for ELTP 323D slopes includes the area from the river's bankfull stage or the edge of floodplain ELTP 303 or 327 to the top of the slope plus ½ a tree length beyond the top of the slope. Remaining riparian area includes a ½ tree length from floodplain ELTP 303 or wetland ELTP 327 associated with the river OR if no floodplain ELTP 303 or wetland ELTP 327, 1 tree length buffer from the river's bankfull stage The beaver riparian prescription does not apply for the following ELTPs since they are not situated in the landscape such that they are associated with the WSR outstandingly remarkable value: Wetland ELTP 327 not associated with the WSR, the riparian area includes the wetland ELTP plus 1 tree length.	Riparian corridor includes riparian area plus an additional 100 feet Clearcut boundary would be undulated within the riparian corridor between the riparian area and the outer edge of the riparian corridor. The beaver riparian corridor prescription does not apply for the following ELTPs since they are not situated in the landscape such that they are associated with the WSR outstandingly remarkable value: Wetland ELTP 327 not associated with the WSR, the riparian corridor includes 2 tree lengths from the edge of the ELTP defined wetland. OR Entire ELTP plus area to top of adjacent slope plus 1 tree length, whichever is greater. When adjacent slopes are D, E, F or LTA 20, go to the top of the slope plus 2 tree lengths or 3 tree lengths from bankfull stage, whichever is greater.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Special Management for WSR outstandingly remarkable value associated with beaver to encourage beaver utilization (Forest Plan, pp. 3-81.2, 3-81.7). Stands with these prescriptions were closely reviewed by the project soil scientist, hydrologist, wildlife biologist and Silviculturist to determine the closest management possible for the WSR while avoiding sedimentation that would adversely impact the water quality river value.	Comp 215/Stand 13	Riparian area includes a 1 tree length buffer from the river's bankfull stage or 1 tree length buffer from the edge of ELTP 303 floodplain or ELTP 327 wetland where present The beaver riparian prescription does not apply for the following ELTPs since they are not situated in the landscape such that they are associated with the WSR outstandingly remarkable value: Floodplain/wetland ELTP s 303, 307, 309, and 327 not associated with the WSR, the riparian area includes the wetland ELTP plus 1 tree length.	Riparian corridor includes riparian area plus an additional 100 feet Clearcut boundary would be undulated within the riparian corridor between the riparian area and the outer edge of the riparian corridor. The beaver riparian corridor prescription does not apply for the following ELTPs since they are not situated in the landscape such that they are associated with the WSR outstandingly remarkable value: Floodplain/wetland ELTP s 303, 307,309, and 327 not associated with the WSR, the riparian corridor includes 2 tree lengths from the edge of the ELTP defined wetland. OR Entire ELTP plus area to top of adjacent slope plus 1 tree length, whichever is greater.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Special Management for Coldwater Trout Habitat With Aspen Clearcut Management Nearby - to discourage beaver activity (400 feet buffer design criteria)	The following stands are found within 400 feet of the perennial fish bearing portion of the Little Presque Isle River: Comp 136/Stand 17; Comp 167/Stands 3, 4, 45, 53, 54 and 56; Comp 168/Stand 4; and Comp 169/Stands 6, 18, 21 and 22	Along the perennial fish bearing portion of the Little Presque Isle River, the riparian area for clearcut management for aspen regeneration: Includes a 400 feet buffer from the river's bankfull stage, or water inundated area (i.e. beaver ponds), or ELTP wetland floodplain, whichever is greatest. *Note*: All harvest prescriptions that do not include management for aspen would follow standard riparian design criteria	Riparian corridor includes only the riparian area since it is a large no harvest area. Clear cut aspen management may occur immediately adjacent to the 400 foot riparian area. *Note*: All harvest prescriptions that do not include management for aspen would follow standard riparian corridor design criteria
Small Permanently Flowing Streams (A slopes) ELTPs 327,301A, 312A,314A	Comp 166/Stand 37; Comp 176/Stand 5; Comp 206/Stand 32; Comp 206/Stand 44; Comp 210/Stand 43; Comp 214/Stand 4	Riparian area includes1 tree length from the bankfull stage. OR when stream is nested within a floodplain, riparian area includes the ELTP defined floodplain plus 1 tree length.	2 tree lengths back from the bankfull stage OR when stream is nested within a floodplain/wetland, go 2 tree lengths from the edge of the wetland, whichever is greater.
Small Permanently Flowing Streams (B and C slopes)	Comp 134/Stands 8 and 9; Comp 135/Stand 20; Comp 136/Stand 17; Comp 167/Stands 3, 53 and 54; Comp 168/Stands 4 and 12; Comp 169/Stands 6, 10, 18, 21 and 22; Comp 170/Stand 1;	Riparian area includes1 tree length from bankfull stage. OR when stream is nested within swamp, bog, or floodplain, riparian area includes the ELTP defined swamp, bog, or floodplain plus 1 tree length.	When permanently flowing (perennial) stream is nested within swamp, bog, or floodplain ELTP, go to the top of the adjacent slope plus 1 tree length OR 2 tree lengths back from the edge of the swamp, bog, or floodplain, whichever is greater. Otherwise, area to the top of the adjacent slope plus 1 tree length.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Small Permanently Flowing Streams (B and C slopes)	Comp 172/Stands 8, 11, 15 and 29; Comp 173/Stands 29 and 44; Comp 206/Stands 7,26,28 and 44; Comp 207/Stands 14, 21, 26, 27 and 34; and Comp 213/Stands 12 and 31	Riparian area includes1 tree length from bankfull stage. OR when stream is nested within swamp, bog, or floodplain, riparian area includes the ELTP defined swamp, bog, or floodplain plus 1 tree length.	When permanently flowing (perennial) stream is nested within swamp, bog, or floodplain ELTP, go to the top of the adjacent slope plus 1 tree length OR 2 tree lengths back from the edge of the swamp, bog, or floodplain, whichever is greater. Otherwise, area to the top of the adjacent slope plus 1 tree length.
Small Permanently Flowing Streams (D slopes)	Comp 210/Stands 8, 11 and 14 and Comp 213/Stands 12 and 31	Riparian area includes area to the top of the adjacent slope plus 1 tree length.	Area to the top of the adjacent slope plus 2 tree lengths.
Seasonally (Intermittent) Flowing Streams (A slopes) ELTPs 311A, 314A and 326A	Comp 170/Stand 24; Comp 175/Stand 8; Comp 215/Stand 13; and Comp 217/Stand 32	Riparian area includes ½ tree length from stream's bankfull stage.	2 tree lengths back from the bankfull stage

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Seasonally (Intermittent) Flowing Streams (B and C slopes)	Comp 134/Stands 6, 7, 8, 12; Comp 135/Stand 23; Comp 136/Stand 17,18; Comp 165/Stands 2, 7, 8, 9, 10 and 13; Comp 166/Stands 13, 16, 32, 36, 37 and 41; Comp 167/Stands 1, 19, 21, 25, 43 and 51; Comp 168/Stand 12; Comp 169/Stands 10, 11, 16 and 23; Comp 172/Stands 11 and 33; Comp 173/Stands 4, 34 and 35; Comp 174/Stands 15 and 17; Comp 177/Stands 2, 7 and 28; Comp 207/Stands 9, 11, 12 and 34; Comp 214/Stands 4, 11 and 34; and Comp 215/Stands10 and 22	Riparian area includes ½ tree length from stream's bankfull stage.	Area to top of adjacent slope plus 1 tree length.
Seasonally (Intermittent) Flowing Streams (D slopes and greater)	Comp 174/Stands 12 and 18; Comp 177/Stand 2; Comp 206/Stand 13; Comp 207/Stand 9; and Comp 214/Stand 4	Riparian area includes Area to the top of the adjacent slope plus ½ tree lengths.	Area to top of adjacent slope plus 1 tree length.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Lakes and Ponds A, B, and C slopes)	Comp 134/Stand 1; Comp 166/Stands 6, 13, 23 and 36; Comp 167/Stand 42; Comp 173/Stand 35; Comp 174/Stands 12, 15, 18 and 24; Comp 176/Stand 25; Comp 177/Stands 19 and 55; Comp 202/Stands 1, 2 and 17; Comp 203/Stands 13, 14, 15, 18, 19, 22, 24, 30 and 40; Comp 204/Stands 22 and 26; Comp 205/Stands 5, 11, 20, 27, 31 and 44; Comp 206/Stands 13, 22 and 53; Comp 213/Stands 2, 4, 8, 16, 24, 23, 31 and 45; Comp 214/Stands 3, 4, 34 and 35	Riparian area includes 1 tree lengths from edge of lake/pond. OR If the lake is nested within a swamp, bog, or floodplain, then the riparian area would be 1 tree length from the edge of the ELTP defined swamp, bog, or floodplain.	Riparian corridor includes 2 tree lengths from the edge of the lake/pond. OR if the lake/pond is nested within a swamp, bog, or floodplain, riparian corridor would be 2 tree lengths from the edge of the ELTP defined swamp, bog, or floodplain. OR area to the top of the slope plus 1 tree length, whichever is greater.
Lakes and Ponds D slopes and greater	Comp 174/Stands 12, 18, 24; Comp 203/Stands 14, 18, 24, 29, 30; Comp 204/Stand 16; Comp 205/Stands 20 and 27; Comp 206/Stands 13 and 16; Comp 213/Stands 2, 4 and 31; Comp 214/Stands 6 and 32	Riparian area includes area to the top of the adjacent slope plus ½ tree lengths.	Area to top of adjacent slope plus 1 tree length.
Forest Seasonal Ponds (1/2 acre in size or larger)	Where found	Riparian area includes the seasonal pond and the tree rooting zone.	The whole seasonal pond plus 1 tree length.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Wetlands (includes sedge-meadow floodplain, swamps, bogs, and other poorly or very poorly drained mineral soils) (ELTPs 7, 40, 41, 42, 300, 303, 307, 308, 309, 312A, 313, 315, 316, 327, 415, 417, 418, 421,422 423A, 424, 436)	Comp 134/Stands 1, 6, 7, 8, 9, 12, 13, 14, 17, 20 and 21; Comp 135/Stands 2, 7, 12, 16, 18, 20, 23 and 30; Comp 136/Stands 2, 5, 17, 19 and 25; Comp 164/Stands 1, 3 and 4; Comp 165/Stands 8, 9, 17, 27 and 38; Comp 166/Stands 1, 4, 6, 9, 13, 16, 17, 20, 22, 25, 29, 32, 36, 37, 40, 42 and 43; Comp 167/Stands 1, 2, 3, 4, 8, 16, 19, 21, 23, 24, 25, 26, 27, 30, 31, 41, 42, 43, 44, 45, 46, 53, 54 and 56; Comp 168/Stands 6, 8, 9, 12, 16; Comp 169/Stands 6, 10, 11, 16, 18, 21, 22, 24 and 26; Comp 170/Stands 1, 3, 4, 7, 9, 11, 17, 24, 28 and 29; Comp 171/Stands 2, 6, 11, 12, 13, 14 and 15; Comp 174/Stands 1, 3, 7, 9, 12, 13, 14, 15, 17, 18, 24;	Riparian area includes the wetland ELTP plus 1 tree length. When adjacent slopes are D,E,F or LTA 20 go to the top of the slope plus 1 tree length	2 tree lengths from the edge of the ELTP defined wetland. OR Entire ELTP plus area to top of adjacent slope plus 1 tree length, whichever is greater. When adjacent slopes are D, E, F or LTA 20 go to the top of the slope plus 2 tree lengths.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Wetlands (includes sedge-meadow floodplain, swamps, bogs, and other poorly or very poorly drained mineral soils) (ELTPs 7, 40, 41, 42, 300, 303, 307, 308, 309, 312A, 313, 315, 316, 327, 415, 417, 418, 421,422 423A, 424, 436)	Comp 175/Stands 7, 8, 9, 11, 12, 13, 20, 21, 24, 30, 39, 40 and 42; Comp 176/Stands 2, 5, 10, 11, 13, 15, 21, 22 and 25; Comp 177/Stands 1, 2, 11, 12, 15, 19, 20, 21, 24, 25, 28, 34, 37, 39, 41, 46, 48, 50, 55 and 56; Comp 201/Stands 30, 52 and 55; Comp 202/Stands 1, 2, 3, 5, 6, 11, 13, 16, 17, 18 and 20; Comp 203/Stands 1, 2, 4, 5, 12, 15, 18, 19, 22, 24, 27, 29, 30, 32, 34, 38, 40 and 43; Comp 204/Stands 2, 3, 5, 7, 8, 15, 16, 17, 21, 22, 26, 35, 37, 38, 42; Comp 205/Stands 1, 5, 7, 11, 20, 26, 27, 30, 31, 32, 34, 39, 41, 44, 50; Comp 206/Stands 1, 2, 7, 11, 13, 16, 18, 19, 20, 26, 27, 28, 32, 44, 53 and 55; Comp 207/Stands 9, 11, 12, 14, 17, 19, 21, 24, 26, 27, 31, 34 and 36; Comp 210/Stands 1, 6, 8, 10, 11, 14, 20, 23, 25, 29, 31, 33, 36, 40, 41 and 43;	Riparian area includes the wetland ELTP plus 1 tree length. When adjacent slopes are D,E,F or LTA 20 go to the top of the slope plus 1 tree length	2 tree lengths from the edge of the ELTP defined wetland. OR Entire ELTP plus area to top of adjacent slope plus 1 tree length, whichever is greater. When adjacent slopes are D, E, F or LTA 20 go to the top of the slope plus 2 tree lengths.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Wetlands (Continued)	Comp 213/Stands 2, 4, 8, 12, 13, 15, 16, 21, 23, 24, 27, 28, 29, 31, 33, 37, 38, 40, 45, 47, 48, 52, 53, 54; Comp 214/Stands 3, 4, 11, 12, 13, 18, 19, 21, 28, 32 and 34; Comp 215/Stands 1,10, 13 and 22; Comp 217/Stands 11, 21, 32 and 33	Riparian area includes the wetland ELTP plus 1 tree length. When adjacent slopes are D,E,F or LTA 20 go to the top of the slope plus 1 tree length	2 tree lengths from the edge of the ELTP defined wetland. OR Entire ELTP plus area to top of adjacent slope plus 1 tree length, whichever is greater. When adjacent slopes are D, E, F or LTA 20 go to the top of the slope plus 2 tree lengths.
Wetland – Forested Linear Wetland (ELTPs 36, 304, 419, 425)	Comp 134/Stands 1, 6, 8, 7, 9, 12, 13, 14, 17, 20, 21 and 22; Comp 135/Stands 2, 3, 7, 9, 12, 16, 18, 20, 23 and 30; Comp 136/Stands 2, 4, 5, 17, 18 and 19, Comp 164/Stands 1, 4 and 9; Comp 165/Stands 1, 2, 3, 7, 9, 10, 11, 13, 15, 24, 26, 27, 37, 40 and 41; Comp 166/Stands 6, 13, 16, 17, 20, 23, 25, 32, 36, 37, 39, 41 and 43; Comp 167/Stands 2, 8, 12, 15, 27, 40, 44, 48 and 51; Comp 168/ Stands 4, 7, 8, 9, 12 and 16;	Riparian area includes the wetland ELTP plus ½ tree length.	Edge of forested linear wetland plus 1 tree length.

ELTP/ Aquatic Feature	Compartments/ Stands Potentially Affected[5]	Riparian Area (Wetlands; areas nearest to the edges of stream/lake/pond/wetland. Riparian area was previously known on the Forest as "nearbank zone")	Riparian Corridor (Management direction from edge of riparian area to outer edge of corridor. Corridor was previously known on the Forest as "riparian influence area" or "outer zone")
Wetland – Forested Linear Wetland (ELTPs 36, 304, 419, 425)	Comp 169/Stands 6, 10, 11, 16, 18 and 26; Comp 170/Stands 1, 3, 11, 24 and 31; Comp 172/Stands 5, 6, 10, 11, 16, 17, 19, 22, 32, 33 and 40; Comp 173/Stands 4, 7, 34, 35, 44, 50 and 54; Comp 175/Stand 8; Comp 177/ Stands 4, 6, 7, 8, 9, 24 and 46; Comp 207/Stands 1, 2, 11, 12, 27 and 47; Comp 213/Stands 27, 28, 29 and 48; Comp 214/Stand 25 and Comp 215/Stand 10	Riparian area includes the wetland ELTP plus ½ tree length.	Edge of forested linear wetland plus 1 tree length.

Appendix 2. Literature Cited

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Appendix 3. Maps