Aspen Management Project
ANALYSIS FRAMEWORK

To facilitate the interdisciplinary analysis of this project, the interdisciplinary team and Responsible Official developed a framework for their analysis. This analysis framework document establishes the issues and alternatives, the analysis assumptions, identifies the measurement indicators (see Table 13) and analysis boundaries (Tables 14 and 18), and defines the depth and detail of analysis necessary to aid the responsible official in making his findings. The interdisciplinary team developed the analysis framework based on comments received in scoping, their professional knowledge of potential environmental impacts, and other legal requirements. The analysis framework provides an outline for the analysis that will be documented in an EA.

1 Preliminary Alternatives to be Considered in Detail

1.1 No Action Alternative

The no action alternative provides a baseline for estimating the effects of other alternatives. No actions would be taken. Aspen stands would continue to age and convert to other forest types.

1.2 Proposed Action

As described in the May 5, 2014 Scoping Letter, the Ottawa National Forest proposes to regenerate an average of approximately 1,700 acres of aspen per year for the next 10-20 years (up to 30,000 acres) to provide for wildlife habitat and maintain the aspen forest type. In order to access the aspen stands a facilitate harvest; the proposal also includes maintenance and reconstruction of system roads, construction of temporary roads, and minor/limited construction of system roads. The IDT has estimated that approximately 8-12 miles of temporary road would be constructed per year and less than 2 miles of new system road construction or relocation of system roads (as limited by the Design Criteria). Finally, the proposal also includes design criteria aimed to help achieve management objectives and reduce impacts from the proposed project.

2 Preliminary Alternatives Considered but Eliminated from Detail Study

- Managing aspen in other management areas (MAs), maintaining more acres of aspen at a faster pace, considering non-commercial options (including fire)
- Not clearcutting at all, select cutting, or not clearcutting in the specific stands mentioned in the comments.

- Consideration of management options adjacent to private land

3 Purpose and Need and Project Outcomes

The interdisciplinary team will provide analysis for the EA to evaluate the extent to which the proposed action and alternatives meet the purpose and need for the project, including achievement of relevant Forest Plan Goals and Objectives (as identified in the Project Initiation Letter and Scoping Letter). The following measures will be used to demonstrate the intended outcomes of the project and achievement of the stated purpose and need.

Table 3.1: Indicator Measures and Data Needs to evaluate Project Outcomes relative to Project Purpose and Need.

Purpose and Need Element	Measurement indicator	Variable(s)/Data needed to address Indicator Measure(s)
There is a need to maintain aspen on the landscape, ensuring a variety of age classes	Acres and proportion of aspen in the various age classes forest-wide, over time.	Use FSVeg data and proposed treatment layers.
There is a need to maintain 12,000 acres of aspen in the 0-9 year age class (Forest Plan page 2-8)	Acres of aspen in the 0-9 year age class forest-wide, over time.	Use FSVeg data and proposed treatment layers.
There is a need to maintain early successional habitat for wildlife species that benefit from it.	The extent to which the project maintains habitat for wildlife species that benefit from early successional habitat.	Use FS Veg data to monitor acres of aspen.
There is a need to support wildlife-based recreation.	The extent to which the project maintains habitat for wildlife species that provide wildlife-based recreation.	Use FS Veg data to monitor acres of aspen.

4 Environmental Consequences - Scope of Analysis

Analysis prepared by the interdisciplinary team will focus on issues generated from public scoping and findings required by law, regulation, or policy. For an EA, the scope of the analysis should be focused to provide sufficient evidence for the Responsible Official to make a determination about the significance of the environmental effects of the proposed action or alternatives (See 40 CRF 1508.9 and FSH 1909.15 Chapter 41.23). The Forest Service uses the criteria in the definition for 'significantly' (1909.15 zero code, section 05) for determining whether the action will have a significant effect on the human environment, including the intensity criteria below. Depth or detail of analysis should be commensurate to the magnitude of the effect.

4.1 Issues

Issues highlight effects or unintended consequences of the Proposed Action and should be phrased as cause-effect statements (Refer to FSH 1909.15 Chapters 12.4 and 12.42). In review of the comments received, the Interdisciplinary Team evaluated the comments for presence of cause and effect relationships. The Responsible Official has determined that there are no issues with the Proposed Action. Concerns have been identified, but they can be addressed through implementation of Forest Plan direction, project design criteria, or simple clarification of the project's intent (see Comment Matrix, Tracking Concerns). Therefore, the Responsible Official has determined that these areas of concern also do not present an issue requiring detailed analysis.

4.2 Intensity Criteria

As there are no issues, the analysis presented in the EA/FONSI will focus on the following intensity criteria:

1. *Consideration of both beneficial and adverse impacts.*
2. *Consideration of the effects on public health and safety.*
3. *Consideration of the unique characteristics of the geographic area.*
4. *The degree to which the effects on the quality of human environment are likely to be highly controversial.*
5. *Consideration of the degree to which effects on the human environment are highly uncertain or involve unique or unknown risks.*
6. *The degree to which this action may establish a precedent for future actions with significant effects or represents a decision in principle about future considerations.*
7. *Consideration of the action in relation to other actions with individually insignificant but cumulative significant effects.*
8. *The degree to which the action may affect listed or eligible historic places.*
9. *The degree to which the action may affect an endangered species or their habitat.*
10. *Whether the proposed action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.*
    - Clean Water Act (33 USC 1251) and State Water Quality Standards
    - Endangered Species Act (16 USC 1531 ET. SEQ.)
    - Migratory Bird Treaty Act (16 USC 703) and Executive Order 13186, Bald and Golden Eagle Protection Act
    - Multiple Use Sustained Yield Act (16 USC 528)
    - National Historic Preservation Act (NHPA 36 CFR 800)
    - National Forest Management Act (NFMA, 16 USC 1600 ET SEQ., MIS, RFSS)
    - Executive Order 11990-Protection of Wetlands
    - Executive Order 11988-Floodplain Management

- Executive Order 12898 - Environmental Justice
- Executive Order 13112 (1999) – Invasive Species
- USDA Forest Service National Strategic Framework for Invasive Species Management (2013)
- USDA Forest Service Non-native Invasive Species Best Management Practices, Guidance for the U.S. Forest Service Eastern Region (Draft 2012)
- Travel Management Rule (36 CFR 212)
- Wild and Scenic Rivers Act (16 USC 1271-1287)

4.3 Analysis Assumptions for All Resources

a) The analysis is based upon several laws, regulations and policies for which a determination for project compliance is required for the Responsible Official's decision-making process. All contract clauses, best management practices, operating restrictions and design criteria would be implemented.

b) The analysis is tiered to the Forest Plan; and its Final Environmental Impact Statement and Record of Decision. All Forest Plan standard and guidelines would be followed. No site-specific amendments are proposed. Many of the larger-scale effects of implementing the Forest Plan have been addressed there-in, which allows this project's analysis to be site-specific. The documentation supporting these analyses in the Forest Plan's administrative record and associated Monitoring and Evaluation Reports are also incorporated by reference.

c) The purpose and need developed for this project would maintain or progress conditions towards the desired conditions of applicable Forestwide goals and objectives.

d) The analysis incorporates by reference other applicable Ottawa National Forest projects, and their project files, as follows: (i) Comprehensive River Management Plan (CRMP); (ii) the programmatic Non-Native Invasive Plant Control Project; and (iii) the project records of the site-specific projects discussed in Section 5 of this framework.

e) The analysis is based on the best available scientific information and is described with sufficient level of detail needed for the Responsible Official to make a determination about the significance of the effects of the proposed alternatives.

f) Analysis is based on the ID Team's review of existing conditions through remote sensing techniques and use of existing databases. Remote sensing efforts include aerial photograph interpretation, use of geographic information system data (GIS) and other Forest databases as applicable to infer the existing cover type mapping. In addition, the existing transportation system and ecological landtype phase (ELTP) mapping assisted the ID Team to identify stands available for inclusion in the Proposed Action. This analysis is also based on pertinent agency manual and handbook direction; professional expertise; monitoring findings as outlined in Monitoring and Evaluation Reports; the outcomes of similar actions (implemented in similar areas and under similar conditions), as a result of experience with past project

implementation and the application of project design criteria and best management practices; and relevant available scientific literature (see project file references).

g) Bounds of analysis for direct, indirect and cumulative effects are defined based on direction outlined in FSH 1909.15, Chapter 10, Sections 15.2 and 15.3, which outlines how to define spatial and temporal bounds. In order to have cumulative effects, the effects of project implementation must overlap in space *and* time when added to past, present, and reasonably foreseeable actions (FSH 1909.15, Chapter 10, Sections 15.1, 15.2 and 15.2b - Exhibit 01)

h) The analysis is based on the best available information and is described with sufficient level of detail needed for the responsible official to make a determination about the significance of the effects of the proposed action. All calculations used in the analysis are estimated and subject to change based upon these implementation needs.

i) The interdisciplinary team is anticipating that at the landscape scale, project area conditions would vary and require different types of design criteria. This project would be planned with the best available information, however all site-specific information would not be available before a decision would be made. Therefore, closer to the time of implementation, the site-specific stand conditions present and proposed road/access locations would be evaluated through field inventory and survey. At that time the appropriate design criteria would be identified and implemented to ensure that resources such as wildlife, water, rare plants, and soil would be protected under the variety of expected stand conditions or road locations and potential negative effects would be minimized. For example, some design criteria would require field surveys prior to implementation to ensure that rare or sensitive resources found are avoided. In addition, interdisciplinary review of proposed road/access locations would be needed prior to implementation. Because many of these resources may change over time and the project is being planned over longer than a decade, completion of surveys and inventories closer to the time of implementation can better ensure the most accurate information is used to implement the project and protect these resources.

j) Due to the long term nature of implementation of the project, the interdisciplinary team would develop an implementation guide, which would include monitoring, to ensure treatments are consistent with the final decision and that treatments are resulting in the intended effects

k) The Project Area includes potential treatment stands as well as the roads maintained, reconstructed or constructed to access these stands.

   i. Approximately 25,000 acres of potential treatment stands have been identified on project maps (see EA/FONSI maps) based on existing available information from databases and some limited field review to verify feasibility of some stands. Note that this number was reduced from the maps provided in scoping as field review indicated about 6000 acres of stands did not meet the criteria or were not feasible for implementation.
   ii. In some limited situations, the stands currently mapped as potential treatment stands may not be the exact stands treated through this project, as field verification may indicate that either 1) the mapped stands do not meet some basic requirements to meet the purpose and need or 2) that some stands *not* currently mapped do meet our criteria. Field verification would occur prior to

implementation and stands would be selected for treatment based on the current age and condition of the stands (see k(iii) below). In addition, all needed surveys would be conducted prior to implementation and all appropriate design criteria implemented for all treated stands (see (i) above). All treatments areas would be reviewed for consistency with the EA and must meet the following requirements:

- All stands are located within MAs 1.1a, 3.1a, 4.1a, 4.2a, which are managed to emphasize early successional forest types.
- Mature and over-mature aspen stands over 40 years of age (per Forest Plan rotation ages pg. 2-16).
- Proportion of aspen remaining in the stand is sufficient to ensure regeneration success.
- Where access is economically feasible (i.e. there is existing access or the cost of temporary construction or reconstruction is matched with sufficient aspen volume)
- Exclude aspen stands located in other MAs (including Wild and Scenic River corridors and Special Interest Areas); areas harvested within the last 30 years; areas recently evaluated in other vegetation management projects; areas with >75% unsuitable soil types; and classified old growth stands.

iii. It has been estimated that 13% of the potential treatments stands over a quarter mile from a system road, therefore, temporary access is required for implementation. Another 30% of stands are within a quarter mile of an existing road and may require a temporary depending on the ability to skid for up to ¼ mile in the area. The interdisciplinary team estimated that approximately 8-12 miles of temporary road construction would be required for each year of treatment. In addition, up to 2 miles per year of system road construction may occur, within the limitations of the Design Criteria (to relocate existing roads or to create permanent access through hardwood). Roads and temporary roads would be constructed in the best site possible, avoiding sensitive soils and the need for stream crossings whenever possible. Estimate average width of new system road construction to be 24 feet. All temporary or system construction would meet the specifications in timber sale contracts. See project file document for detailed methodology for this estimate.

- Outyear planning for determining site-specific locations of temporary and permanent roads, where needed, would be conducted in an interdisciplinary manner - including at a minimum, an engineer, soil scientist, and hydrologist - to ensure they are cost-effective and minimize sedimentation and other impacts.

l) Prioritization of stands for treatment would be based on a range of conditions identified by the interdisciplinary team such as: stand age and condition, providing a diversity of age conditions across the landscape, accessibility of the stands, potential resource effects, economic viability of the harvest, and relation to other stands proposed for treatment.

m) The proposed action is developed to fully achieve the purpose and need for this project. However, it must be recognized that funding levels and other management restrictions may not allow for full achievement of these goals. The extent of implementation would depend on a variety of factors and would influence the degree to which the proposal can achieve the desired conditions.

4.4 Vegetation

4.4.1 Analysis Assumptions:

a) The project (combined with other active projects) would regenerate/clear-cut an average of approximately 1,700 acres of aspen per year as directed in the forest plan on suitable acres.

b) The 2011 Monitoring and Evaluation Report section 13, as well as the Forest Plan FEIS (pg. 3-58 to 3-61), provides detailed background information to support the purpose and need.

   i. *Acres of aspen:* During development of the Forest Plan in 2006, it was estimated that 109,000 acres of aspen on lands suitable for timber management would be maintained on the Forest over time to support achievement of the goals, objectives, and desired conditions (Final Environmental Impact Statement (FEIS) p. 3-59). It was determined that maintaining 109,000 acres would require an emphasis on regeneration over the next 10-20 years and an estimated average annual regeneration harvest of 20% of suitable acres per decade (or assuming a 65 year mean rotation age, 1,700 acres per year) to create new early successional stands. Currently, aspen harvest averages about 690 acres per year (2011Monitoring and Evaluation Report).

   ii. *Age classes of aspen:* According to the best available information, the percentage of aspen currently meets the Forest Plan desired condition in these MAs. However, it does not meet the desired mix of age classes. Aspen has been decreasing for the past several decades on the Ottawa (and in the region in general) as it matures and transitions to mixed hardwood and conifer. While the Forest Plan objectives seek to provide a full range of age classes for aspen, current conditions are skewed towards over-mature age classes. Over 42% of aspen on the Ottawa is over 60 years of age and is at risk of converting or is beginning to convert to other species (2011 Monitoring and Evaluation Report).

c) The most appropriate silvicultural treatment for aspen management is clearcutting (Forest Plan Appendix C-8 and C-9).

d) Without treatment, over-mature aspen are susceptible to disease and/or conversion to other forest types within a single generation (FEIS 3-43 to 3-45).

e) Approximately 425 acres/year of potential treatment stands would be spruce/fir/aspen type that would be converted only partially to young aspen.

4.4.2 Forest Plan Guidance:

a) The Forest Plan FEIS projected that 109,000 acres of aspen/paper birch could be maintained over the long-term, with an estimated average annual regeneration harvest of about 1,700 acres per year (assuming a 65 year rotation age).
b) Objective 16a, (pg 2-6); Emphasize regeneration harvests of mature and over mature aspen within the next 10 to 20 years to ensure the aspen type is maintained within the desired vegetation composition range for the management area
c) Objective 27a , (pg. 2-8): Maintain at least 12,000 acres of 0-9 year aspen/paper birch regeneration, for ruffed grouse habitat, well-distributed on lands suited for timber production.
d) Guideline (pg. 2-29): From suited acres, maintain approximately 90,000 acres of aspen for foraging habitat [for lynx], and 25% of this acreage in the 5- to 20-year age class.

4.4.3 Findings Required by Law or Policy:

Law/Regulation/Policy	Required Finding
National Forest Management Act	1. Prescribed treatments for all stands proposed for harvest are designed to conserve soil and water resources and not allow significant or permanent impairment of the productivity of the land (16 USC 1604 (g)(3)(C)). Protection is provided for streams and stream banks from detrimental changes in water temperatures, blockages of water courses, and deposits of sediments (16 USC 1604 (g)(3)(D)(iii)). 2. All stands proposed for harvest with timber production objectives are on lands suitable for timber production (16 USC 1604 (k)). Clearcutting is the optimum method (16 USC 1604 (g)(3)(F)(i))for achieving the site specific objectives for aspen: 3. Created openings do not exceed the 40 acre maximum in the Forest Plan established in USC 1604 (g)(3)(F)(iv) except as provided for on a case-by-case basis after 60 days public review by the Regional Forester. These openings have been determined to be the optimum (practical, best, and most reasonable) method of treatment to obtain the objectives for these sites. 4. Where even-aged management is prescribed, it has been determined to be appropriate for that forest type as described in Agricultural Handbook #445 dated 12/83 and in compliance with management direction in the Forest Land Management Plan. 5. Treatments are consistent with multiple-use objectives established for the project area as they apply to the portions of 16 USC 1604 (g)(3)(E)(iii), (i), and 1604 (g)(3)(A) not

	specifically addressed above: (a) Resource protection, (b) Vegetative manipulation,(c) Silvicultural practices, (d) Even-aged management,(e) Riparian areas,(f) Soil and water, and (g) Diversity. 6. Stands selected for treatment have an appropriate suitability classification in the Forest Land Management Plan as defined in (16 USC 1604 (k)). 7. Stands selected for even-aged regeneration treatments have reached the culmination of mean annual increment of growth 16 USC 1604(m)(1).

4.4.4 Effects Analysis Boundaries

	Spatial boundary (extent)	***Temporal boundary (duration)***
Direct/Indirect	Changes to vegetation (direct effects) would occur within the treatment stands and access routes (project area). Achievement of the purpose and need would be measured at the Management Areas 1.1a, 3.1a, 4.1a, and 4.2a scale, as this is where achievement of aspen percentages and age class distribution is appropriately measured	From implementation (2017) to the final treatments occurring in 2037.
Cumulative	Changes to vegetation (direct effects) would occur within the treatment stands and access routes. Achievement of the purpose and need would be measured at the forestwide scale, as this is where achievement of Forest Plan goals.	From implementation (2017) to the final treatments occurring in 2037.

4.4.5 Additional Documentation

Project File Document	**Rationale/Need**

FSVegAspenYOO.xlsx	An excel spreadsheet showing age classes over time forestwide.
Silviculture Specialist Report	

4.5 Wildlife

4.5.1 Analysis Assumptions:

a) Loss of Aspen/Birch Habitat with No Action Alternative: Not treating aspen and paper birch vegetation communities means these habitat types will become less common in the project area in the succeeding forest stands as other vegetation types replace them.

b) Habitat Condition Change: Wildlife needs and conditions change over time, as do their responses to changes in the quantity and quality of habitats available to them at the project level. As a result, pre-project wildlife inventories are not considered absolute in either detection or locations where wildlife and habitats have been identified. For example, new raptor nests and/or territories are likely to become active or detected at a later date after the project decision has occurred; therefore raptor surveys will be conducted once stands are determined and 1-2 years prior to implementation. When new information becomes available, specific cases or issues will be addressed as needed on a case by case basis by Ottawa staff biologists throughout the life of the project.

c) Animal Mobility Reduces Effects: Animals are mobile and most capable of leaving an area during implementation of the proposed actions when greater activity and noises can occur. Avoidance of project activities would reduce the potential of direct impacts like injury or mortality. However, potentially slightly more direct impacts would be possible to smaller and less mobile terrestrial wildlife like eggs and/or nests, recent fledglings, reptiles, amphibians, small mammals and invertebrates. The duration of displacement would vary depending on the type and timing of harvest, and species tolerances to human related disturbances. Some animals may permanently relocate to other more suitable areas, while others would return after disturbances end and/or their specific habitat preferences were not negatively affected.

d) Management Indicator Species: The Wildlife Management Indicator Species report (see MIS report, project file) provides analysis to the ruffed grouse, a representative species for early-successional habitat which hosts a suite of other wildlife species dependent upon this habitat type. This report specifically uses more common non-TES wildlife that are monitored on the forest and are used as indicators to how management might impact certain habitat types. Therefore, we do expect other species dependent on either early successional forest types to also have similar effects.

4.5.2 Forest Plan Guidance:

a) Standards and Guidelines, (pg. 2-28): Bald eagle-timing and distance standards and guidelines

b) Guidelines for species of viability concern (pg. 2-27)

c) Forest Gray wolf-den and rendezvous site distance and timing restrictions, pg. 2-28 and 2-29).
d) Guidelines (pg. 2-29 to 2-30): Canada lynx-habitat improvements in suited acres to maintain aspen with 25% in 5-20 year age class and promote conifer in aspen treatments.
e) Guidelines (pg. 2-30): Raptors-protect red-shouldered hawk nesting territories (see design criteria for specifics)
f) Guidelines (pg.2-31): Ruffed grouse-when regenerating aspen, desired aspen sucker densities should be >10,000 stems per acre in order to result in a densely stocked aspen stand on most stands
g) Guidelines (pg. 2-32): Terrestrial ecosystem-as appropriate retain live cavity trees and snags, favoring larger diameter trees. If lacking, create by girdling or other methods.

4.5.3 Findings Required by Law or Policy

Law/Regulation/Policy	Required Finding
The Migratory Bird Treaty Act (16 USC 703) and Executive Order 13186, Bald and Golden Eagle Protection Act	Makes it illegal for the harassment, taking, possessing, or selling of native bird species.
Endangered Species Act (16 USC 1531 ET. SEQ)	Relative to species listed under the Endangered Species Act of 1973 (ESA), as amended, biological assessments (the Biological Assessment is included in our Biological Evaluation [BE]) must arrive at one of three possible determinations: 1) “no effect” (NE); 2) “not likely to adversely affect” (which includes beneficial effects) (NLAA); or 3) “likely to adversely affect” (LAA). If a “not likely to adversely affect” or “likely to adversely affect” determination is made relative to a listed species, informal consultation must be initiated with US Fish and Wildlife Service under section 7 of ESA.
National Forest Management Act (16 USC 1600 ET SEQ)	The National Forest Management Act and associated regulations direct the Forest Service to develop Land and Resource Management Plans that provide for diversity of plant and animal communities based on the suitability and capability of the land (USC 1604-g). In addition to our Forest Plan, the Forest Service Manual (FSM) has direction to help achieve the desired diversity of plant and animal communities. FSM 2670 has direction for the conservation of Regional Forester Sensitive Species (RFSS). FSM 2621 &2634 has direction for using Management Indicator Species (MIS) to represent issues, concerns, and opportunities in the management of National Forests. Considerations for NFMA would also include determinations for whether this project is consistent with NFM (16 USC 1604[i]) in terms of consistency with the Forest Plan; multiple-use goals of the Forest Plan (USC 1604 [e][f]); and whether the project provides “…. The desired effects on water quality and quantity, wildlife, regeneration of desired tree species, forage production, recreation uses, aesthetic values, and other resource yields”.

4.5.4 Effects Analysis Boundaries

	Spatial boundary (extent)	***Temporal boundary (duration)***
Direct/Indirect	The bounds of analysis for the BE and MIS will be the project area boundary since the effects of project implementation are not expected to occur outside the project area.	The time frame for the temporal bounds of analysis for direct effects is from 2017-2047. This time period is used because this is the amount of time expected to complete treatment of selected stands (20 years of implementation) plus the first ten years post treatment. The goal of the project is to keep aspen/birch forest types on the landscape and by being treated we make a reasonable assumption that it will perpetuate until environmental conditions change or it is allowed to convert to another forest type. For future temporal bounds, we reach forward about 10 years post treatment, based on the expected impact that early successional habitat has on many of benefitting wildlife species identified in the purpose and need.
Cumulative	The bounds of the analysis for the BE will be the project area boundary since the project area is large enough to encompass the home range of most wildlife species directly affected by the treatment. For some species (including gray wolf, bald eagle, and red-shouldered hawk, and all three bat species), the cumulative effects analysis may be analyzed at a larger scale because these species have a larger home range than sections of the treatment area or other circumstances (see BE in the Project File for Species specific effect boundaries).	Temporal bounds for the cumulative effects analyses for most terrestrial wildlife species, except when otherwise noted, include reaching forward 10 years from the year of treatment to between 2017-2047.

4.5.5 Additional Documentation

Project File Document	Rationale/Need
M & E Reports	Document past monitoring results and re-stocking surveys RE timber harvest activities / support analysis assumptions/ satisfy NFMA.
Representative sale documents	Support analysis assumptions
Maps	Supports design criteria (i.e., operation restrictions).

4.6 Recreation

4.6.1 Analysis Assumptions:

a) There is no change to designated public motor vehicle access through project implementation.
b) All Forest Plan standards and guidelines, and best management practices, will be followed to promote a variety of recreation activities that meet the Recreation Opportunity Spectrum (ROS) for Management Area designation within the project boundary (Forest Plan, 2-4).
c) The treatments occur at different times within the year across the project area, and the project occurs over a 10-20 year period. The scale of impacts to developed and dispersed recreation in each stand is minimal and short lived.
d) There are no treatment stands within or adjacent to developed recreation sites or campgrounds, so there would be no impacts on visitor use at developed sites. Design criteria are designed to mitigate any effects to developed and dispersed recreation within the project area
e) The entire Ottawa National Forest is open to dispersed recreational opportunities in a variety of settings.
f) Design criteria are designed to mitigate any effects to developed and dispersed recreation within the project area.

4.6.2 Forest Plan Guidance:

a) Goal 9, (p 2-4). Promote diverse and quality recreation experiences within the capability of sustainable ecosystems, and consistent with the niche of the Ottawa, while minimizing impacts to natural resources
b) Objective 26 (d), (p 2-8): Provide a variety of recreational wildlife-based and nature watching opportunities.
c) Guideline, (pg. 2-13): Forest management activities will generally reflect recreation objectives while minimizing conflicts with recreation uses.

d) Guideline, (pg. 2-14): Manage the North Country National Scenic Trail consistent with the "North Country Trail Comprehensive Plan for Management and Use"…
e) Recreation Opportunity Spectrum (Forest Plan, Appendix B) The Proposed Action promotes recreation activities that would meet the Recreation Opportunity Spectrum (ROS) for Management Area designation within the project boundary. Changes to access, infrastructure, and development may create perceived changes to the ROS. Compare proposed changes to the ROS criteria assigned to the project area (based on ROS layer - R9 OTT Recreation Opportunity Spectrum 1986).

4.6.3 Findings Required by Law or Policy

Law/Regulation/Policy	**Required Finding**
Forest Service Manual 2300	Sets forth National Forest System policy and direction for recreation management.

4.6.4 Effects Analysis Boundaries

	Spatial Analysis Boundaries (Extent)	***Temporal Analysis Boundaries (duration)***
Direct/Indirect	Effects from the proposed action on the recreation resource would not occur outside of the project area (treatment stands and access routes).	Most recreation impacts would be limited to the time during Project implementation (2017-2037). For the benefits to recreational experience from early successional habitat, effects may last 10 years after implementation.
Cumulative	Same as direct/indirect.	Same as direct/indirect.

4.6.5 Additional Documentation

Project File Document	**Rationale/Need**
Recreation Specialist Report	Document to disclose resource analysis and relevant literature cited.

4.7 Resource: Economic and Social Impacts

4.7.1 Analysis Assumptions:

a) Analysis of the economic environment is a complex subject that is generally analyzed at a broader scale than an individual, potential timber sale or vegetation management project. Therefore, an evaluation of the effects from the proposed actions on economics will be performed at the scale larger than the project area (FEIS, Volume I, pp. 3-208 to 3-224).

b) This financial breakdown is not designed to modal all economic factors used in an intensive and complex timber sale appraisal process. This analysis will take a less complex, but systematic approach to display the relative differences in financial efficiencies (i.e. relevant revenues and costs) between each alternative. The costs and benefits of project implementation will be considered by the Deciding Official during his/her decision; however, choosing an alternative is not based on the greatest dollar return (16 USC 1604 Sec. 6 (g)(3)(E)(iv)).

c) The program *Quick-Silver* will be used for this analysis, which is a statistical, modeling program that is used to perform the calculations needed to display the differences of costs and benefits per alternative. This program provides an economic analysis of long-term, on-the-ground resource management projects. It also provides a consistent benefit/cost framework to determine if one management action costs less or provides a more positive, net return. Factors that will be included in the analysis are the costs and revenues directly related to implementing the proposed actions. The project benefits are generated from the commercial sale of timber, and the incurred expenses include expenses from timber sale planning, preparation; sale administration, reforestation, resource specialist project support, and implementation of proposed transportation plans.

d) The 25% Fund Act returns 25% of all revenues to the State of Michigan for distribution among the counties whose borders overlap with the Ottawa National Forest.

e) Estimated timber volumes will be figured for each action alternative through the examination of each proposed treatment with its associated acreage. Using historical cruise information as a basis, volumes will be generated at a per acre basis. These volumes will be then lumped into forest product/contract groups for the ease of determining a monetary value.

f) The projected base prices for each forest product group that will be used in this analysis was built from the Region 9 District Automation Project (DAP) transaction evidence values (TEV) for the Ottawa National Forest that was queried on July 8th, 2014.

g) The Net Present Value is the difference between the discounted value of all outputs with a monetary rate assigned, and the total discounted costs required for managing a project area. This analysis does include a 4% discounted rate for inflation. The inclusion of a discounted rate gives a monetary value per acre of proposed treatment for continuous management of the stands.

h) This analysis will not take into account that each alternative produces non-monetary benefits. For instance, a portion of timber sale generated revenue is deposited into the project's Knutson-Vandenberg (K-V) fund. This fund may be used for habitat improvement projects that are deemed beneficial to the project area by the Interdisciplinary Team. The resulting benefits of K-V projects, such as the improvement of fisheries and wildlife habitat, cannot be quantified in this economic analysis because it is not possible to estimate objective monetary values for these benefits on a project basis. In addition, due to the uncertainty of which projects, qualifying for K-V Funds, which would be handled via stewardship contracts, the K-V costs have not been applied.

i) In addition to the forest products industry, outdoor recreation contributes to the economy in the Upper Peninsula. The Forest Plan FEIS (p 3-185 to 3-198) recognizes the National Visitor Use Monitoring (NVUM) survey as a measure of the amount of recreation occurring on the Ottawa. According to the NVUM, wildlife-based recreation (i.e. hunting, fishing, and viewing wildlife) is one of the top recreational

activities that visitor's participated in during their visit to the Ottawa. The purpose and need of the Aspen Management Project focuses on the enhancement and maintenance of wildlife-based recreation. The purposed activities would improve the user's recreational experience through enhancing wildlife habitat and the transportation system. However, economic reporting to quantify these benefits and the money generated in the locally economy from the recreation and tourism derived from this project is difficult to measure at this scale. Concerns of this nature are best measured at a larger scale and therefore this project is tired to the economic analysis in the Forest Plan's FEIS (p. 3-208 to 3-224).

j) All harvest treatments proposed in the Project would be part of the average annual allowable sale quantity set at 90.1 million board feet (Forest Plan, Appendix E, p. E-1).
k) Timber sold and harvested in the project area would be consistent with forest-wide management direction to provide a sustained yield of timber and strive to contribute to the social and economic vitality of local communities (Forest Plan, pp. 2-4 and 2-6).
l) To facilitate timber sale operations, changes to the transportation road system are necessary. However given the scope of the project, exact road construction/reconstruction/maintenance expenses are unknown at this time.
m) Cost of reforestation efforts are dependent on the amount of acres treated and the type of reforestation activities per alternative. The cost figures for these actions were obtained from FSH 2409.19, Renewable Resource uses for Knutson-Vandenburg (K-V) Fund Handbook. For this project, the reforestation costs were calculated using the number of acres assigned to receive post-harvest site preparation, fill-in plantings, first and third year stocking/survival surveys, and stand certifications
n) Administrative costs will include the project's planning effort (including field surveys), timber sale appraisal/contract preparation, marking/sale layout, and contract administration. Based off these projections, a cost per hundred cubic feet (CCF) will be estimated for each alternative.

4.7.2 Forest Plan Guidance:

a) Goal 7 (p. 2-4): Identify opportunities for the Ottawa to contribute to the social and economic vitality of local communities.
b) Goal 14, Objectives A and B (p. 2-6): Provide a sustained yield of timber while meeting integrated resource management objectives consistent with land capabilities.
    1) Provide a mix of timber sale sizes and species/products, which are consistent with the range of purchaser demands and are efficient to prepare and administer.
    2) Recover timber volume, in alignment with MA prescriptions, from trees killed or damaged by insects, disease, or other disturbance events.

4.7.3 Findings Required by Law or Policy

Law/Regulation/Policy	Required Finding
Multiple Use Sustained Yield Act	The management of renewable surface resources…so that they are utilized in the combination that will best meet the needs of the American people…[consider]…the relative values of the various resources…not necessarily the combination of uses that will give the greatest dollar return or the great

	unit output.
Environmental Justice (Executive Order 12898)	This Executive Order directs federal agencies to identify and address, as appropriate, any disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.
36 CFR 219	Plans shall provide for multiple use and sustained yield of goods and services from the National Forest System in a way that maximizes long term net public benefits in an environmentally sound manner
OMB Circular A-94	Benefit –cost analysis is recommended as the technique to use in a formal economic analysis of government programs or projects.

4.7.4 Effects Analysis Boundaries

	Spatial boundary (extent)	***Temporal boundary (duration)***
Direct/Indirect and Cumulative	According to the Ottawa National Forest Final Environmental Impact Statement (p. 3-209), the economic impact area for the Ottawa includes six Michigan counties in the western upper Peninsula (Gogebic, Ontonagon, Houghton, Baraga, Dickinson, and Iron) and five northern Wisconsin counties (Ashland, Iron, Florence, Forest, and Vilas). Due to their proximity to the Aspen Management Project area, these 11 counties will be economically effected the greatest by the Aspen Management Project.	The Aspen Management Project is expected to take 15-20 years to fully implement. The duration of the economic impact to the local communities is estimated to coincide with the implementation (2017-2037).

4.7.5 Additional Documentation

Project File Document	**Rationale/Need**
Quick-Silver Modeling Documents	The Quick-Silver program analyzes the benefits and costs for each alternative, and illustrates the economic impact of long-term, on the ground resource management actions.

Excel Documentation (Base Timber Volume Estimates, Volume-Price Breakdown, Administration Cost Breakdown, Transportation Cost Breakdown, Proposed Alternatives Breakdown, and DAP/TEV Summary)	These Excel spreadsheets obtain the foundational data that is needed to quantify the economic efficiency of each alternative

4.8 Botany: Management Indicator Plant

4.8.1 Analysis Assumptions:

a) On the Ottawa NF, cutleaf toothwort is an indicator species for effects of management in northern hardwoods. Since the proposed treatments (harvest) would occur in aspen cover types, there is no habitat present for the indicator plant. Therefore, there would be no effects to this plant or its habitat from the harvest. However, there is a chance some roads may be built to access the stands through northern hardwoods; these roads could impact cutleaf toothwort.
b) Cutleaf toothwort is representative of other spring ephemerals (Fox et al. dated 2012, published 2014).
c) Cutleaf toothwort is relatively scarce across the Ottawa National Forest perhaps because with its limited dispersal ability it is still recovering from the intensive logging and disturbance at the turn of the 20th century (Fox et al. dated 2012, published 2014).

4.8.2 Forest Plan Guidance:

a) Guidelines (p. 2-31): In northern hardwoods harvest units, provide for live tree retention for recruitment of forest woody debris and tip-up habitat. Create downed coarse woody debris, where lacking and appropriate to site conditions, to provide habitat and microclimate. [Note this would only apply to access roads for this project]

4.8.3 Findings Required by Law or Policy

Law/Regulation/Policy	Required Finding
FSM 2634.1 and 2621.3	Directs an evaluation of MIS by project alternative.

4.8.4 Effects Analysis Boundaries

	Spatial boundary (extent)	***Temporal boundary (duration)***
Direct/Indirect	The analysis area for direct and indirect effects is the hardwood stands on national forest system lands adjacent to proposed aspen treatment units, since this is where	The timeframe for direct effects analysis is while temp roads are being constructed, since this is when the effects could occur. The timeframe for indirect effects is the same, since

	cutleaf toothwort populations and habitat could occur, and where temporary access roads could affect populations or habitat.	once the roads are constructed, plants and habitat could be impacted, and no additional effects on toothwort would occur from use of the access roads (2017-2037).
Cumulative	The cumulative effects analysis area is the same as the direct effects analysis area. Loss of toothwort plants (if any) in a few access roads would not affect plant numbers elsewhere, since toothwort can only migrate short distances by vegetative reproduction or seed dispersal (such as 1 meter or less per year, Matlack 1994).	The timeframe for cumulative effects analysis is the present (with present condition a proxy resulting from all past effects), through the implementation of the project, about 10-20 years (2017-2037).

4.8.5 Additional Documentation

Project File Document	Rationale/Need
MIS Specialist report	Required by FSM.

4.9 Botany: Non-native Invasive Plants (NNIP)

4.9.1 Analysis Assumptions:

a) Treatment of priority non-native invasive plant infestations may occur as concurrent/future actions under the previously authorized Ottawa NF NNIP Control Project (2005).
b) Lower priority NNIP, such as spotted knapweed, reed canary grass, orange hawkweed, and exotic thistles, usually will not be treated and will continue to spread within the project area by wind, wildlife, water, vehicles and other means, as they are doing throughout the Upper Peninsula and northern Wisconsin.
c) 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 best available scientific information and professional judgment.
d) Treatment stand-specific surveys would occur prior to project implementation. These surveys would allow identification of non-native invasive plant infestations. Design criteria then could be applied to minimize or eliminate resource effects.
e) The design criteria developed to minimize the spread of non-native invasive plants take into account (1) Forest Plan direction; (2) USDA Forest Service Guide to Noxious Weed Prevention Practices (2001); (3) USDA Forest Service Non-native Invasive Species Best Management Practices, Guidance for the U.S. Forest Service Eastern Region (Draft 2012); and (4) Implementation of the 2005 NNIP Control Project.

4.9.2 Forest Plan Guidance:

a) Goal 8, Objectives A and C (p. 2-4): Through implementation of appropriate prevention, control and eradication measures for non-native invasive species, maintain intact ecosystems to prevent the displacement, decreased viability, or extirpation of native species.

1) Objective A. Use early detection and rapid response to identify new and limit the spread of non-native invasive species and infestations.
2) Objective C. Limit the spread of non-native invasive species, focusing on areas where these species have high potential for establishment and spread or for serious environmental effects.

b) Guidelines (p. 2-13): Utilize and promote a variety of appropriate prevention practices such as equipment cleaning, minimizing soil disturbance, and others to avoid starting new infestations.

c) Guidelines (p. 2-13): As much as practical, ensure all plant materials, mulches, erosion control devices, and gravel or fill materials used in construction, reconstruction, restoration, or revegetation, are free of priority non-native invasive species propagules (seeds, eggs, spores, fragments, etc.) and pathogens.

d) Guidelines (p. 2-13): Freshly disturbed soil areas, such as landings and unsurfaced road beds, may be left to revegetate naturally or be revegetated as follows:
1) Seed where non-native invasive species are expected to be primary colonizers.
2) If non-native colonization potential is low, avoid seeding to favor natural regeneration of native herbs and shrubs.
3) Any seeding should use a native seed mix or a non-native, non-persistent seed mix appropriate to the site.

4.9.3 Findings Required by Law or Policy

Law/Regulation/Policy	Required Finding
Executive Order 13112 (1999)	Directs Federal agencies to: (1) identify actions that may affect status of an invasive species; (2)(a) prevent introduction of such species; (b) detect and control such species; (c) monitor populations of such species; (d) provide for restoration of native species; (e) conduct research on invasive species and develop technologies to prevent introduction of such species;(f) promote public education of such species; and 3) not authorize, fund, or carry out actions likely to cause the introduction or spread of invasive species in the United States or elsewhere unless the benefits of the action clearly outweigh the harm and the agencies take steps to minimize the harm.
USDA Forest Service National Strategic Framework for Invasive Species Management (2013)	This framework prioritizes and guides the prevention, detection, and control of invasive species and identifies four program elements: prevention, detection, control and management and restoration and rehabilitation.
USDA Forest Service Non-native Invasive Species Best Management Practices, Guidance for the U.S. Forest	This guide provides best management practices to help managers make the most efficient use of limited resources to combat NNIS in forests.

Service Eastern Region (Draft 2012)	
FSM 2903	Directs that the FS "determine the risk of introducing, establishing, or spreading invasive species associated with any proposed action, as an integral component of project planning and analysis, and where necessary provide for alternatives or mitigation measures to reduce or eliminate that risk prior to project approval."

4.9.4 Effects Analysis Boundaries

	Spatial boundary (extent)	***Temporal boundary (duration)***
Direct/Indirect	The direct and indirect effects analysis area is the project area (that is, treatment stands and access roads), since this is where these effects would occur.	The temporal bounds for direct effects analysis are while project activities occur (2017-2037) since this is when direct impacts could occur. The temporal bounds for indirect effects analysis are during project activities or in subsequent years following introduction of propagules or ground disturbance, i.e. the life of the project plus 5 years (2017-2042).
Cumulative	The cumulative effects spatial analysis area is the project area plus a ½ mile buffer zone around treatment units, since this is the likely area into which new infestations, resulting from project activities, might spread.	Same as direct/indirect

4.9.5 Additional Documentation

Project File Document	**Rationale/Need**
NNIP Specialist report	Required by FSM 2900.

4.10 Botany: Regional Forester's Sensitive Plants (RFSS Plants)

4.10.1 Analysis Assumptions:

a) Stand-specific surveys would occur prior to project implementation. These surveys would allow identification of rare plant populations. RFSS plant populations would be protected through implementation of appropriate design criteria (specifically, Scoping Letter Design

Criteria numbered C2a and b), typically buffer zones that would result in all project activity avoiding previously documented and newly located sites.

b) Complete life history, taxon needs, and threat information is not available for all rare plants, especially for the nonvascular plants; therefore, analysis is based on available information and professional judgment.

4.10.2 Forest Plan Guidance:

a) Goal 30 (p. 2-9): Promote the conservation, restoration, and recovery of populations of species of viability concern.

b) See also relevant guidelines on pages 2-27 to 2-28, and 2-32 to 2-34.

4.10.3 Findings Required by Law or Policy

Law/Regulation/Policy	Required Finding
FSM 2670.32	Directs that a biological evaluation (BE) be prepared to determine potential effects of project activities on RFSS. Relative to Regional Forester's Sensitive Species, biological evaluations (BE) must arrive at one of four possible determinations: 1) "no impacts", NI (where no effect is expected); 2) "beneficial effects", BEN (where effects are expected to be beneficial); 3) "may impact individuals but is not likely to cause a trend to federal listing or loss of viability", MII (where effects are expected to be insignificant (unmeasurable), or discountable (extremely unlikely); or 4) "likely to result in a trend to federal listing or loss of viability", LRT (where effects are expected to be detrimental and substantial). This analysis is contained in the project BA/BE. This analysis provides the Responsible Official information necessary to make a determination for this project's consistency with the Forest Plan (NFMA 16 USC 1604[i]) as well as NFMA, Vegetative Treatments (16 USC 1604 [e][f]) in which projects should "be best suited to the multiple-use goals stated in the Forest Plan;" and "be selected to provide the desired effects on water quality and quantity, wildlife, regeneration of desired tree species, forage production, recreation uses, aesthetic values, and other resource yields."

4.10.4 Effects Analysis Boundaries

	Spatial boundary (extent)	***Temporal boundary (duration)***
Direct/Indirect	The direct and indirect effect analyses for RFSS plant species are conducted at the treatment stand and access road scale because this is where the direct and indirect effects would occur.	The direct effects temporal boundary is while project activities occur since this is when direct impacts could occur. The bounds for indirect effects extend another 5 years, after which project effects dissipate (2017-2042)
Cumulative	The analysis area for cumulative effects to Sensitive plants is the Ottawa National Forest since habitat for most of the plants occurs across the Forest and the plants are so sparse and widely scattered. Impacts to populations	Same as direct/indirect

	anywhere on the Forest could decrease species viability across the Forest, so this larger scale is needed for analysis.	

4.10.5 Additional Documentation

Project File Document	Rationale/Need
BA/BE for project	Required by FSM 2670; joint document with wildlife and fish resources.

4.11 Visuals

4.11.1 Analysis Assumptions:

a) Past projects have shown that due to the implementation of design criteria, extent of typical management practices and rapid re-growth of vegetation, negative effects to visual quality are limited and short-term in nature (about 5 years).
b) The design criteria developed to mitigate the vegetative treatments takes into account Forest Plan direction and follows the USDA Forest Service Scenery Management Guidelines.
c) The project area lies within a broader context of the managed northern hardwood forest landscape. Management of this landscape can increase variety and diversity in the middle and background views over the long term.
d) Topography varies from rolling to flat, with most views being foreground only and few places with middle or background views in the distance.
e) Management is consistent with the VQOs of modification and maximum modification, therefore, the analysis area is predominately focused on foreground views of proposed treatment areas and access routes that occur within retention or partial retention areas (primarily located long high level roads), with very few locations having the potential to view the project in the background.

4.11.2 Forest Plan Guidance:

a) MA 3.1 Table 3-12 and MA 4.1a Table 3-15 (Section 3-18 and Section 3-24). Scenery Management (Forest Plan, Appendix G). The project area's conditions would remain consistent with the Forest Plan's Scenery Management direction when design criteria are applied. Changes in scenery will be measured by established variables in the Forest Plan for variety class, distance zones, sensitivity levels and visual quality objectives.

4.11.3 Findings Required by Law or Policy

Law/Regulation/Policy	**Required Finding**
National Forest Management Act (16 USC 1600 ET SEQ.)	A determination of whether this project is consistent with the Forest Plan is required pursuant to NFMA (16 USC 1604[i]).

4.11.4 Effects Analysis Boundaries

	Spatial boundary (extent)	Temporal boundary (duration)
Direct/Indirect	Project area. Visuals effects from harvest and associated activities would occur mostly within the project area. Some stands may be visible from vantage points outside the project area, depending on topography. The analysis will consider these sites where they are sensitive.	The timeframe of implementation within the stand boundaries proposed for treatment were selected for the bounds of analysis for direct effects because harvest and ground disturbance is confined to the area in need of treatment which can be logically measured. Implementation (e.g., year of sale offer) is estimated as occurring between fiscal years 2017 through 2037. Indirect Effects: This analysis assumes that visual resource impacts would decrease within 5 years with the new growth of vegetation; therefore, the bounds of analysis for indirect effects is 2042 (5 years beyond the last sale offered).

Cumulative	Same as outlined for direct/indirect effects for the same rationale.	Same as outlined for direct/indirect effects for the same rationale.

4.11.5 Additional Documentation

Project File Document	**Rationale/Need**
Visual Specialist Report	Document to disclose resource analysis and relevant literature cited.

4.12 Water and Fish Resources

4.12.1 Analysis Assumptions:

a) Water Quality: Based on professional experience with past similar projects – road maintenance and reconstruction activities generally maintain or slightly improve water quality, although effects may not be discernible. Design criteria for soil and water resources developed for similar past projects have been used to reduce impacts to wetlands and floodplains, including reducing sedimentation.

b) Riparian characteristics that enhance or contribute to aquatic habitat, such as shade, large woody structure, and bank stability are allowed to develop naturally in areas such as classified old growth and other protected riparian areas.

c) Wild and Scenic Rivers: The project is not located within any Wild and Scenic River (WSR) corridors. Riparian design criteria would reduce potential effects from activities occurring near streams outside the corridors that ultimately flow into the WSRs. Therefore, WSR water quality would be protected.

d) Road Crossings: Road crossings where new culverts are installed on fish-bearing streams would provide for aquatic organism passage based on implementation of design criteria (see design criteria documentation in the project record).

e) Road Reconstruction: Sedimentation and the resultant degradation of aquatic habitat would be reduced through road reconstruction included in this project. All reconstructed road stream crossings would comply with State of MI stream crossing requirements. Risk of sedimentation would be reduced due to implementation of design criteria that protect streams, lakes, ponds, and wetlands.

f) Coldwater Resources: Coldwater resources (cold and cold transitional streams) would be protected by project design criteria. The exclusion of aspen regeneration within 400 feet of these streams would lower the risk of the influx of beaver, therefore preventing the subsequent damming and warming of the streams.

g) Management Indicator Species (MIS): The aquatic MIS is a suite of aquatic insects known as EPT (Ephemeroptera-Plectoptera-Trichoptera or Mayfly, Stonefly, Caddisfly), which are representative species for coldwater stream habitat and represent a host of other species dependent upon this habitat type. These are common, non-TES aquatic species monitored on the Forest and used as indicators of

management's impact on certain habitat types. We expect other species dependent on coldwater stream habitat to experience similar effects. EPT densities have been maintained or improved across the Forest, indicating that stream protection criteria similar to those in other recent similar projects would also produce a positive trend for EPT in this project.

h) The Biological Evaluation presents the effects of the proposed actions to aquatic Regional Foresters Sensitive Species (RFSS). The finding must be one of the following four statements: 1) "no impacts," NI (where no effect is expected); 2) "beneficial effects," BEN (where effects are expected to be beneficial); 3) "may impact individuals but is not likely to cause a trend to federal listing or loss of viability," MII (where effects are expected to be insignificant [unmeasurable], or discountable [extremely unlikely]); or 4) "likely to result in a trend to federal listing or loss of viability," LRT (where effects are expected to be detrimental and substantial). Project design criteria would prevent aquatic RFSS from receiving an LRT finding. This analysis would also provide the Responsible Official information necessary to a determination for this project's consistency with the Forest Plan (NFMA 16 USC 1604[i]) as well as NFMA, Vegetative Treatments (16 USC 1604 [e][f]) in terms of "be best suited to the multiple-use goals stated in the Forest Plan;" and "be selected to provide the desired effects on water quality and quantity, wildlife, regeneration of desired tree species, forage production, recreation uses, aesthetic values, and other resource yields."

i) Cumulative Effects: There has been a trend of positive cumulative effects on water quality throughout the Ottawa since the late 1800 and early 1900 cut-over, as noted in previous management projects, with no, minimal or negligible direct and indirect effects. Effects are expected to be consistent with the findings of recent similar projects located adjacent to the project that included similar design criteria and activities to protect and enhance aquatic resources.

j) Roads, road/stream crossings, and timber harvest pose a risk to water quality, sedimentation, and aquatic habitat that BMP/design criteria serve to minimize;

k) Road stream crossings can be a barrier to AOP, both upstream and downstream; and

l) Effects of sedimentation are most evident near crossings with effects becoming diluted with distance and additional flow from other tributaries.

m) Sediment entering streams, either naturally or from management actions is a very dynamic and complex process. It can be held in suspension in the water column given sufficient flow energy, move along the stream bottom through substrate transport, get stored in the channel indefinitely in various low energy sites, or removed into the floodplain during high flow events where it may remain or may reenter the channel during a later flow event.

n) New road construction that includes stream crossings would require State of MI permits for the crossings.

o) An open area analysis was completed to determine if the proposed clearcut timber harvest is in compliance with the Forest Plan threshold that states the total acreage of temporary openings (<16 year old trees) and upland openings do not exceed 60% of the total 6th level

watershed area (Forest Plan page 2-32). All 6th level watersheds are well within the threshold with 37% determined to be the worst possible opening scenario.

p)

4.12.2 Forest Plan Guidance:

a) Goal 3 and Objective e (pg. 2-3); Goal 20 and Objectives b, c, d (pg. 2-7); Goal 23 (pg. 2-7): All goals and objectives relative to riparian areas, wetlands, floodplains, streams, lakes and seasonal ponds (pgs. 2-26 through 2-27).
b) Goal 27 (p. 2-8); Goal 32 and Objective a (p. 2-10); Goal 34 and Objective a (P. 2-10): All goals and objectives relative to providing a diversity and abundance of native aquatic fauna populations and habitat, including aquatic Management Indicator Species and Species of Viability Concern such as Threatened, Endangered, and Sensitive species.
c) Guidelines (p. 2-27): Protect known occurrences of Species of Viability Concern and their zones of influence. Continue protection until population or habitat objectives are defined and met.
d) Guideline (pg. 2-32): In order to maintain stream stability (streamflow, sedimentation, and channel erosion), management actions on National Forest System land should be completed so that the total acreage of temporary openings (<16 years old) and upland openings do not exceed 60% of the total area of any 6th level watershed.
e) Guidelines (pg. 2-34): Design, construct and maintain stream crossings and dams to minimize disrupting the migration or movement of fish and other aquatic life.

4.12.3 Findings Required by Law or Policy

Law/Regulation/Policy	Required Finding
EQ 11990-Protection of Wetlands; EO 11988-Floodplain Management.	Provides specific language for the protection of wetlands and floodplains, respectively.
Clean Water Act (33 USC 1251) and State Water Quality Standards	The Clean Water Act and State water quality standards provide direction for protection of water quality.
Wild and Scenic Rivers	Requires that we protect and maintain river values including Outstandingly Remarkable Values, free-flowing condition, and water quality.
Executive Order 13112	Directs Federal agencies to, among other things, prevent the introduction of invasive species and not authorize, fund, or carry out actions likely to cause the introduction or spread of invasive species in the United States or elsewhere unless the benefits of the action clearly outweigh the harm, and the agencies take steps to minimize the harm.
National Forest Management Act (16 USC 1600 ET SEQ.)	The National Forest Management Act and associated regulations direct the Forest Service to develop Land and Resource Management Plans that provide for diversity of plant and animal communities based on the suitability and capability of the land (USC 1604 – g). Considerations for NFMA would

	include determinations for whether this project is consistent with NFMA (16 USC 1604[i]); is consistent with the multiple-use goals of the Forest Plan (USC 1604 [e][f]); and provides "…the desired effects on water quality and quantity, wildlife, regeneration of desired tree species, forage production, recreation uses, aesthetic values, and other resource yields."
Forest Service Manual	FSM 2670 provides direction for the conservation of Regional Forester Sensitive Species (RFSS). FSM 2621 & 2634 have direction for using Management Indicator Species (MIS) to represent issues, concerns, and opportunities in the management of National Forests.

4.12.4 Effects Analysis Boundaries

	Spatial boundary (extent)	***Temporal boundary (duration)***
Direct/Indirect	The boundary includes streams that intersect roads maintained or reconstructed for this project, or that intersect stands proposed for treatment and continuing downstream of project area to the next major channel junction where flow changes allowing sediment to be re- suspended, transported, or stored. The boundary also includes the area within 400 feet of streams since aspen clearcut within this distance may attract beaver. In addition, the boundary includes streams and tributaries continuing upstream above reconstructed stream crossings where habitat would be made accessible to downstream organisms. The boundary for lakes, ponds and wetlands includes these waterbodies within proposed treatment stands and the area within 300 feet of these waterbodies since aspen clearcut on slopes within this distance may result in some erosion with sedimentation (risk dependent on steepness of slope and soil characteristics).	Direct: During project implementation because that is when direct effects occur. Indirect: During project implementation and continuing for 10 years after project completion (see cumulative effects discussion for rationale) (2017-2047).

Cumulative	Streams within the contributing watershed area upstream from the downstream point of the direct and indirect effects analysis boundary, because upstream sedimentation sources and crossings contribute to the condition within the direct and indirect analysis boundary.	Using the existing conditions as a proxy for past management activities is allowed by the 2005 CEQ Memo (see project file). Effects are also expected during project implementation and continuing for 10 years after project completion. However, sediment remains in streams until completely routed out of the system, which may take 100 years. Ten years was chosen for analysis purposes since some sediment would likely route through the analysis area in this timeframe, although some would route through more quickly such as sediment in suspension and some would take considerably more time [specialist professional judgment and personal conversation with Joseph Wagenbrenner]. Stream crossings would remain indefinitely and continue to incrementally add sediment to the system over time).

4.12.5 Additional Documentation

Project File Document	Rationale/Need
Biological Evaluation	Required for compliance with FSM 2670-32
Management Indicator Species Report	Required for compliance with FSM 2621 & 2634
Specialist Report	Document to disclose resource analysis and relevant literature cited.
Wagenbrenner citation	Conversation record located in project file

4.13 Soils

4.13.1 Analysis Assumptions:

a) All project design criteria would be followed during project implementation. 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).

b) System roads and trails within or adjacent to an activity area are dedicated land uses and are not considered detrimental soil conditions (Forest Service Manual R9 RO 2550-2012-1).

c) Based on past projects with similar land type associations (LTAs), similar proposed actions, and similar design criteria, proposed activities are expected to have minimal or negligible direct, indirect, or cumulative effects (2011 M&E Report, pp. 22-23, USDA Forest Service, 2009). Representative timber sales with similar treatments and transportation networks on similar landforms will be reviewed for the Aspen project and incorporated into the soil resource analysis.

d) Detrimental impacts to the soil are generally determined by the indicators of degree, duration, distribution, and extent of disturbance. Degree refers to the amount of change in any one particular soil property. Duration is the length of time disturbance effects persist. Distribution of soil disturbance within a particular area can be dispersed throughout an area in small polygons or may be concentrated in one or more larger features. Extent can be defined as the amount of land surface affected by a disturbance (Page-Dumroese, Abbott, and Rice, 2009, p. 3). Soil monitoring on the forest (which includes non-system roads) had found detrimental disturbance within payment units to be generally 5% or less (USDA Forest Service, 2008, p. 24). The overall percent of haul roads in a unit can vary, and may be influenced by sale layout, topography, and soil type. As a result, a very general indication of an area that may be disturbed by roads can range from an overall average of 5.5% (Grigal D. B., 1992) to approximately 10% (Megahan, 1988) for ground based operations (Grigal D. F., 2000, p. 171).

4.13.2 Forest Plan Guidance:

a) Goals, Objectives, and Guidelines (pp. 2-7 to 2-8; 2-26 to 2-27)

b) Goal 20, Objective a (p. 2-7). Provide for ecologically healthy watersheds, soils, riparian areas, and streams to support viable populations of native and desired non-native species, and to restore and enhance values associated with the Great Lakes System (E.O. 13340).

1) Objective a: Maintain soil productivity.

4.13.3 Findings Required by Law or Policy

Law/Regulation/Policy	Required Finding
National Forest Management Act (16 USC 1600 ET SEQ.)	Facets of NFMA need to be addressed to show that this project is consistent with the Forest Plan (16 USC 1604[i]) as well as ensuring proposed vegetation treatments are planned in accordance with Forest Plan multiple-use goals (USC 1604 [e][f]),and “Be selected to avoid permanent impairment of site productivity and to ensure conservation of soil and water resources”.

4.13.4 Effects Analysis Boundaries

	Spatial boundary (extent)	*Temporal boundary (duration)*
Direct/Indirect	The bounds of analysis for determining direct and indirect effects of the proposed activities will be the portions of the Ecological Land-Type Phases (ELTPs) that fall within the project boundary. Potential direct and indirect effects to the soil resource are reasonably confined to the soil directly beneath where the disturbance factors are taking place. Effects may extend slightly to the edges of adjacent ELTPs in some instances, but not to an extent where the effect would extend outside of the immediate project area. Each ELTP has its own unique ecological characteristics and capabilities and is affected differently to some extent by surface operations, but the ELTPs do not interact with each other; i.e. compaction in one ELTP does not cause adjacent ELTPs to be compacted nor does it cause a neighboring ELTP to react differently to compaction.	2017 to 2037. Harvest and ground disturbance is confined to the area in need of treatment (that can be logically measured). The timeframe of implementation within the stand boundaries proposed for treatment was selected as the temporal bound of analysis for direct and indirect effects.
Cumulative	The bounds of analysis for determining cumulative effects of the proposed activities will be the portions of the ELTPs that fall within the project boundary. Cumulative effects to the soil are confined to the soil directly beneath where the disturbance factors (i.e. machinery operations) take place, and not to an extent where the effect would transcend these ELTP boundaries (reference Direct/Indirect Effects Rationale above).	1998-2055. The timeframe described includes 18 years prior to and beyond the implementation timeframe because 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).

4.13.5 Additional Documentation

Project File Document	**Rationale/Need**
M & E Reports	Document past monitoring results and re-stocking surveys RE timber harvest activities / support analysis assumptions/ satisfy NFMA.
Representative sale documents	Support analysis assumptions

Maps	Supports design criteria (i.e., operation restrictions).

4.14 Cultural Resources

4.14.1 Analysis Assumptions:

a) All cultural resources sites will be protected through the implementation of design criteria that would result in all project activity avoiding cultural resource sites.

4.14.2 Forest Plan Guidance

a) Goal 12a (p. 2-5). Heritage resources are identified and protected during project planning and implementation.
b) Goal 12b1 (p. 2-5). Manage and protect the Lac Vieux Desert – L'Anse Trail Corridor through consultation and cooperation with tribal governments.

4.14.3 Findings Required by Law or Policy

Law/Regulation/Policy	Required Finding
Forest Service Manual 2360	Sets forth National Forest System policy and direction for cultural resources.
Forest Service Handbook 6209.12 (DRAFT)	Provides processes and procedures for managing cultural resources on national forest system lands.
NHPA (36 CFR 800)	Section 106 of the National Historic Preservation Act 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 eligible for inclusion in the National Register of Historic Places. Section 106 of the National Historic Preservation Act also requires federal agencies to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on agency undertakings.

4.14.4 Effects Analysis Boundaries

	Spatial boundary (extent)	***Temporal boundary (duration)***
Direct/Indirect	Project boundary. The harvest units and roadways where actions that have potential to disturb cultural resource sites will be taking place.	Project implementation (2017-2037). The time period during which actions that have potential to disturb cultural resource sites will be taking place.
Cumulative	Project Boundary. The harvest units and roadways where actions that have potential to	Project implementation (2017-2037). The time period during which actions that have potential to

	disturb cultural resource sites will be taking place.	disturb cultural resource sites will be taking place.

4.14.5 Additional Documentation

Project File Document	Rationale/Need
CRRR 09-07-00-503 [FOR ADMINISTRATIVE USE ONLY]	Cultural Resources Reconnaissance Report 09-07-00-503: Aspen Project. Technical report on file (File Code 2360) at the USDA Forest Service, Ottawa National Forest, Ironwood, MI. 2014. *This document identifies the location of archaeological resources and is not available to the public (as provided in Archaeological Resources Protection Act of 1979, 16 USC 470aa).*

5 PAST, PRESENT, AND RESONABLY FORSEEABLE ACTIONS

The following past, present and reasonably foreseeable (PPRF) actions may have effects that overlap in space and time with the effects of the Proposed Action. These actions should be considered along with the impacts of the Proposed Action to determine if any significant cumulative effects may occur. If authorized, the Aspen Management Project is anticipated to be implemented beginning in 2017, with areas offered for harvest each year for 10-20 years, ending in 2037.

None of the stands proposed for harvest have been clearcut or had vegetation management of any kind in over 30 years (all stands treated within the last 30-years were removed from the analysis area). However, some of the boundaries of past projects may overlap the stands or the access routes. For those past projects, the effects of the past projects are evident in the existing condition (existing roads or old skid roads, if remaining).

Table 5.1 – Ongoing and Reasonably Foreseeable Actions

PPRF ACTION	Comments[1]
Ongoing Actions Adjacent to Stands Identified for Treatment (within ½ mile) and within MAs 1.1a, 3.1a, 4.1a, 4.2a[2]	
Wildlife opening maintenance	Implementation 2015-2016
Baltimore VMP	Implementation ends 2016
Deadstream-McClellen VMP	Implementation ends 2016
Jack Pine Budworm VMP	Implementation ends 2017
Prospector VMP	Implementation ends 2019
Papa Bear VMP	Implementation ends 2020
Slate VMP	Implementation ends 2020
Bluff Divide VMP	Implementation ends 2021
Baraga Plains Restoration Project	Implementation ends 2023
Beaton VMP	Implementation ends 2023
Maintenance of hunter walking trails	Ongoing
Treatment of non-native invasive plants	Ongoing

[1] Implementation timeframes are estimated to extend 5 years beyond when the final sales are planned to occur. For several of these, project implementation will be completed prior to the aspen management project proposed treatments.
[2] Note – all of the project areas that are within ½ mile are also at least partially within the same MAs.

Special use permits/roads/UPPCO Camps	Ongoing
Reasonably Foreseeable Future Actions Adjacent to Stands Identified for Treatment and within MAs 1.1a, 3.1a, 4.1a, 4.2a[3]	
Pori Junction VMP	Implementation 2016- 2028
Interior VMP	Implementation 2015-2028
Red Pine Thinning Project	Implementation 2015-2025
Riparian restoration project	Starting in 2015 and Ongoing, located on select cold-water streams
Aquatic Organism Passage Projects	Starting in 2015 and Ongoing, select locations throughout the forest

6 Responsible Official Approval

As the Responsible Official of the project, I approve the use of this analysis framework in developing resource analysis and Environmental Assessment/FONSI for the Aspen Management Project. I expect your analysis to fall within the parameters established in the framework. If you find your analysis will fall outside the parameters please contact myself and the team leader.

Linda L Jackson

LINDA JACKSON

Forest Supervisor

12/15/2014

Date

[3] Assumes implementation of proposed project beginning in 2016.