# Chapter 2: Comparison of Alternatives

## 2.1 Introduction

This chapter describes:

- how a range of alternatives was developed,
- alternatives analyzed in detail, including monitoring,
- alternatives considered but not analyzed in detail, and
- alternatives by activities, effects and accomplishment of the purpose and need.

In accordance with the National Environmental Policy Act, a No Action Alternative (Alternative 2) is included in this analysis. This alternative is intended to serve as a control showing the environmental and social effects of taking no action, as well as to provide the deciding officer the option of taking no action at this time.

If there are unresolved issues about effects, alternatives are developed. Alternatives are used to provide the responsible official with choices for avoiding or minimizing effects. The purpose and need for action sets the range of alternatives since all alternatives must in some way meet the purpose and need.

## 2.2 Development of a Range of Alternatives

The implementation guidelines (40 CFR 1500) developed by the Council on Environmental Quality require that an environmental review must "...rigorously explore and objectively evaluate all reasonable alternatives.' The courts have established that this direction does not mean that every conceivable alternative must be considered, but that selection and discussion of alternatives must permit a reasoned choice and foster informed public participation and decision-making.

To meet the purpose and need for the Inga South project, the interdisciplinary team developed a proposed action, which was included in the April 2005 Scoping Report. Based on additional field reviews and new information, the team modified the proposed action to make it feasible to implement.

Public comments received on the scoping report were used to identify significant issues (listed in Chapter 1 of this EA). The significant issues were used to develop an alternative that would manage fewer stands in areas of high scenic integrity, retain more acres in large mature upland patches, and retain more mature individual red and white pines.

When developing alternatives, the interdisciplinary team also identified specific design features and mitigation measures to minimize impacts on resources from the management activities proposed in the action alternatives. Design features are derived from Forest Service policies, Forest Plan Standards and Guidelines, and Minnesota Forest Resources Council Forest Management Guidelines (1999). Where needed on individual units, site-

specific mitigation measures are identified to further reduce effects of management activities. Design features are described in detail in Appendix C, and mitigation measures are listed in Appendix D.

The Inga South Environmental Assessment analyzes the effects of three alternatives in detail and five alternatives not in detail. These eight alternatives provide an adequate range of alternatives and disclose the effects of the actions, provide adequate information on the tradeoffs between resources, and meet the direction in the Forest Plan.

## 2.3 Alternatives Considered in Detail

### Alternative 1: Modified Proposed Action

This alternative was developed to achieve the purpose and need for action in the Inga South Project Area. It will increase the conifer component in the Dry-Mesic Red and White Pine (DMRWP) Landscape Ecosystem (LE) through harvesting and other vegetative management techniques and emphasizes planting or seeding of red and white pine and white spruce. Harvesting through clearcutting and partial cutting would be the primary tool used to restore conifers to this area. Additional sites will receive some form of competition control (mechanical, management-ignited fire, or both) to minimize understory brush and create an understory of young conifers.

The long-term outcomes of these treatments will be an increase in the size and connectivity of existing upland mature red and white pine patches and an increase in the white spruce component of this landscape ecosystem.

Additional actions in this alternative include clearcutting aspen and birch stands to create acres of young hardwoods, reducing fuels in stands to protect areas at risk in case of wildfire, and decommissioning roads no longer needed.

Appendix B lists the stands and road prescriptions for this alternative.

### Alternative 2: No Action

In this alternative, the proposed action would not take place, and there would be no new management actions proposed at this time. Existing management actions such as timber sales or road projects would be allowed to continue. Natural succession processes would take place. Current road use would continue. Selection of this alternative would not preclude future management actions in the project area.

### Alternative 3

This alternative was developed in response to comments received during the public scoping process. It would manage fewer stands in areas of high scenic integrity, retain more acres in large mature upland patches, and retain more mature individual red and white pine trees.

Most harvest units with concerns about the visual impacts of treatments were eliminated from this alternative, as were harvest treatments in red or white pine stands or harvest of red or white pine when they are a component of a stand of another forest type. Most treatments that would reduce the size of large upland mature patches were eliminated.

Additional sites will receive some form of competition control (mechanical, management-ignited fire, or both) to minimize understory brush and create an understory of young conifers. Many of the proposed fuels reduction treatments remain. Roads no longer needed will be decommissioned.

Appendix B lists the stands and road prescriptions for this alternative.

## 2.4 Alternatives Considered But Eliminated From Detailed Study

### Alternative 4. Proposed Action of April, 2005

After further examination, the original proposed action sent out for public scoping in April, 2005 was eliminated from detailed analysis in this document for the following reasons:

- Upon further review and consultation with silviculturists, it was determined that the lowland black spruce stands (Units 229030, 228022, 230012, 230014, 231026, and 267055) proposed for strip clearcuts would be better regenerated through the use of clearcuts with reserves and site preparation burns.

- Two of the pine stands originally proposed for partial harvest or thinning treatments (Units 224001 and 312002) are included in upland mature red and white pine patches for which there is a Forest Plan standard to maintain at least 60% crown closure. Measurement of the crown closure in these stands revealed that they were at or very near the standard, so the proposed treatments were dropped.

- It was determined that unit 228028 had no access at any time and the unit was dropped.

- In some units, the species originally proposed for regeneration were upon further review found to be sub-optimal for the sites in question.

- Units 285007 and 285032 were dropped because of concerns about access and soils.

- Unit 312055 was mechanically scarified and planted in the summer of 2005 as a part of the post-windstorm recovery effort and does not need further treatment.

- A few mechanical fuels reduction treatments and underburns were either dropped or modified because of concerns about the potential loss of either canopy cover or existing pine seedlings.

- Reconstruction of F.R. 103 was dropped from this proposal.

### Alternative 5. Maximize harvest of aspen beyond rotation age

One alternative proposed during the public scoping process would maximize the harvest of aspen that is beyond its rotation (harvestable) age. The commenters felt that to do so would "...increase the amount of early successional landscapes in the project area through expansion or connection of existing habitats of this type" and would provide benefits to wildlife species that thrive in early-successional forests. They also felt that this would "...capture volume that may be lost to mortality" and provide a balance to the older conifer forests that are found within the Boundary Waters Canoe Area Wilderness.

The Forest Plan, through Landscape Ecosystem Objectives and Management Indicator Habitat Objectives, would reduce the amount of early successional species. "Over time, the Revised Plan will decrease the amount of aspen and young tree age classes and therefore may decrease the habitat for some game species…The actual change in habitat will occur over a long period of time and will be influenced by the habitat provided by intermingled private, county and state lands. In the shorter term (next 10-20 years) there will be minimal effects on populations as a result of this slow change in condition, and game species habitat is expected to remain fairly high during this period. In the Revised Plan, my decision is to gradually reduce the emphasis that the 1986 Plan placed on game species habitat and turn the emphasis toward managing for the entire spectrum of wildlife habitats" (USDA 2004a, p. 12).

Forest Plan Management Indicator Habitat objectives call for a decrease in young aspen and birch across the Dry Mesic Red and White Pine LE, of which this project area is part (USDA 2004b, p. 2-66). Currently there are about 130 acres of young aspen or birch in the project area. The range of alternatives considered would create 805 acres of young aspen and birch in Alternative 1 or 327 acres of young aspen and birch in Alternative 3. This provides an adequate range for displaying effects.

Furthermore, the Forest Plan does not call for harvest of every stand that reaches rotation age. Even though Management Indicator Habitat Objectives call for a reduction in the amount of mature or older aspen, some older age classes are desired. An alternative that harvested most mature aspen and birch and maximized the amount of young aspen and birch would not be consistent with the Forest Plan.

The purpose and need for this project includes increasing the amount of red and white pine (Purpose and Need #1) and increasing conifer (Purpose and Need # 2). An alternative that maximized hardwood regeneration would not meet the purpose and need.

### Alternative 6. Do not harvest aspen over 80 years old

One commenter proposed that all units of older aspen, especially those near lowland conifer stands, should be eliminated from the project because they are extremely important for cavity-nesting birds such as the boreal owl. The commenter felt that selective logging practices which leave large, older aspen would be preferable to "full-scale logging.'

This project proposes harvest of aspen >80 years old in approximately 201 acres in Alternative 1 and 161 acres in Alternative 3. There is a mitigation in place that will leave trees and in some cases untreated areas for cavity-nesting birds in these units when they are adjacent to lowland conifer stands which accomplishes in part what selective logging leaving older aspen would accomplish. The No Action Alternative accomplishes the proposal to not harvest aspen over 80 years old. This alternative does not need to be analyzed further because the No Action and action alternatives already provide an adequate range of effects.

### Alternative 7. Selectively harvest birch and aspen to restore pine or reduce amount of harvest to achieve mixed regeneration

Several commenters felt that the Forest Service should either take a less-intense approach to converting sites from hardwood to conifer or that we should allow natural succession processes to take place instead of actively managing the stands.

In the proposed action many of the conversions would be accomplished through partial harvests and underplanting; in some cases, however, clearcutting would be the most effective tool to achieve the purpose and need. For example, many of paper birch stands that have been proposed for clearcutting already have low stocking, and there would simply not be enough healthy trees to leave as residuals beyond those required in a normal clearcut with reserve trees. The Interdisciplinary team considered the current condition of each stand before selecting the treatment that would best accomplish the objective of increasing conifers in the project area. In addition, partial cutting with a higher residual would not create young age class as stated in Purpose and Need #2.

The No Action Alternative addresses natural succession processes as they pertain to forest type conversions so there was no need to address this option in a separate alternative. This alternative, therefore, is already presented in the current range of alternatives.

### Alternative 8. No clearcutting, restore forest types without logging, and protect unspoiled areas

One commenter proposed the Forest Service consider the No-Action alternative, no-clearcut alternative, and alternatives that generally seek to restore forest types to their range of natural variation without using logging techniques.

This alternative emphasizes restoring damaged forest areas and protecting those areas that remain unspoiled. This alternative can be implemented in a way that fulfills the Agency's stated Purpose and Need. In such an alternative, roadless areas and old growth forests would be completely protected from logging and road-building. Only logging with a biological (non-commercial) justification would occur, and there would be no logging of red or white pine. Young stands of jack pine would be created by planting seedlings and burning. Native plants and animals would be inventoried and monitored in accordance with applicable laws, and management activities would seek to protect and restore habitat for sensitive species. Rather than building new roads, the agency would invest its resources in analyzing the current road system and decommissioning all roads unnecessary for the minimum permanent system. Finally, the economic health of the forest would be ensured by emphasizing non-motorized recreational opportunities and the jobs that these recreational opportunities support.

This alternative was not considered for multiple reasons. The commenter referred to a "statutory obligation" to consider a no-clearcut alternative, yet no such obligation exists. The Forest Plan states that clearcutting will be a management tool that will be utilized across the forest and that timber harvest will be the primary tool for reaching vegetative objectives and the effects of this management have been disclosed in the Forest Plan Final Environmental Impact Statement (FEIS, USDA 2004c). The No Action Alternative discusses the likely outcome of natural succession processes in the area and therefore is already analyzed in the range of alternatives. Alternative 3 addresses the concern regarding harvest of red and white pine, and in both alternatives, roads that are no longer needed are decommissioned. There is no logging or road building in roadless areas proposed in either action alternative.

Areas of special consideration, including Unique Biological Areas and Candidate Research Natural Areas, have been designated by the Forest Plan; imposing special designations that are not included in the Forest Plan are inconsistent with the multiple-use goals of the General Forest-Longer Rotation Management Area and are outside the scope of this analysis.

## 2.5 Description of Treatments and Monitoring

Table 2.1 describes the treatment types and activities proposed in this project. Table 2.2 lists the proposed monitoring strategy that accompanies the activities proposed in this document.
These treatments and activities entail the use of design features that apply to all alternatives and all treatment units. Design features are taken from established Forest Service policies, Forest Plan standards and guidelines, Minnesota Forest Resources Council Forest Management Guidelines (1999), and federal laws and regulations. Each of these design features is designed to limit or avoid potential adverse effects even before a proposed action or alternative is developed. They are automatically taken into consideration during the analysis of each alternative. Design features are listed in Appendix C.

If adverse effects that could be avoided were identified during this analysis, a site-specific mitigation measure was developed to ensure protection of the resource. Appendix D lists the mitigations that will be employed in individual treatment units. Application of some of these mitigation measures may reduce the number of treatment acres in some units.

*Table 2.1. Description of Treatments*

| Treatment | Description |
|---|---|
| **Harvest Treatments** | |
| **Clearcut with Reserve Trees** | The objective of this treatment is to remove all but 6-12 trees per acre plus legacy patches and fully expose the site for the development of a new age class. This treatment usually favors shade intolerant species such as jack pine, aspen or birch. Reserve trees are left according to design features for wildlife and diversity. |
| **Seed Tree Cut** | The objective of this treatment is to remove all but a small number of widely dispersed trees for seed production and to create a microenvironment suitable for regenerating a new age class. This treatment usually favors shade intolerant species such as jack pine. |
| **Partial Cut** | The objectives of partial cuts are to either convert a stand from hardwood to conifer or to establish a two-aged stand. There are three types of partial cuts, based on how many trees are left as residuals after harvest:<br>Lower residual: The objective of this treatment is to restore a conifer stand where there currently is a hardwood stand. Treatment includes harvesting some trees while leaving others to provide sufficient shade that will retard the hardwood regeneration and create a microenvironment suitable for regeneration. The treatment is also used to regenerate red pine while retaining structural elements such as mature trees. 30-40 square feet of basal area per acre will be reserved and be based on ecological characteristics. This treatment usually favors long-lived species. Stands receiving this treatment will be reset to age zero.<br><br>Higher residual: The objective of this treatment is to create a two-aged stand or to restore a conifer stand where there currently is a hardwood stand. Treatment includes harvesting some trees while leaving others to provide sufficient shade to produce a new age class in a moderated microenvironment, or retain structural elements or biological legacies from the harvested stand. This treatment usually favors long-lived species such as white and red pine and white spruce. 50-60 square feet of basal area per acre will be reserved and be based on ecological characteristics. The age of stands receiving this treatment will not be reset to zero.<br><br>Crown closure: The objective of this treatment is to maintain the canopy closure in mature pine types and create a microenvironment suitable for regeneration of a second age class in areas that are devoid of natural regeneration. Treatment includes leaving trees to retain structural elements or biological |

*Table 2.1. Description of Treatments*

| Treatment | Description |
|---|---|
| **Partial Cut** | legacies to achieve various ecological objectives. A minimum canopy closure percent of 60 will be maintained within the patch. The species reserved will predominantly be the species desired for regeneration but other long-lived species may be planted. The age of stands receiving this treatment will not be reset to zero. |
| **Intermediate Treatments** | |
| **Commercial Thin** | The objective of thinning is to remove some trees in a stand so that the remaining trees will grow faster due to reduced competition for nutrients, water and sunlight. In addition, thinning utilizes material that would normally be lost due to natural stand mortality. Trees designated for harvest would generally be those exhibiting slower growth rates, signs of insects or disease infestations, overcrowding (where crowns are touching) or damage from either natural disturbances or previous management.<br>Access strips (approximately 14 ft. wide placed approximately 30 ft apart) would be needed and all trees within these strips would be removed to allow machinery to move through the stand and would be used for access in future treatments. |
| **Mechanical Site Preparation** | The objective of this treatment is to prepare the site for regeneration. It is often used after harvest. With this treatment, brush and smaller trees are crushed or otherwise removed from the site. |
| **Prescribed Burn Treatments** | |
| **Under Burn** | The objectives may include reducing hazardous fuels, maintaining fire return intervals, reintroducing fire, reducing understory competition and maintaining fire resistant characteristics.<br>A low intensity fire that burns beneath the canopy of live, standing timber. Fire removes material that is considered a fuel ladder that could potentially spread fire from the ground fuels into the crown of standing live timber. Understory ground materials that would be removed include small down, dead, woody material. This prevents a subsequent wildfire from spreading into the crowns and causing overstory mortality. Underburns also kill shrubs and most young trees that compete with the overstory canopy vegetation. Some live trees may be burned during understory burns, but the objective is to maintain the forest cover. Following the burn, the stand would consist of a standing forest that is open underneath. |
| **Burn Inclusion** | These are areas around or within broadcast burns which may have fire creep into them but will not be ignited. The majority of these areas are lowland wet areas where fire typically will not carry. |
| **Mechanical Fuel Reduction** | The objective of mechanical fuel reduction projects is to reduce understory hazardous fuels. The understory fuels may be piled and burned, crushed, chopped, or removed with mechanical equipment. The overstory will be undisturbed. |
| **Hand Pile and Burn** | The objective is to reduce understory hazardous fuels that have accumulated. The understory fuels will be piled by hand crews and burned under appropriate weather conditions. The overstory will be undisturbed. |

*Table 2.1. Description of Treatments*

| Treatment | Description |
|---|---|
| **Transportation Management** | |
| **National Forest System Roads (NFSR)** | The objective of these classified roads is to provide long term access to an area. They may be used in the project and will also be needed in the future to access the area for recreation, timber harvest or other administrative need.<br>Each road is assigned an Objective Maintenance Level (OML) which indicates the standard of maintenance and often indicates whether the road is open or closed to vehicular traffic.<br>New OML 1 roads are intermittent service roads closed to motor vehicle use when not needed for periods exceeding one year. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and to perpetuate the road to facilitate future management activities. The following actions will occur where appropriate. In cases where the action would result in more resource damage, i.e., recontouring a fill area will cause more disturbance to a stream, the action will not be taken.<br>• Culverts and temporary bridges will be removed in all-season streams where no need for the road exists for at least five years.<br>• Water bars will be constructed on roads in areas with steep slopes. Areas at risk for erosion will be seeded.<br>• Where available one cubic yard of rocks (embedded 1/3 of their depth), stumps, and slash will be randomly placed at visible part of the road to ensure that passage does not seem feasible and is not attempted.<br>• At the access point off the main road, the original ditch will be restored.<br>OML 2 roads are open for use by high clearance vehicles. They are maintained and operated the same as OML 1 except they are left open for travel therefore the culvert removal and closure aspects of OML 1 do not apply to OML2.<br>Generally no new OML2 are proposed unless required for recreation or administrative needs such as a gravel pit operation that cannot be operated with the 12 month closure requirement of the OML1. |
| **Temporary Roads** | The objective of these roads is to provide short term access. Once the need for access has expired, the road will be obliterated.<br>All temporary roads needed to access harvest units will be obliterated and allowed to return to a more natural state once reforestation objectives have been met. The following actions will occur where appropriate:<br>• Culverts and temporary bridges will be removed.<br>• Stream crossings will be returned to a more natural state by returning the crossing to the approximate original contour and by stabilizing the crossing banks through re-vegetation.<br>• Original drainages will be reopened and water diversions from roadbeds will be provided.<br>• Water bars will be constructed on temporary roads or skid trails in |

*Table 2.1. Description of Treatments*

| Treatment | Description |
|---|---|
| **Temporary Roads** | areas with steep slopes. Areas at risk for erosion will be seeded.<br>• Windrows of slash or rock along temporary roads will be flattened or spread out.<br>• Where available nearby small balsam and spruce will be transplanted into road bed and one cubic yard of rocks (embedded 1/3 of their depth), stumps, and slash will be randomly placed on the visible part of the road to ensure that passage does not seem feasible and is not attempted. Cuts and fills will be re-contoured to pre-road condition.<br>At the access point off the main road, the original ditch will be restored. |
| **Special Use Road** | The objective of these roads is to provide access across federal lands to non-federal lands. If the required need is permanent then the design features will be similar to the OML1 or OML2 features. If the need is for a one time access the temporary road features will be followed. |
| **Decommission** | NFSR roads and unclassified roads planned for decommissioning shall meet the design closure features of the temporary road. |

*Table 2.2. Monitoring of Treatments*

| **Harvest and Site Preparation Areas** | |
|---|---|
| Objective | Ensure that the mitigation measures and provisions in contracts are implemented. |
| Methods | Visual inspection of treatment stands. |
| Frequency | Treatment areas would be visited on a regular basis during the length of the contract. |
| Responsibility | Timber Management Assistant, Silviculturalist |
| **Prescribed Burns** | |
| Objective | Ensure that treatment objectives are met. Document weather, fire behavior, and smoke. Ensure design features and mitigation measures are followed. |
| Methods | Complete a Prescribed Burn Evaluation. |
| Frequency | During and after each burn. |
| Responsibility | Fire Planner/Burn Boss |
| **Non-Native Invasive Species** | |
| Objective | Monitor the extent of non-native plant infestation in the project area. |
| Methods | Monitor harvest units and newly constructed roads after harvest, site prep, or construction to determine if invasive plants have colonized areas where management activities have occurred. |
| Frequency | Between year one and year three following the sale |
| Responsibility | Forest Plant Ecologist |
| **Temporary Roads** | |
| Objective | Monitor to ensure that temporary roads are constructed/rehabilitated/obliterated after completion of treatment activities. |
| Methods | Inspect temporary road locations as they are being built, during treatments, between treatments, and after they are closed to determine if additional protection/rehabilitation efforts are needed. |
| Frequency | Inspect all road locations that are more than ¼ mile in length. |
| Responsibility | Timber Management Assistant, Zone Engineer |

*Table 2.2. Monitoring of Treatments*

| **Forest Composition/Regeneration** | |
|---|---|
| Objective | Ensure that minimum stocking standards are met in each forest type for artificial and natural regeneration treatments. Procedures and standards are located in the Forest Service Reforestation Handbook 2409.26b. |
| Methods | Natural and artificial regeneration areas would be surveyed for the number of acceptable trees/acre using Regional Guidelines. Stands planted to red and white pine would be checked every other year for pruning and release need. |
| Frequency | Reforestation surveys would be conducted after the 1st and 3rd growing season following reforestation treatment. Stands not expected to reach regional stocking standards after the 5th growing season would be rescheduled for treatment. Release needs for red pine would be checked every other year for 5 years. Pruning and release needs for white pine would be checked every other year until year 10, and then every five years until the base of live branches reached at least 9 feet off the ground. |
| Responsibility | Zone Silviculturalist |
| **Understory Regeneration of Pine** | |
| Objective | Ensure that desired stocking occurs in stands with an objective of creating a pine understory. |
| Methods | Stands would be surveyed for the number of pine seedlings. Stands planted to red and white pine would be checked every other year for pruning and release need. |
| Frequency | Reforestation surveys would be conducted after the 1st and 3rd growing season following reforestation treatment. Stands not expected to reach desired stocking after the 5th growing season would be rescheduled for treatment. Release needs for red pine would be checked every other year for 5 years. Pruning and release needs for white pine would be checked every other year until year 10, and then every five years until the base of live branches reached at least 9 feet off the ground. |
| Responsibility | Zone Silviculturalist |

## 2.6 Comparison of Alternatives and Effects

### Comparison of Acres of Proposed Treatments

The following tables allow for a comparison of the three alternatives presented in this EA. Table 2.3 shows the acres of the proposed harvest treatments. Table 2.4 shows the acres of proposed intermediate treatments. Table 2.5 lists acres and species proposed for reforestation. Table 2.6 shows proposed transportation management activities.

*Table 2.3 Comparison of Harvest Treatment Total Acres* by Forest Type and Alternative*

| Treatment Type/Forest Type | | Alt. 1 | Alt. 2 | Alt. 3 |
|---|---|---|---|---|
| **Clearcut with Reserves** | | | | |
| | Jack Pine | 10 | 0 | 10 |
| | Lowland Black Spruce | 115 | 0 | 88 |
| | Spruce-Fir | 459 | 0 | 415 |
| | Aspen | 772 | 0 | 581 |
| | Paper Birch | 999 | 0 | 355 |
| **Seed Tree Harvest** | | | | |
| | Jack Pine | 28 | 0 | 28 |
| **Partial Cut-Lower Residual** | | | | |
| | Jack Pine | 55 | 0 | 0 |
| | Red Pine | 31 | 0 | 0 |
| | White Pine | 19 | 0 | 0 |
| | Aspen | 206 | 0 | 27 |
| | Paper Birch | 199 | 0 | 182 |
| **Partial Cut-Higher Residual** | | | | |
| | Red Pine** | 20 | 0 | 0 |
| | White Pine** | 79 | 0 | 0 |
| | Aspen | 80 | 0 | 80 |
| | Paper Birch | 174 | 0 | 174 |
| **Partial Cut-Crown Closure** | | | | |
| | Red Pine | 71 | 0 | 0 |
| | White Pine | 197 | 0 | 0 |
| | **Total:** | **3,514** | **0** | **1,940** |

*All acres shown are estimates based on stand acres. Actual treated acres would be less than the numbers shown due to legacy patches, reserve islands, and other factors.
**Acres typed as "Mixed Pines" were equally distributed between the Red Pine and White Pine forest types.

*Table 2.4. Comparison of Intermediate Treatment Total Acres* by Forest Type and Alternative*

| Treatment Type/Forest Type | | Alt. 1 | Alt. 2 | Alt. 3 |
|---|---|---|---|---|
| **Commercial Thin** | | | | |
| | Red Pine** | 84 | 0 | 0 |
| | White Pine** | 4 | 0 | 0 |
| **Mechanical Site Preparation** | | | | |
| | Red Pine | 240 | 0 | 240 |
| | White Pine | 646 | 0 | 646 |
| | Spruce-Fir | 60 | 0 | 60 |
| | Aspen | 8 | 0 | 8 |

*Table 2.4. Comparison of Intermediate Treatment Total Acres* by Forest Type and Alternative*

| Treatment Type/Forest Type | | Alt. 1 | Alt. 2 | Alt. 3 |
|---|---|---|---|---|
| **Mechanical Fuels Reduction** | | | | |
| | Red Pine | 79 | 0 | 79 |
| | Spruce-Fir | 6 | 0 | 6 |
| | Aspen | 142 | 0 | 142 |
| | Paper Birch | 122 | 0 | 122 |
| **Hand Pile and Burn** | | | | |
| | Jack Pine | 9 | 0 | 9 |
| | Red Pine | 82 | 0 | 82 |
| | White Pine | 27 | 0 | 27 |
| | Spruce-Fir | 7 | 0 | 7 |
| **Underburn** | | | | |
| | Red Pine | 138 | 0 | 27 |
| **Burn Inclusion** | | | | |
| | Lowland Black Spruce | 3 | 0 | 0 |
| | Open/Non-Forest | 32 | 0 | 13 |
| | **Total:** | **1,689** | **0** | **1,468** |

*All acres shown are estimates based on stand acres. Actual treated acres would be less than the numbers shown due to legacy patches, reserve islands, and other factors.
**Acres typed as "Mixed Pines" were equally distributed between the Red Pine and White Pine forest types.

*Table 2.5. Comparison of Post-Harvest Reforestation Total Acres* and Species by Alternative*

| Reforestation Method | | Alt.1 | Alt.2 | Alt.3 |
|---|---|---|---|---|
| **Natural Regeneration** | | | | |
| | Aspen | 299 | 0 | 198 |
| | Jack Pine | 38 | 0 | 38 |
| | Jack Pine/Black Spruce | 15 | 0 | 15 |
| | Paper Birch | 506 | 0 | 129 |
| | Mixed Pines | 55 | 0 | 0 |
| | White Spruce | 10 | 0 | 10 |
| **Reforestation by Planting**** | | | | |
| | Black Spruce with Tamarack | 26 | 0 | 26 |
| | Jack Pine | 21 | 0 | 21 |
| | Red Pine | 112 | 0 | 0 |
| | Mixed Pines | 547 | 0 | 124 |
| | White Pine | 681 | 0 | 387 |
| | White Pine with White Spruce | 18 | 0 | 0 |
| | White Spruce | 671 | 0 | 504 |
| | White Spruce with Tamarack | 47 | 0 | 47 |
| | White Spruce with Yellow Birch | 296 | 0 | 296 |
| **Reforestation by Direct Seeding** | | | | |
| | Black Spruce | 172 | 0 | 145 |

*All acres shown are estimates based on stand acres. Actual treated acres would be less than the numbers shown due to legacy patches, reserve islands, and other factors.
**All acres would be released if needed. Vegetation competing with the planted species would be cut. Some type of protection from deer browse such as bud caps or spraying deer replant would occur where needed.

*Table 2.6. Comparison of the Road Activities Proposed Under Each Alternative*

| | Alt 1 | Alt 2 | Alt 3 |
|---|---|---|---|
| **Transportation System** | | | |
| Miles Temp. Access, use existing trail | 4.8 | 0 mi | 3.6 |
| Miles Temp. Road, reuse grown in route | 1.4 | | 1.4 |
| Miles Temp. Road, new construction | 5.0 | | 2.8 |
| **Total Miles Temporary Access or Road** | **11.2** | | **7.8** |
| Miles NFSR-convert from unclassified road | 4.9 | 0 mi | 4.9 |
| Miles Special Use – convert from unclassified rd. | 0.3 | | 0.3 |
| **Total Miles of additional NFSR and SU** | **5.2** | | **5.2** |
| Decommission unclassified road | 4.9 | 0 mi | 4.9 |
| Decommission NFSR – OML1 | 0.1 | | 0.1 |
| Decommission NFSR – OML2 | 1.2 | | 1.1 |
| **Total Decommission** | **6.2** | | **6.1** |

## Comparison of Effects of Proposed Treatments by Issue

The following is a summary of the differences in effects between the alternatives. More detailed information on the effects and the analysis done are in Chapter 3.

### Red and White Pine

Under Alternative 2 (No Action), there would be little change to red and white pine stands in the short term. Understory brush and some balsam fir would continue to dominate the understory of pine stands. In the long term it is more likely spruce or balsam fir would become established in the understory versus red or white pine.

Alternative 1 would create 1,443 acres of multi-aged pine stands through harvest, site preparation and/or underburning and 146 acres of other multi-aged stands with a young pine component. It would also have the greatest effect on increasing the size and connectivity of the existing upland mature red and white pine patches through the conversion of 1,035 acres of non-pine stands. Of these acres 939 acres are in the DMRWP Landscape Ecosystem.

Alternative 3 would create 965 acres of multi-aged pine stands, and 146 acres of other multi-aged stands with a young pine component. This alternative would convert 519 acres of non-pine stands to red and white pine. The increase in the size and connectivity of the existing upland mature red and white pine patches would still occur but to a lesser extent. There would be fewer acres of young pine created, and fewer multi-aged stands as well.

### Scenic Quality

Alternative 2 proposes no management activities in the project area, and therefore has no direct effects to the scenery. Proposing 652 acres of even-aged treatments in High Scenic Integrity Objective areas, Alternative 1 would create noticeable short-term direct effects associated with the harvest activities and with post-harvest activities such as slash disposal, site preparation, and re-vegetation. Project design features and mitigation

measures would reduce these effects upon the scenery. Alternative 3 proposes 306 acres of even-aged treatments in High Scenic Integrity Objective areas. There would be fewer noticeable changes to the scenery when compared to Alternative 1.

Alternative 2 proposes no management activities in the project area, and therefore has no direct effects to the scenery along the Flathorn Gegoka Ski Trail system as a result of management actions. Activities associated with Alternative 1 would occur along approximately 2.95 miles (16%) of the ski trail system. Design features and mitigation measures would be effective in reducing the amount of change that would occur to the scenery by maintaining most of the forested environment. Because of the limited extent of the effects, the trail system would still be desirable to skiers and the number of skiers using the trail system is not expected to change. The treatments proposed in Alternative 3 would impact an approximate total of 1.61 miles (8.8%) of the trail system. Because of the limited extent of the effects, the trail system would still be desirable to skiers and the number of skiers using the trail system is not expected to change.

### Fragmentation

*Table 2.7. Comparison of Effects of Proposed Treatments on Significant Issues and Indicators*

| Issue | Alt. 1 | Alt2 | Alt. 3 |
|---|---|---|---|
| Interior forest acres (MIH 12) | 2,165 | 2,531 | 2,219 |
| Number of large upland mature/old forest patches (acres) (MIH 13) | 6 (6,190) | 8 (7,695) | 7 (6,850) |

The trends predicted for cumulative federal actions to MIHs 12 and 13 in Inga South are consistent with the analyses of effects in the Forest Plan EIS (USDA 2004c, 2004, pp. 3.2-61 and 3.2-67). On federal lands within the Superior National Forest, the amount of interior forest (MIH 12) is projected to continue to decrease over the next 10 years with the implementation of future projects. Similarly, the number and acres of large mature upland patches (MIH 13) is predicted to decrease in Spatial Zone 3.

### Threatened and Endangered Species

Alternatives 1, 2 and 3 may effect but are not likely to adversely affect the bald eagle because nest sites are protected from disturbance with mitigations and future nesting habitat would increase. Alternatives 1, 2 and 3 may effect but are not likely to adversely affect the gray wolf and Canada lynx because vegetative habitat is maintained with good distribution and miles of open roads are lowered in the action alternatives.

### Regional Forester Sensitive Species

Alternatives 1 and 3 may impact individuals of heather vole, northern goshawk, boreal owl, olive-sided flycatcher, black-throated blue warbler, bay-breasted warbler, Connecticut warbler, three-toed woodpecker, great gray owl, tiger beetle, mancinus alpine butterfly, Nabokov's blue butterfly, jutta arctic butterfly, and Freija's grizzled skipper, but are not likely to result in a trend toward federal listing or a loss of viability. No impacts to all other terrestrial species are expected.

Alternative 2 (no action) may impact individuals but is not likely to result in a trend to federal listing or a loss of viability for the same species listed above except three-toed woodpecker and Freija's grizzled skipper, as a result of minimal direct, indirect or cumulative effects. No impacts to all other terrestrial species are expected.

All alternatives may impact individuals of brook lamprey, black sandshell or creek heelsplitter but are not likely to cause a trend to federal listing or a loss of viability.

Alternatives 1 and 3 may impact individuals of floating marsh-marigold, fairy slipper, Katahdin sedge, New England sedge, ram's-head lady's slipper, linear-leaved sundew, neat spike rush, moor rush, Vasey's rush, auricled twayblade, American shoregrass, large-leaved sandwort, fall dropseed muhly, dwarf water lily, Canada ricegrass, club-spur orchid, small shinleaf, cloudberry, northern bur-reed, awlwort, Canada yew, lance-leaved violet, barren strawberry, Arctoparmelia centrifuga, Arctoparmelia subcentrifuga, Caloplaca parvula, Certraria aurescens, Cladonia wainoi, Menegazzia terebrata, Peltigera venosa, Pseudocyphellaria crocata, Ramalina thrausta, Sticta fuliginosa, or Usnea longissima but are not likely to cause a trend to federal listing or loss of viability.

Alternative 2 may impact individuals of pointed moonwort, common moonwort, Michigan moonwort, pale moonwort, ternate grapefern, or least moonwort but is not likely to cause a trend to federal listing or loss of viability.

Alternative 2 would have no impacts to alpine milkvetch, swamp beggar-ticks, floating marsh-marigold, fairy slipper, Katahdin sedge, New England sedge, ram's-head lady's slipper, linear-leaved sundew, neat spike rush, moor rush, Vasey's rush, auricled twayblade, American shoregrass, large-leaved sandwort, fall dropseed muhly, dwarf water lily, Canada ricegrass, club-spur orchid, small shinleaf, cloudberry, northern bur-reed, awlwort, Canada yew, lance-leaved violet, barren strawberry, Arctoparmelia centrifuga, Arctoparmelia subcentrifuga, Caloplaca parvula, Certraria aurescens, Cladonia wainoi, Menegazzia terebrata, Peltigera venosa, Pseudocyphellaria crocata, Ramalina thrausta, Sticta fuliginosa, or Usnea longissima.

### Non-Native Invasive Species

All of the alternatives have the potential to increase the spread of NNIS in the project area. Alternative 1 has a slightly higher risk of NNIS spread than Alternative 3, and both Alternatives 1 and 3 have a higher risk than the risk posed by Alternative 2. Under the action alternatives, the risk of spread of NNIS would be minimized by mitigations described in Appendix D of this document.

## Comparison of How Alternatives Meet Purpose and Need

**1. The purpose of this project is to increase acres of red and white pine in large patches and to create more multi-aged stands.**

Alternative 1 would convert 1,035 acres of hardwood (aspen and birch) forest types to red and white pine, while Alternative 3 would convert 519 acres. These acres would

eventually add to the size and connectivity of the existing mature upland red and white pine patches. Alternative 1 would create 1,443 acres of multi-aged pine stands through harvest, site preparation and/or underburning and 146 acres of other multi-aged stands with a young pine component. Alternative 3 would create 965 acres of multi-aged pine stands, and 146 acres of other multi-aged stands with a young pine component. The multi-aged character would increase the resilience and longevity of these pine stands by establishing a pine understory to replace the canopy trees as they naturally die off. Alternative 2 (no action) would not increase the acres of red and white pine; it would not increase the acres of multi-aged pine stands.

**2. The purpose of this project is to move towards landscape ecosystem objectives for age class, composition and within-stand diversity, specifically by increasing acres of young forest and acres of conifer.**

Dry-Mesic Red and White Pine LE

*Table 2.8. Vegetation Composition Within the Dry-Mesic Red and White Pine LE of the Inga South Area in 2006 (Existing Condition) and by Alternative in 2015.**

| Upland Forest Type | 2006 | 2015 | | |
|---|---|---|---|---|
| | Existing Condition | Alt 1 | Alt 2 No Action | Alt 3 |
| Jack Pine | 971 | 896 | 930 | 951 |
| Red Pine | 4,256 | 4,094 | 4,256 | 4,084 |
| White Pine | 2,642 | 3,049 | 2,642 | 3,013 |
| Mixed Pines | 546 | 1,241 | 546 | 866 |
| Spruce-Fir | 1,696 | 3,016 | 2,930 | 3,121 |
| Aspen | 8,054 | 6,845 | 7,595 | 7,129 |
| Paper Birch | 2,843 | 1,866 | 2,109 | 1,844 |
| **Total Acres:** | **21,008** | **21,008** | **21,008** | **21,008** |

*Only those forest types that would be affected by the proposed activities are displayed.

In the Dry-Mesic Red and White Pine LE, there would be an increase in the presence of both red pine and white pine across the landscape. The number of acres of forest typed as red pine would decrease slightly in the two action alternatives because some of the stands would be typed as mixed pine after treament. White pine acres would increase in all action alternatives. Spruce-fir would increase in all alternatives through both natural succession and planting. In the action alternatives there would be limited conversion of hardwood (aspen and birch) stands to the spruce-fir type. Acres of aspen and birch decrease across the landscape ecosystem in this area through both natural processes and through conversion to conifer.

*Table 2.9. Age Class Composition within the Dry-Mesic Red and White Pine LE in 2006 (Existing Condition) and by Alternative in 2015.*

| Age Class | 2006 | 2015 | | |
|---|---|---|---|---|
| | Existing Condition | Alt. 1 | Alt.2 | Alt. 3 |
| 0-9 | 404 | 2,664 | 0 | 1,530 |
| 10-49 | 9,172 | 9,191 | 9,732 | 9,417 |
| 50-99 | 6,018 | 4,600 | 5,703 | 5,023 |
| 100-139 | 5,356 | 4,413 | 5,433 | 4,898 |
| 140+ | 58 | 139 | 139 | 139 |
| **Total Acres:** | **21,008** | **21,008** | **21,008** | **21,008** |

In the Dry-Mesic Red and White Pine LE, both of the action alternatives would substantially increase the number of acres of young forest. Harvest methods such as clearcutting, partial cutting with retention of 30BA, and seed tree harvests would be the tools used to create young forest. The no-action alternative would not result in the creation of young forest acres. The oldest age class would increase in all alternatives, as would the 10-49 age class. The 50-99 age class would decrease in all alternatives but would decrease less in Alternative 2 (no-action alternative).

Tables 2-10 and 2-11 show the cumulative changes in age class and composition for the DMRWP LE forest-wide. The figures are projected to 2014 because that is the end of the first decade of the Forest Plan, allowing a comparison of whether objectives are being met. The figures include past, present and reasonably future actions with the landscape ecosystem and succession as modeled under the Forest Plan FEIS. Virginia, Dunka and the Proposed Action for Echo Trail and the Modified Proposed Action for Inga South are included. Approximately 45% of the DMRWP LE has had actions or decisions completed for this decade.

*Table 2-10. Cumulative Effects to Vegetation Composition within the Dry-Mesic Red and White Pine Landscape Ecosystem Forestwide.*

| Upland Forest Type | Existing Condition 2006 (acres) | Condition in 2014 (acres) |
|---|---|---|
| Jack Pine | 16,352 | 16,199 |
| Red Pine | 23,555 | 23,665 |
| White Pine | 15,065 | 16,419 |
| Mixed Pines | 630 | 1,245 |
| Spruce-Fir | 14,983 | 21,619 |
| Upland Northern Hardwoods | 2,322 | 2,305 |
| Aspen | 98,812 | 91,701 |
| Paper Birch | 17,219 | 15,748 |
| **Total:** | **188,938** | **188,901** |

*Table 2-11. Cumulative Effects to Age-Class Composition within the Dry-Mesic Red and White Pine Landscape Ecosystem Forestwide.*

| Age Class | Existing Condition 2006 (acres) | Condition in 2014 (acres) |
|---|---|---|
| 0-9 | 15,727 | 8,462 |
| 10-49 | 59,980 | 79,949 |
| 50-99 | 90,621 | 71,504 |
| 100-139 | 22,066 | 28,103 |
| 140+ | 544 | 882 |
| **Total:** | **188,938** | **188,901** |

*Table 2.12. Changes in Tree Species Diversity from Existing Condition Compared to Forest Plan Objectives for the Dry-Mesic Red and White Pine Landscape Ecosystem.*

| Species | Forest Plan Objective | Alt 1 | Alt 2 (No Action) | Alt 3 |
|---|---|---|---|---|
| Jack Pine | Increase | Decrease | Decrease | Decrease |
| Red Pine | Increase | Decrease | Maintain | Decrease |
| White Pine | Increase | Increase | Maintain | Increase |
| Spruce-Fir | Increase | Increase | Increase | Increase |
| White Cedar | Increase | Maintain | Maintain | Maintain |
| Aspen | Decrease | Decrease | Decrease | Decrease |
| Paper Birch | Maintain | Decrease | Decrease | Decrease |

Mesic Birch/Aspen/Spruce/Fir LE

Less than 1% of the project area is in the Mesic Birch/Aspen/Spruce/Fir LE and proposed treatments affect age class or composition on less than 400 acres; therefore the changes are only summarized here. Complete tables and calculations are included in the project record. This landscape ecosystem currently has 289 acres in the young (0-9) age class. Alternative 1 would create about 373 acres of young, while alternative 3 would create about 291 acres. The No Action alternative would result in no new young forest being created. Aspen and birch would decrease slightly under all alternatives (less than 156 acres) and spruce fir and mixed pines would increase slightly.

Lowland Conifer LE

There are about 4,466 acres of all Lowland Conifer LE's in the project. Since the majority of the Lowland Conifer LE's are in Lowland Conifer -A, this analysis groups all Lowland Conifer LE's together as Lowland Conifer-A. The action alternatives would create 116 (Alternative 1) and 89 (Alternative 3) acres of young forest. The young forest will be created by harvesting in the 100-139 age class. The No Action Alternative would not create any young forest. Composition would not change under any alternative. Complete tables and calculations are included in the project record.

**3. The purpose of this project is to improve/maintain habitat for viable populations of native and desired non-native species by moving toward Management Indicator Habitats (MIH) objectives.**

MIHs are identified in the Forest Plan to represent the types, ages, amounts, and function of habitats within Landscape Ecosystems (LE) for evaluating a broad spectrum of species. "A key assumption we apply in evaluating MIHs 1-10 is that ecological conditions are likely to provide for species viability and maintain well-distributed habitats if there is an adequate representation of the range of habitats that would have been present under the range of natural variability" (USDA 2004c, p. 3.3.1-2). Landscape ecosystems usually cover a broader geographic area than a project area such as Inga South and therefore, landscape ecosystem analyses occur at the landscape-level. At the project-level, MIHs may or may not meet FP objectives.
The effects to MIHs within the portion of the DMRWP LE occurring in the project area are shown in Table 2.13. The project area analysis used a 10-year timeframe, to 2015. Cumulative effects to the MIHs were analyzed using 2014 (rather than 2015) to allow for comparisons to Forest Plan predictions and identify whether objectives are being accomplished. The portion of the Mesic Birch/Aspen/Spruce/Fir and Lowland Conifer LEs occurring within the project area encompass <1 and 16 percent, respectively, of their entire LE and proposed treatments would alter only minimal amounts of habitat; therefore they are not discussed further.

*Table 2.13. Management Indicator Habitats for the Dry-Mesic Red and White Pine LE Within the Inga South Project Area.*

| Management Indicator Habitat (MIH) | 2006 Existing Condition | | Condition in 2015 | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Alternative 1 | | Alternative 2 | | Alternative 3 | |
| | Acres | %* | Acres | % | Acres | % | Acres | % |
| **MIH 1: Upland Forest** | | | | | | | | |
| Young | 404 | 2 | 2,665 | 13 | 0 | 0 | 1,531 | 7 |
| Pole | 9,028 | 43 | 9,195 | 44 | 9,737 | 46 | 9,422 | 45 |
| Mature | 7,178 | 34 | 5,423 | 26 | 5,978 | 29 | 5,615 | 27 |
| Old/Old Growth/Multi-aged | 4,398 | 21 | 3,723 | 18 | 5,292 | 25 | 4,440 | 21 |
| **Total Acres:** | 21,007 | 100 | 21,007 | 100 | 21,007 | 100 | 21,008 | 100 |
| **MIH 4: Aspen-Birch and Mixed Aspen-Conifer Forest** | | | | | | | | |
| Young | 136 | 1 | 812 | 9 | 0 | 0 | 354 | 4 |
| Pole | 5,484 | 50 | 5,187 | 60 | 5,251 | 54 | 5,187 | 58 |
| Mature | 2,360 | 22 | 1,364 | 16 | 1,905 | 20 | 1,535 | 17 |
| Old/Old Growth/Multi-aged | 2,916 | 27 | 1,349 | 15 | 2,546 | 26 | 1,897 | 21 |
| **Total Acres:** | 10,896 | 100 | 8,712 | 100 | 9,703 | 100 | 8,973 | 100 |
| **MIH 5: Upland Conifer Forest** | | | | | | | | |
| Young | 268 | 3 | 1,852 | 15 | 0 | 0 | 1,177 | 10 |
| Pole | 3,544 | 35 | 4,009 | 33 | 4,486 | 40 | 4,235 | 35 |
| Mature | 4,817 | 48 | 4,061 | 33 | 4,073 | 36 | 4,080 | 34 |
| Old/Old Growth/Multi-aged | 1,482 | 15 | 2,374 | 19 | 2,746 | 24 | 2,543 | 21 |
| **Total Acres:** | 10,111 | 100 | 12,295 | 100 | 11,304 | 100 | 12,035 | 100 |

*Table 2.13. Management Indicator Habitats for the Dry-Mesic Red and White Pine LE Within the Inga South Project Area.*

| Management Indicator Habitat (MIH) | 2006 Existing Condition | | Condition in 2015 | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Alternative 1 | | Alternative 2 | | Alternative 3 | |
| | Acres | %* | Acres | % | Acres | % | Acres | % |
| **MIH 6: Upland Spruce-Fir Forest** | | | | | | | | |
| Young | 106 | 6 | 846 | 28 | 0 | 0 | 679 | 22 |
| Pole | 645 | 38 | 1,291 | 43 | 1,776 | 61 | 1,518 | 49 |
| Mature | 472 | 28 | 658 | 22 | 721 | 24 | 658 | 21 |
| Old/Old Growth/Multi-aged | 473 | 28 | 221 | 7 | 432 | 15 | 266 | 9 |
| **Total Acres:** | 1,695 | 100 | 3,017 | 100 | 2,930 | 100 | 3,121 | 100 |
| **MIH 7: Red and White Pine Forest** | | | | | | | | |
| Young | 147 | 2 | 950 | 11 | 0 | 0 | 441 | 6 |
| Pole | 2,416 | 32 | 2,329 | 28 | 2,321 | 31 | 2,329 | 29 |
| Mature | 4,007 | 54 | 3,127 | 37 | 3,076 | 41 | 3,147 | 39 |
| Old/Old Growth/Multi-aged | 875 | 12 | 1,978 | 24 | 2,047 | 28 | 2,047 | 26 |
| **Total Acres** | 7,444 | 100 | 8,383 | 100 | 7,444 | 100 | 7,963 | 100 |
| **MIH 8: Jack Pine Forest** | | | | | | | | |
| Young | 15 | 2 | 57 | 6 | 0 | 0 | 57 | 6 |
| Pole | 484 | 50 | 389 | 43 | 389 | 42 | 389 | 41 |
| Mature | 225 | 23 | 275 | 31 | 275 | 29 | 275 | 29 |
| Old/Old Growth/Multi-aged | 247 | 25 | 175 | 19 | 266 | 29 | 230 | 24 |
| **Total Acres:** | 971 | 100 | 896 | 100 | 930 | 100 | 951 | 100 |
| **MIH 10: Upland Mature Riparian Forest** | | | | | | | | |
| Mature | 629 | 53 | 448 | 51 | 440 | 43 | 454 | 46 |
| Old/Old Growth/Multi-aged | 550 | 47 | 428 | 49 | 595 | 57 | 534 | 54 |
| **Total Acres:** | 1,178 | 100 | 876 | 100 | 1,035 | 100 | 988 | 100 |

*Percentages may add to more than 100% due to rounding errors.

*Table 2.14. Cumulative Effects to Management Indicator Habitats (MIH) on the Dry-Mesic Red and White Pine Landscape Ecosystem.*

| Management Indicator Habitat | 2006 Existing Condition | | Condition in 2014 (Alt. 1) | | Forest Plan Objective Decade One* |
|---|---|---|---|---|---|
| | Acres | % | Acres | % | |
| **MIH 1: Upland Forest** | | | | | |
| Young | 14,357 | 8 | 8,462 | 4 | - |
| Pole | 66,210 | 35 | 78,487 | 42 | n/a |
| Mature | 51,649 | 27 | 38,369 | 20 | - |
| Old/Old Growth and Multi-Aged | 57,322 | 30 | 63,582 | 34 | + |
| **Total Acres:** | **188,938** | **100** | **188,901** | **100** | |
| **MIH 4: Aspen-Birch and Mixed Aspen-Conifer Forest** | | | | | |
| Young | 8,725 | 7 | 4,451 | 4 | – |
| Pole | 42,891 | 37 | 47,431 | 44 | n/a |
| Mature | 23,210 | 20 | 12,371 | 12 | – |
| Old/Old Growth and Multi-Aged | 41,205 | 36 | 43,195 | 40 | - |
| **Total Acres:** | **116,031** | **100** | **107,449** | **100** | |

*Table 2.14. Cumulative Effects to Management Indicator Habitats (MIH) on the Dry-Mesic Red and White Pine Landscape Ecosystem.*

| Management Indicator Habitat | 2006 Existing Condition | | Condition in 2014 (Alt. 1) | | Forest Plan Objective Decade One* |
|---|---|---|---|---|---|
| | Acres | % | Acres | % | |
| **MIH 5: Upland Conifer Forest** | | | | | |
| Young | 5,619 | 8 | 4,011 | 5 | − |
| Pole | 23,032 | 33 | 30,882 | 39 | n/a |
| Mature | 26,434 | 37 | 23,914 | 30 | − |
| Old/Old Growth and Multi-Aged | 15,500 | 22 | 20,340 | 26 | + |
| **Total Acres:** | **70,585** | **100** | **79,147** | **100** | |
| **MIH 6: Upland Spruce-Fir Forest** | | | | | |
| Young | 624 | 4 | 842 | 4 | - |
| Pole | 4,521 | 30 | 9,705 | 45 | n/a |
| Mature | 7,478 | 50 | 5,537 | 26 | - |
| Old/Old Growth and Multi-Aged | 2,360 | 16 | 5,535 | 25 | + |
| **Total Acres:** | **14,983** | **100** | **21,619** | **100** | |
| **MIH 7: Red and White Pine Forest** | | | | | |
| Young | 4,446 | 11 | 2,265 | 5 | - |
| Pole | 12,573 | 32 | 16,071 | 39 | n/a |
| Mature | 17,791 | 45 | 16,435 | 40 | - |
| Old/Old Growth and Multi-Aged | 4,440 | 12 | 6,558 | 16 | + |
| **Total Acres:** | **39,250** | **100** | **41,330** | **100** | |
| **MIH 8: Jack Pine Forest** | | | | | |
| Young | 549 | 3 | 904 | 6 | + |
| Pole | 5,938 | 36 | 5,106 | 31 | n/a |
| Mature | 1,165 | 7 | 1,942 | 12 | + |
| Old/Old Growth and Multi-Aged | 8,700 | 54 | 8,247 | 51 | − |
| **Total Acres:** | **16,352** | **100** | **16,199** | **100** | |

**Note: the Forest Plan does not specify objectives for the pole age classes.*

Changes to DMRWP MIHs 4 through 7 in the project area, as shown in Table 2.13, and comparison of Alternative 1 to trends predicted in the Forest Plan, as shown in Table 2.14, are discussed below. MIHs 1, 8, and 10 are not discussed for the following reasons: MIH 1 is a combination of MIHs 2 through 8 and relevant information is covered in those individual MIH discussions and MIHs 8 and 10 only occur in minor amounts in the project area and any proposed treatments would not significantly reduce habitat.

MIH 4: There would be an overall decrease in total acres of aspen-birch and mixed aspen-conifer forest in MIH 4. The amount of young aspen-birch and mixed aspen-conifer forest would decrease to zero under Alternative 2 due to succession and would increase under both action alternatives due to harvest/regeneration treatments. The amount of mature and old/old growth forest would decrease under all alternatives; under Alternative 2 due to succession and under the action alternatives due to harvest treatments and succession.

MIH 5: Overall, there would be an increase in total acres of upland conifer forest in MIH 5. The amount of young upland conifer forest would decrease to zero under Alternative 2

due to succession and increase under both action alternatives due to harvest and regeneration treatments. Under all alternatives, there would be similar decreases in mature upland conifer but old/old growth would increase considerably.

MIH 6: There would be an overall increase in total acres of spruce-fir forest in MIH 6. The amount of young upland spruce-fir forest would decrease to zero under Alternative 2 due to succession and increase substantially under both action alternatives due to harvest and regeneration treatments. The amount of mature and old/old growth forest would decrease under all alternatives; under Alternative 2 due to succession and under the action alternatives due to harvest treatments and succession.

MIH 7: Overall, under Alternative 2, there would be no change in total acres of red and white pine, whereas under both action alternatives, there would be increases of red and white pine in MIH 7. The amount of young red and white pine forest would decrease to zero under Alternative 2 due to succession and increase under both action alternatives due to harvest and regeneration treatments. Under all alternatives, there would be similar decreases in mature red and white pine forest; however, there would be increases in old/old growth as those mature stands move into old/old growth due to succession.

By 2014, all MIH age groupings in the DMRWP LE are predicted to trend in the same direction as Forest Plan MIH objectives except for the amount of old plus-aged aspen-birch and mixed aspen-conifer (MIH 4). However, the amount would be only a slight increase in acres rather than a decrease identified in FP objectives. The amount of young upland spruce-fir forest (MIH 6) would increase slightly but the proportion of young to overall acres would slightly decrease (rounding of percentages resulted in 4% for both 2006 and 2014), thereby trending in the direction of the FP.

**4. The purpose of this project is to reduce hazardous fuels in high risk areas and improve condition class of vegetation in the project area.**

Under both action alternatives, fuel reduction would occur on 624 acres of high hazard and risk areas. The fuel hazards are in high priority areas located near urban interface areas. Alternative 1 treats more acres of high and moderate fuel hazards and risks (1,348 acres of high hazard/risk and 2,360 acres of moderate hazard/risk). Alternative 3 treats approximately half (624 of high hazard/risk and 1,580 acres of moderate hazard/risk) of the high and moderate fuel hazard and risk areas compared to Alternative 1. Alternative 3 treatments are focused adjacent to private property and access routes. Alternative 1 treatments expand on Alternative 3 treatments to create a wider buffer for potential wildfire effects. The acres not treated under Alternative 3 that are treated under Alternative 1 are harvest areas. These areas are generally not adjacent to private property, but within 0.5 mile of private property and travel routes. Alternative 3 treatments do treat all high hazard and risk areas adjacent to private property that were identified as a concern for the project area. Alternative 3 treatments treat hazard and risk areas that would provide additional buffers for potential wildfires. Under Alternative 2 No Action, fuels would continue to accumulate throughout the project area.

**5. The purpose of this project is to provide sustainable timber products.**

No Action (Alternative 2) would not provide timber products from this area at this time. It does not preclude providing timber products in the future. Alternative 1 would provide approximately 14.5 MMBF and Alternative 3 would provide approximately 9.0 MMBF. Harvesting the timber stands proposed in the action alternative now offers immediate economic return to federal and local governments and to the timber industry. Harvesting in Alternative 1 or 3 would be a continuation of the economic returns from harvest similar to the return in the past 10 years in the project area. Further discussion of economic impacts is presented in Appendix E.

**6. The purpose of this project is to provide an adequate transportation system for managing the National Forest, to provide appropriate access to non-federal land, and other needs.**

Table 2.6 displays the differences in road management by alternative. Both alternatives convert 5.2 miles of unclassified roads to National Forest System Roads or special use roads. Alternative 1 and 3 decommission 6.2 and 6.1 miles of unclassified road respectively. Under Alternative 2 (no action), unclassified roads would remain unclassified.